FINAL ENVIRONMENTAL ASSESSMENT, REGULATORY IMPACT REVIEW, AND FINAL REGULATORY FLEXIBILITY ANALYSIS FOR A PROPOSED RULE TO IMPLEMENT PROVISIONS OF SECTION 101(a)(2)(A) OF THE MARINE MAMMAL PROTECTION ACT FOR IMPORTS OF FISH AND FISH PRODUCTS

United States Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Office of International Affairs

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Proposed Rule to Implement Provisions of Section 101(A)(2)(A) of the Marine Mammal Protection Act for Imports of Fish and Fish Products

Actions: Establish the standards by which the United States will assess marine mammal incidental mortality and serious injury in the fisheries of nations from which the United States imports fish and fish products; establish procedures for ensuring those standards are met; establish procedures for developing recommendations to the Secretary of Treasury regarding import prohibitions.

Type of Statement: Final Environmental Assessment and Regulatory Impact Review

Lead Agency: National Marine Fisheries Service

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Abstract:

The Marine Mammal Protection Act (MMPA) contains provisions to address the incidental mortality and serious injury of marine mammals in both domestic and foreign commercial fisheries. With respect to foreign fisheries, section 101(a)(2) of the MMPA (16 U.S.C. 1371(a)(2)) authorizes a ban on importation of fish or fish products "caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of United States standards." Two organizations submitted a petition for rulemaking under the Administrative Procedure Act to ban the importation of swordfish and swordfish products from nations that have failed to provide reasonable proof of the effects on ocean mammals of the commercial fishing technology used to catch swordfish. This action would encompass all fish and fish products, including highly processed products, not only swordfish, and establish a standard to evaluate whether importing nations have measures or a regulatory program, comparable in effectiveness, governing incidental mortality and serious injury of marine mammals in commercial fisheries. Background information on the issues and a description of the alternatives being considered for this rulemaking are described in this environmental assessment.

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ENVIRONMENTAL ASSESSMENT

1.0 INTRODUCTION

In March 2008 the Center for Biological Diversity and Turtle Island Restoration Network petitioned the National Marine Fisheries Service (NMFS) to initiate rulemaking under the Marine Mammal Protection Act (MMPA)(16 U.S.C. 1361) to ban imports of swordfish and swordfish products "from all countries that have failed to provide proof of the effects on marine mammals of the commercial fishing technology they use to catch swordfish." (*See*, Petition at 1, Appendix A). The MMPA requires such action: "The Secretary of the Treasury shall ban the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of United States standards." (16 U.S.C. 1371(a)(2)).

Import regulations related to incidental take of marine mammals have been applied to tuna caught in association with dolphins (50 C.F.R. 216.90-216.95 and 300.20 – 300.25), to any fish products caught with high seas driftnets (50 C.F.R. 300.31), and could potentially be applied to nations who fail to take sufficient action to address bycatch of protected living marine resources (50 C.F.R. 300.203 – 300.205). The proposed rule that is the subject of this assessment is informed in large part by approaches from the aforementioned regulations, as well as regulations governing incidental take of marine mammals in U.S. fisheries (50 C.F.R. Part 229).

1.1 PURPOSE AND NEED FOR ACTION

The purpose of the proposed rule is to implement section 101(a)(2) of the MMPA by defining U.S. standards. The import provision has been a long-standing statutory requirement that needed agency action for rulemaking and standards. The proposed rule also recommends procedures for a nation to provide reasonable proof of comparability, to document that it has prohibited the intentional mortality and serious injury of marine mammals in the course of commercial fishing operations, calculated a limit on allowable incidental mortality and serious injury of marine mammals in fisheries, and has reduced the incidental mortality and serious injury of marine mammals in these fisheries to levels at or below that limit or implemented a regulatory program comparable in effectiveness to the U.S. regulatory program.

NMFS elected to expand the proposed rule to encompass all fish and fish products, not just swordfish, because the provisions of section 101(a)(2) apply broadly to imports from foreign fisheries that have harmful interactions with marine mammals. In response to public comment, the rule has omitted an exemption for highly processed products, which now are included in the definition of fish and fish products.

This environmental assessment was prepared to evaluate the potential impacts on the environment of implementing the proposed regulations. The assessment analyzes a no-action alternative, four alternatives to define U.S. standards, and the agency proposal for

a regulatory approach to certify comparability after an initial exemption period of five years.

1.2 NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act (NEPA) (42 U.S.C. 4321, et seq.) was enacted in 1969 and requires consideration of environmental issues in federal agency planning and decision-making. NEPA requires federal agencies to evaluate the impacts of major federal actions on the human environment. The procedural provisions of NEPA, which outline the responsibilities of federal agencies, are provided in the Council on Environmental Quality NEPA regulations, 40 CFR Parts 1500-1508. NOAA has published procedures for implementing NEPA in NOAA Administrative Order 216-6 (NAO 216-6). NAO 216-6 also reiterates Department of Commerce provisions of Executive Order 12114, Environmental Effects Abroad of major Federal Actions.

This Environmental Assessment (EA) is prepared in accordance with NEPA, its implementing regulations, and NAO 216-6.

Under NAO 216-6, the promulgation of regulations that are procedural and administrative in nature is subject to a categorical exclusion from the requirement to prepare an Environmental Assessment. However, NMFS decided to do an EA for this action in order to facilitate public involvement in the development of the proposed national standard and procedures. This EA provides the public with a context for reviewing the proposed action by exploring the impacts on marine mammals associated with fishing, the methods the United States has used to reduce those impacts, and a comparison of how approaches under the MMPA and the High Seas Driftnet Moratorium Protection Act provisions of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 would affect importing nations. NMFS published an advance notice of proposed rulemaking (75 Fed. Reg. 22731 (April 30, 2010)) for this action and solicited public comment on the development of these procedures and on the types of information to be considered in the process.

The proposed rule incorporates comments that NMFS received from 30 nations, the Marine Mammal Commission, federal agencies and numerous environmental and fishing industry organizations on the advance notice of proposed rulemaking (75 Fed. Reg. 22731 (April 30, 2010)).

1.3 BACKGROUND

To provide context for the proposed action, background information on bycatch and current domestic laws is summarized in this section. Note that environmental assessments and environmental impact statements on some aspects of bycatch and incidental take of marine mammals have been prepared for other rulemakings. These documents, as well as related reports to Congress, technical memoranda, action plans, and documents prepared as background for the proposed rule can be found in Appendices A – L.

Congressional action to promote international wildlife conservation in general and protection of marine mammals in particular is documented in a background paper

published as part of an EA of the potential impacts of regulations establishing certification procedures pursuant to the High Seas Driftnet Fishing Moratorium Protection Act. (NOAA 2010, Appendix B) Portions of that document related to marine mammals are summarized here and incorporated by reference.

The MMPA places a moratorium on taking (harassment, hunting, capture, killing or attempt thereof) marine mammals, then provides a system of exceptions, exemptions, permits, and programs to allow takes for purposes of scientific research, public display, photography for educational or commercial purposes, or enhancing the survival or recovery of a species or stock. In addition, the MMPA authorizes the incidental take of marine mammals in commercial fishing operations in U.S. waters under limited conditions. Section 101(a)(2) of the MMPA authorizes limited incidental taking of marine mammals by U.S. fishermen in the course of commercial fishing pursuant to a permit issued by NMFS, in conformity with and governed by certain statutory criteria in sections 103, 104, and 118 and implementing regulations. The Act's stated goal is that the incidental kill or serious injury of marine mammals in the course of commercial fishing be reduced to insignificant levels approaching zero. (16 U.S.C 1371 (a)(2), 1387 (a)(1) and (b))

The Congress acknowledged in passing the MMPA that "unilateral action by the United States" affecting any species or subspecies of marine mammals would be ineffective without international cooperation. (S. Rep. 92-863, 2nd Sess. at 10 (1972)).

Section 101(a)(2) of the MMPA states: "The Secretary of Treasury shall ban the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of U.S. standards." Subparagraph (A) requires the Secretary to "insist on reasonable proof from the government of any nation from which fish or fish products will be exported to the U.S. of the effects on ocean mammals of the commercial fishing technology in use for such fish or fish products exported from such nation to the U.S." (16 U.S.C. 1371 (a)(2)(A)).

Section 102 (c)(3) states that "It is unlawful to import into the United States…any fish, whether fresh, frozen, or otherwise prepared, if such fish was caught in a manner which the Secretary has proscribed for persons subject to the jurisdiction of the United States, whether or not any marine mammals were in fact taken incident to the catching of the fish." (16 U.S.C. 1372(c)(3)).

The import ban provisions have been used to address incidental takes of dolphins in tuna fisheries. A description of U.S. actions to reduce the number of dolphins killed in the course of tuna fishing operations in the Eastern Pacific Ocean and the regulatory history associated with those measures is detailed in the supplementary material to the proposed rule and in a NOAA Technical Memorandum (NOAA 2007, Appendix C), incorporated here by reference.

The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 amends the High Seas Driftnet Fishing Moratorium Protection Act (Moratorium

Protection Act) to require the United States to take action to address illegal, unreported, or unregulated (IUU) fishing and the bycatch of protected living marine resources (PLMRs). The definition of PLMRs includes marine mammals. To help reduce bycatch in international fisheries, the Moratorium Protection Act includes actions to encourage the use of bycatch reduction methods comparable in effectiveness to methods used by U.S. fishermen in high seas fisheries, in order to protect certain vulnerable species of concern to the United States, such as marine mammals. Appendix D shows the status of living marine resources shared by the United States or subject to treaties or agreements to which the United States is party.

Specifically, the Moratorium Protection Act requires the Secretary of Commerce to identify in a biennial report to Congress those foreign nations whose vessels are engaged in fishing activities that result in bycatch of PLMRs. The Moratorium Protection Act also requires the establishment of procedures to certify whether nations identified in the biennial report are taking appropriate corrective actions to address bycatch of PLMRs by fishing vessels of that nation. Identified nations that do not receive a positive certification from the Secretary of Commerce could be subject to measures under the High Seas Driftnet Fisheries Enforcement Act (16 U.S.C. 1826a), such as the denial of port privileges, prohibition on the importation of certain fish or fish products into the United States, or other measures. A similar procedure is required for bycatch of PLMRs in which the United States shares interest and that occur beyond the U.S. Exclusive Economic Zone.

After a process that gives the international community time to respond to notification of their identification, or to amend existing treaties or develop new instruments as appropriate, the Secretary of Commerce must certify whether the nation has provided documentary evidence of the adoption of a regulatory program governing the conservation of the PLMR that is comparable to that of the United States, and has established a management plan containing requirements that will assist in gathering species-specific data to support international stock assessments and conservation enforcement efforts for protected living marine resources. (50 C.F.R. 300.203 – 300.205; *See also,* 16 U.S.C. 1826(k)(c)(1)). If the Secretary does not positively certify that the government of the identified nation has taken appropriate corrective action, the Secretary of the Treasury is authorized to take a number of actions, including prohibiting the importation of certain fish or fish products from that nation.

In addition, the MMPA requires the Secretary of Commerce, working through the Secretary of State, to initiate negotiations for development of bilateral or multilateral agreements with other nations for the protection and conservation of marine mammals.

The International Dolphin Conservation Program Act and the Pelly Amendment to the Fishermen's Protective Act (16 U.S.C. 1441 *et seq.*, 22 U.S.C. 1978) call for nations to comply or act in a manner consistent with international fisheries management measures, and provide for various types of trade-restrictive measures against nations whose vessels engage in activities that undermine the effectiveness of international fisheries conservation measures or otherwise engage in prohibited activities.

A related enforcement tool is the Lacey Act, which prohibits interstate and foreign trafficking in fish or wildlife taken in violation of domestic or foreign law (*See* 16 U.S.C.

3371-3378). The Act also prohibits the import, export, transport, sale, possession, or purchase of any fish or wildlife taken, possessed, transported, or sold in violation of any law, treaty, or regulation of the United States or in violation of any Indian tribal law. The Lacey Act provides for both civil and criminal sanctions.

1.4 REGULATORY HISTORY

NMFS implemented Section 101(A)(2) of the MMPA through the general permit governing the incidental take of marine mammals in U.S. fisheries. As the general permit provision evolved, the regulatory focus of Section 101(A)(2) narrowed to cover only yellowfin tuna harvested with purse seine nets in the eastern tropical Pacific and subsequently, fish products harvested on the high seas with a large-scale driftnet.

Throughout the 1970s and 1980s, in order to import fish and fish products into the United States, the U.S. standards (referenced in Section 101 (a)(2) of the MMPA) were two-part. The fish could not be caught: (1) using a fishing technology that results in a rate of serious injury or death to marine mammals exceeding that resulting from U.S. fishing operations authorized under a general permit; or (2) in a manner prohibited for U.S. fishermen (Section 102(c)(3)).

A 1988 court decision found that NOAA could not issue incidental take permits authorizing incidental takes in domestic fisheries for the majority of marine mammal populations. (*See Kokechik Fishermen's Ass'n v Secretary of Commerce,* 839 F.2d (D.C. 1988)). By 1989, the general permit system for domestic fisheries was replaced by an interim exemption from the MMPA's take prohibition, allowing domestic fisheries to operate while the United States developed an approach governing incidental mortality and serious injury of marine mammals in its domestic commercial fisheries. The 1991 regulations implementing the interim exemption effectively removed the standard for all other fisheries that exported fish and fish products to the United States. Table 1 summarizes the changes in regulation over the period. A detailed regulatory history is provided in Appendix E.

Table 1. Regulatory changes in U.S. standards — import of fish and fish products 1974 - 1991

Year	Action	Standard	Imports Allowed	Source
1974	MMPA implementation	Prohibited by MMPA rules; or fishing technique prohibited for person under U.S. jurisdiction	Incidental mortality and serious injury rate equal to or less than U.S. operations; documentation; alternative certification that specified flag vessels in conformance with U.S. regs.	(39 FR 32117, Sept. 5, 1974)
1975	Import ban on yellowfin tuna, halibut, salmon, sardines/pilchards from South Africa	Fishing operation resulted in death or injury	If documentation that operations meet the standard.	(40 FR 56899, Dec. 5, 1975)
1977	Fisheries Certificate of Origin	Rate of death or injury in fishing operation does not exceed U.S. rate; not caught in manner prohibited for U.S.	If responsible official or master of vessel makes statement that operations meet the standard.	(42 FR 12010, March 1, 1977)
1980	ETP tuna regs	Specific operational standard	Certification still required for	(45 FR 72194,

	modified; sardines removed from ban list	for ETP yellowfin	salmon and halibut	Oct. 31, 1980)
1986	Fisheries Certificate of Origin eliminated	Prohibited by MMPA rules; or fishing technique prohibited for person under U.S. jurisdiction	Certification still required for salmon and halibut	(51 FR 28963, Aug. 13, 1986), (54 FR 9438, March 7, 1989)
1991	Implement DPCIA	Revises import requirements for yellowfin caught in ETP purse seine fishery; adds species taken on high seas with large-scale driftnets	Fisheries Certificate of Origin must accompany imports from driftnet nations	(56 FR 47418, Sept. 19, 1991)

1.5 SCOPE OF ASSESSMENT

The scope of this assessment analyzes the establishment, via regulation, of U.S standards and procedures that harvesting nations must follow to obtain a comparability finding, in order to import fish and fish products into the United States as required by the MMPA. NMFS' comparability finding procedures could result in a recommendation to the Secretaries of the Treasury and Homeland Security that certain fish or fish products from a harvesting nation's fisheries should be subject to an import prohibition. This EA provides a general overview of the definition of U.S. standards, and the comparability finding procedures. Since the imposition of import restrictions would be implemented through a separate Federal Register notice, the EA does not address these actions. The EA does not address alternatives or consequences related to concurrent or subsequent rulemakings related to traceability, import documentation, or recommendations of the Presidential Task Force on Combating Illegal, Unreported and Unregulated Fishing and Seafood Fraud (Task Force) (79 FR 75536; December 18, 2014).

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

As described in Section 1.0, the proposed action is to implement section 101(a)(2) of the MMPA by defining U.S. standards for reducing incidental mortality and serious injury to marine mammals in commercial fishing operations. The proposed rule also recommends procedures for implementation and compliance by harvesting nations exporting fish and fish products to the United States. It requires a finding by the Assistant Administrator for Fisheries that the harvesting nation: (1) prohibits the intentional mortality and serious injury of marine mammals in the course of commercial fishing operations in its exempt and export fisheries; and (2) additionally its export fishery has a regulatory program (with regard to the level of marine mammal bycatch) comparable in effectiveness to the regulatory program under which U.S. commercial fisheries operate (a "comparability finding").

Although NMFS is proposing a comparability finding that is similar to regulations for importing yellowfin tuna caught with purse seine vessels in the eastern tropical Pacific Ocean, NMFS is not proposing to amend the regulations on importing fish products taken in high seas driftnet fisheries or in eastern tropical Pacific yellowfin tuna purse seine fisheries. Marine mammal incidental mortality and serious injury in eastern tropical Pacific yellowfin tuna purse seine fisheries is governed by section 101(a)(2)(B) and Title III of the MMPA (16 U.S.C. 1371(a)(2)(B) and 16 U.S.C. 1411-1417). Regulations governing take in the eastern tropical Pacific yellowfin tuna purse seine fisheries are implemented in 50 C.F.R. 216.24, and are not addressed in this rulemaking. Import of fish products taken in high seas driftnet fisheries is prohibited in the High Seas Driftnet Fisheries Enforcement Act (16 U.S.C. 1826a and 1826c) and are implemented at 50 C.F.R. Part 300, International Fisheries Regulations, and is addressed in this rulemaking as an alternative to the proposed action.

The CEQ regulations implementing NEPA call for consideration of the proposed action and a range of alternatives to the proposed action. A range of alternatives includes analysis of reasonable alternatives and the rationale for eliminating alternatives from detailed study.

To be considered reasonable, an alternative must meet the stated purpose of and need for the proposed action. Therefore, alternatives for both defining U.S. standards and implementing procedures are required to meet the purpose and need.

The alternatives described in section 2.1 provide options for defining U.S. standards. The discussion in 2.2 describes the proposed implementation and compliance procedures. The Preferred Alternative is identified in section 2.1.2. Alternatives considered but not further analyzed are described in 2.3.

NMFS has laid out a three-step process in the proposed rule:

1. Define U.S. standards.

2. Design criteria to evaluate an importing nation's incidental mortality and serious injury similar to those used to govern incidental take in U.S. fisheries.
3. Develop procedures for compliance with an approach similar to regulations for importing yellowfin tuna caught with purse seine vessels in the ETP.

2.1 ALTERNATIVES FOR DEFINING U.S. STANDARDS

This EA describes five alternatives to define "U.S. standards" for reducing mortality of marine mammals in fishing operations (Sections 2.1.1-2.1.5). In addition to defining standards, the proposed rule sets out implementation, mitigation and compliance steps as part of an overall regulatory program for a harvesting nation's fishery wishing to import fish and fish products into the United States, described below in Section 2.2.1, 2.2.2 and 2.2.3. Implementation and compliance steps differ slightly under each alternative, but differ most starkly under the Driftnet Moratorium Protection Act Alternative and the No Action Alternative and are analyzed in the Environmental Consequences section of this EA.

In the proposed rule and this EA, "Harvesting nation" is defined as a the country under whose flag or jurisdiction one or more fishing vessels or other entity engaged in commercial fishing operations are documented, or which has by formal declaration or agreement asserted jurisdiction over one or more authorized or certified charter vessels, and from such vessel(s) or entity(ies) fish are caught or harvested that are a part of any cargo or shipment of fish to be imported into the United States, regardless of any intervening transshipments, exports, or re-exports.

"*Export fishery*" is a term defined for the first time by the rule as "a commercial fishing operation determined by the Assistant Administrator to be the source of exports of commercial fish and fish products to the United States and to have more than a remote likelihood of incidental mortality and serious injury of marine mammals (as defined in the definition of an "exempt fishery") in the course of its commercial fishing operations. Where reliable information has not been provided by the harvesting nation on the frequency of incidental mortality and serious injury of marine mammals caused by the commercial fishing operation, the Assistant Administrator may determine whether the likelihood of incidental mortality and serious injury is more than "remote" by evaluating information concerning factors such as fishing techniques, gear used, methods used to deter marine mammals, target species, seasons and areas fished, qualitative data from logbooks or fisher reports, stranding data, and the species and distribution of marine mammals in the area, or other factors at the discretion of the Assistant Administrator that may inform whether the likelihood of incidental mortality and serious injury of marine mammals caused by the commercial fishing operation is more than "remote." Commercial fishing operations not specifically identified in the current List of Foreign Fisheries as either exempt or export fisheries are deemed to be export fisheries until the next List of Foreign Fisheries is published unless the Assistant Administrator has reliable information from the harvesting nation to properly classify the foreign commercial fishing operation. Additionally, the Assistant Administrator, may request additional information from the harvesting nation and may consider other relevant information as set forth in § 216.24(h)(3) about such commercial fishing operations and the frequency of

incidental mortality and serious injury of marine mammals, to properly classify the foreign commercial fishing operation.

Exempt fishery means a foreign commercial fishing operation determined by the Assistant Administrator to be the source of exports of commercial fish and fish products to the United States and to have a remote likelihood of, or no known, incidental mortality and serious injury of marine mammals in the course of commercial fishing operations. A commercial fishing operation that has a remote likelihood of causing incidental mortality and serious injury of marine mammals is one that collectively with other foreign fisheries exporting fish and fish products to the United States causes the annual removal of:

(1) Ten percent or less of any marine mammal stock's bycatch limit; or

(2) More than 10 percent of any marine mammal stock's bycatch limit, yet that fishery by itself removes 1 percent or less of that stock's bycatch limit annually; or

(3) Where reliable information has not been provided by the harvesting nation on the frequency of incidental mortality and serious injury of marine mammals caused by the commercial fishing operation, the Assistant Administrator may determine whether the likelihood of incidental mortality and serious injury is "remote" by evaluating information concerning factors such as fishing techniques, gear used, methods used to deter marine mammals, target species, seasons and areas fished, qualitative data from logbooks or fisher reports, stranding data, the species and distribution of marine mammals in the area, or other factors at the discretion of the Assistant Administrator. A foreign fishery will not be classified as an exempt fishery unless the Assistant Administrator has reliable information from the harvesting nation, or other information to support such a finding.

2.1.1 Alternative 1. Quantitative Standard — Define U.S. standards under Section 101(a)(2) as Potential Biological Removal and Zero Mortality Rate Goal

The MMPA requires that U.S. commercial fisheries reduce incidental mortality and serious injury of marine mammals to insignificant levels approaching a zero mortality and serious injury rate 16 U.S.C 1387(a)(1). NMFS has promulgated a regulatory definition for the zero mortality rate goal (ZMRG), wherein the insignificance threshold equals 10% of a stock's potential biological removal (PBR) level. *See* 50 C.F.R. § 229.2 (definition of "insignificance threshold"). The MMPA defines PBR as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. The potential biological removal level is the product of the following factors:

(A) The minimum population estimate of the stock.

(B) One-half the maximum theoretical or estimated net productivity rate of the stock at a small population size.

(C) A recovery factor of between 0.1 and 1.0.

The MMPA provides this methodology for calculating PBR and establishes a standard that commercial fisheries operating under the jurisdiction of the United States achieve incidental take levels below PBR 16 U.S.C 1387(f)(2).

This alternative would require export fisheries of harvesting nations to likewise reduce incidental mortality and serious injury of marine mammals to levels below PBR and subsequently to the same "insignificant" threshold, or 10 percent of PBR to import fish and fish products. In order to do so, a harvesting nation would need to calculate the PBR of marine mammal stocks subject to interactions in its export fisheries. The International Whaling Commission's Scientific Committee, parties to the Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas, and the International Council for the Exploration of the Sea have adopted performance measures comparable to PBR. This alternative is analyzed and compared with other alternatives in section 4.3.1, below.

2.1.2 Alternative 2 — Performance Standard: Define U.S. standards as Sections 117 and 118 of MMPA requirements to assess and reduce (*Preferred Alternative*)

Alternative 2 would require harvesting nations wishing to export fish and fish products to the United States to demonstrate comparability with U.S. standards defined as set out for domestic fisheries under Sections 117 and 118 of the MMPA. Comparability is defined as "comparable in effectiveness to that of the United States [regulatory program]," or achieving comparable results, not necessarily identical or as detailed. A finding of comparability would be made based on the documentary evidence provided by the harvesting nation to allow the Assistant Administrator to determine whether the harvesting nation has developed and implemented a regulatory program comparable in effectiveness to the U.S. program generally prescribed for U.S. commercial fisheries in Sections 117 and 118 of the MMPA. This is NMFS' Preferred Alternative.

The Preferred Alternative classifies commercial fishing operations that export fish and fish products to the U.S. as either an export fishery or exempt fishery.

Like the prior alternative, the Preferred Alternative involves calculating PBR and reducing incidental mortality and serious injury of marine mammals to levels below PBR. At the same time, the Preferred Alternative provides ample flexibility in the timing and approach to achieve those goals. In 1994, the MMPA was amended to establish Sections 117 and 118 as the programmatic and quantitative standards to govern the incidental take of marine mammals in domestic commercial fisheries. The two sections lay out a multi-step process:

1) assess marine mammal stocks and calculate of PBR for each stock;
2) monitor commercial fisheries to establish extent of marine mammal bycatch; (16 U.S.C. 1386)
3) register commercial fishing vessels;
4) require reporting of incidental takes;
5) develop and implement plans to reduce and mitigate bycatch . (16 U.S.C. 1387)

Under this alternative, Section 101(a)(2) would be implemented in a manner that would require a nation to prohibit the intentional mortality and serious injury of marine mammals in the course of commercial fishing operations in exempt and export fisheries. The preferred alternative would also require a nation's export fishery to develop and

implement a program to assess marine mammal stocks and monitor bycatch of marine mammals in their export fisheries comparable to section 117, as an initial step. To be consistent with requirements for U.S. fisheries and marine mammal stocks in section 118 of the MMPA, the nation likewise would have to develop and implement a comparable bycatch reduction program for relevant export fisheries. Such a program could include similar requirements to the U.S. program under MMPA section 118: register commercial fishermen; require all commercial fishermen to report when a marine mammal has been injured or killed in commercial fishing operations; provide the authority to place observers on certain fishing vessels to monitor the fishery; and provide a mechanism to reduce marine mammal bycatch or some other mechanisms to develop and enforce mitigation measures to reduce marine mammal interactions with commercial fisheries below a bycatch limit. At the least, the approach in the Preferred Alternative requires the assessment of stock status and interactions; monitoring of incidental takes; and a program to reduce mortality and injury or alternative measures demonstrating that the export fishery achieves similar reductions in bycatch to a comparable marine mammal stock and fishery.

NMFS is proposing an "exemption period" of five years from the effective date of the final rule implementing the MMPA import provisions. Within the first year of the exemption period and after consultations with harvesting nations, NMFS will prepare a draft and final List Foreign Fisheries. The List of Foreign Fisheries will classify a harvesting nation's fishery as either exempt or export and is the basis to initiate consultations with harvesting nations, informing them of the regulatory requirements for those fisheries to import fish and fish products into the United States. During the exemption period, NMFS will provide, when requested and contingent on appropriation, technical assistance to harvesting nations to develop a regulatory program that would achieve comparable results to the U.S. regulatory program. At the end of the exemption period and every four years thereafter, the agency will assess documentation provided and make determinations as to which harvesting nation's fisheries are "comparable in effectiveness" referred to as a comparability finding. The comparability finding is effective for four years. If a comparability finding cannot be made for a fishery, the fish and fish products from that fishery will be subject to import prohibitions. The Assistant Administrator for Fisheries in coordination with the Secretaries of the Treasury and Homeland Security would identify and publish a notice in the Federal Register listing the fish and fish products by fishery and harvesting nation subject to an import prohibition. During the evaluation of the documentation, NMFS would notify a harvesting nation if a fishery is likely to fail to qualify for a comparability finding, providing the harvesting nation with an opportunity to refute preliminary comparability findings and communicate any corrective action taken to comply with the conditions for a comparability finding.

A separate set of requirements is proposed for harvesting nations that export fish or fish products from fisheries operating on the high seas. For these harvesting nations, NMFS is proposing that the harvesting nation comply with the following conditions:

> (1) Prohibits the intentional mortality or serious injury of marine mammals in the course of commercial fishing operations unless the intentional mortality or serious injury of a marine mammal is imminently necessary in self-defense or to save the life of a person in immediate danger;

(2) Demonstrates the harvesting nation applies a regulatory program comparable in effectiveness to the United States regulatory program, which includes:

(i) Implementing marine mammal data collection and conservation and management measures applicable to that fishery required under an applicable intergovernmental agreement or regional fisheries management organization to which the United States is a party; and

(ii) Implementing any applicable take reduction plan measures for transboundary stocks or covering the high seas.

Without a finding of comparability, imports of fish or fish products would be prohibited.

2.1.3 Alternative 3—Define U.S. standards as measures comparable to requirements imposed on U.S. commercial fisheries through MMPA Take Reduction Plan implementing regulations

The MMPA sets overarching goals and requirements to reduce marine mammal mortality and serious injury incidental in commercial fishing operations, but provides the Secretary with discretion in developing measures to achieve those reductions. It requires the development of a take reduction plan that includes regulatory and/or voluntary measures for reducing incidental mortality and serious injury and dates for achieving the objectives of the plan.

This alternative would define U.S. standards as those specific regulatory measures required of U.S. commercial fishing operations as the result of a take reduction plan's implementing regulations. Such regulatory measures could also be applied to fisheries conducted on the high seas where a take reduction plan is in place (and thus the requirements would already apply to vessels under the jurisdiction of the United States), and to foreign fisheries, regardless of their area of operation, that are comparable to U.S. fisheries (e.g., longline fisheries would be required to modify their gear to reduce false killer whale bycatch such as required by the False Killer Whale Take Reduction Plan implementing regulations or other comparable measures).

2.1.4 Alternative 4 – Promulgate rule as part of High Seas Driftnet Fishing Moratorium Protection Act regulations

Alternative 4 uses a procedure of identification, documentation, and certification devised under the Moratorium Protection Act and promulgated as a final rule in 2011 (76 FR 2011, Jan. 12, 2011). To receive a positive certification from the Secretary of Commerce, nations identified in the biennial report to Congress (called for in section 610(a) of the Moratorium Protection Act) as having vessels that are engaged, or have been engaged during the preceding calendar year in bycatch of PLMRs must provide documentary evidence of their adoption of a regulatory program governing the conservation of the PLMR that is comparable in effectiveness with that of the United States. Under the MSRA approach, the Secretary may take into account conditions in the export fishery that differ from U.S. circumstances. A comparable regulatory program would include a management plan that will assist in species-specific data collection to support international stock assessments and conservation enforcement efforts for marine mammals.

The certification is a two-step process. First, NMFS would establish a procedure whereby it would examine the bycatch reduction methods currently in use to determine if they are comparable to methods used by U.S. fishermen. In its certification decision, NMFS would evaluate whether the nation has measures in place that are comparable in effectiveness to those required in the United States to reduce marine mammal bycatch. In the case of a U.S. fishery for which bycatch reduction measures are required (e.g., pingers for gillnets, time/area restrictions, or similar measures required of U.S. fisheries operating under take reduction plans), the program would be judged as comparable if for example, a nation requires bycatch reduction measures such as gear modifications, time/area closures, and outreach and research program that are similar to the United States or achieve similar reduction in bycatch.

Among the different conditions the United States may take into account in determining whether measures are comparable are considerations such as oceanographic or environmental conditions, resource or capacity constraints, or available technology. These are meant to be exemplary, not exhaustive, and do not constitute a set of standards. The most important consideration in evaluating comparability would be whether the nation is making progress in reducing bycatch of marine mammals in its fisheries and that its bycatch reduction measures are achieving similar outcomes to those of the United States.

The second step is for a nation to establish a management plan that will assist in species-specific data collection to support international stock assessments and conservation enforcement efforts.

If a harvesting nation does not take sufficient action to address bycatch of PLMRs, and thereby does not receive a positive certification from the Secretary of Commerce, the nation faces denial of port privileges for its fishing vessels, prohibitions on the import of certain fish and fish products into the United States, and other appropriate measures. Factors that the Secretary and other federal agencies may consider in making recommendations are detailed in the final rule and analyzed in the accompanying

Environmental Assessment (*See* Appendix B). Recommendations to impose trade restrictive measures will be made on a case-by-case basis in accordance with international obligations, including the General Agreement on Tariffs and Trade of the World Trade Organization.

2.1.5 No action alternative

This alternative proposes no further action under the MMPA and does not provide any specific standard to implement Section 101(A)(2).

2.2 PROCEDURES AND CONDITIONS FOR A COMPARABILITY FINDING

In addition to alternative U.S. standards for reducing bycatch of marine mammals, the proposed rule also proposes conditions that a regulatory program must meet to be deemed comparable to the U.S. regulatory program.

Under the quantitative standard described above in 2.1.1, the condition would be that harvesting nations calculate PBR or similar bycatch limit for marine mammal stocks under their jurisdiction, including within the EEZ of the harvesting nation, that are known or expected to have mortality and serious injury rates incidental to fishing. A determination could be made that fishing technology permitted by that nation to harvest exported fish products did not result in a rate of serious injury or death to marine mammals in excess of that occurring in U.S. fishing operations or in excess of PBR.

Under the two performance-based alternatives, including the Preferred Alternative, the conditions for a comparability finding require the nation to demonstrate it prohibits intentional killing of marine mammals, can certify that its exports of fish and fish products are not result of an intentional killing or serious injury of marine mammals. The export fishery must occur under a regulatory program similar to or comparable in effectiveness to domestic fisheries under sections 117 and 118 of the MMPA including: assessing marine mammal stocks and estimating bycatch, providing measures to mitigate interaction and incidental takes, a registry of vessels participating in the export fishery, and monitoring compliance with prescribed measures including measures in the export fishery designed to reduce total incidental mortality and serious injury in a marine mammal stock below the bycatch limit. The Preferred Alternative also calls for international efforts through both formal agreements and cooperation. This proposed procedure is described in detail in Section 2.2.1, below.

Under the Moratorium Protection Act alternative, procedures to implement are the same as those in the regulations:

- Identification in Biennial Report to Congress based on set of factors and considerations;
- Notification and consultation with identified nations;
- Pursuit of international or regional agreements to address bycatch;
- Cooperation and assistance to identified nations, including cooperative research, technology transfer, and assistance to international and regional organizations;

- Certification that a nation's program is comparable, based on set of factors.

Under the No Action alternative, the Secretary would have broad discretion in the manner and timing of imposition of any import restrictions on harvesting nations seeking to export fish or fish products to the United States from foreign fisheries that have marine mammal bycatch.

2.2.1 Procedures to Implement Preferred Alternative

Within one year of establishing a program under Section 101(a)(2), NMFS would evaluate imports of fish and fish products that are harvested with fishing gear or methods that may incidentally kill or seriously injure marine mammals. The agency would seek information from governments of nations that export fish or fish products to the United States and whose nationals or companies are engaged in commercial fishing operations with gear types that have or may have bycatch of marine mammals resulting in incidental mortality or serious injury. For purposes of the proposed rule, the term "commercial fishing operation" includes aquaculture activities that interact with or occur in marine mammal habitat. It does not include aquaculture facilities that are solely freshwater, are not located in marine mammal habitat, and have no interactions with marine mammals. NMFS would request harvesting nations' governments provide information about the fisheries, level of marine mammal bycatch, and regulatory programs, including provisions of RFMOs under which the fisheries operate. Based the information provided by the harvesting nation and any other available information, NMFS would classify each fishery as either an export or exempt fishery based on its level of interaction or incidental mortality and serious injury. NMFS would publish these classifications in a List of Foreign Fisheries. NMFS would notify the harvesting nation of the classification of its fisheries, provide the regulatory requirements of the MMPA, and the conditions that a harvesting nation must meet to receive a comparability finding for a fishery.

As appropriate, and contingent on annual appropriations, NMFS could assist harvesting nations in developing the programs outlined below. In assessing the comparability of a harvesting nation's programs to the U.S. regulatory program under Section 117 and 118, NMFS would look to whether the nation's program implements the following conditions, which are the central requirements for U.S. commercial fisheries under the MMPA, or implements similar conditions in a regulatory program that effectively achieves comparable results to the U.S. regulatory program.

Prior to the conclusion of the exemption period, a harvesting nation must apply for and receive a comparability finding. To issue a finding for an exempt fishery, NMFS must determine, based upon on the reasonable proof provided by the harvesting nation that a harvesting nation has prohibited the intentional mortality or serious injury of marine mammals in the course of commercial fishing operations in an exempt fishery unless the intentional mortality or serious injury of a marine mammal is imminently necessary in self-defense or to save the life of a person in immediate danger.

To issue a comparability finding for an export fishery, NMFS must determine, based on the reasonable proof provided by the harvesting nation with and other relevant information, the harvesting nation:

- Prohibits the intentional mortality or serious injury of marine mammals in the course of commercial fishing operations in the fishery unless the intentional mortality or serious injury of a marine mammal is imminently necessary in self-defense or to save the life of a person in immediate danger; or
- Demonstrates that it has procedures to reliably certify that exports of fish and fish products to the United States are not the product of an intentional killing or serious injury of a marine mammal unless the intentional mortality or serious injury of a marine mammal is imminently necessary in self-defense or to save the life of a person in immediate danger;
- Maintains a regulatory program with respect to the fishery that is comparable in effectiveness to the U.S. regulatory program with respect to incidental mortality and serious injury of marine mammals in the course of commercial fishing operations, in particular by maintaining a regulatory program that includes, or effectively achieves comparable results.

To issue a comparability finding for an export fishery operating under the jurisdiction of a harvesting nation within its EEZ, the Assistant Administrator shall determine whether the harvesting nation maintains a regulatory program that effectively achieves the following:

- Marine mammal assessments that estimate population abundance for marine mammal stocks subject to incidental mortality or serious injury in the export fishery.
- A register of all fishing vessels participating in the export fishery, the number of vessels participating, the time or season and area of operation, gear type and target species.
- Regulatory requirements including reporting, measures to reduce incidental take below the bycatch limit, measures to reduce incidental mortality and serious injury with respect to transboundary stocks.
- Monitoring, bycatch estimates, mortality estimates, and an indication of the statistical reliability of those estimates.
- Calculation of bycatch limits for marine mammal stocks in waters under its jurisdiction that are incidentally killed or seriously injured in the export fishery.
- Comparison of the incidental mortality and serious injury of each marine mammal stock or stocks that interact with the export fishery in relation to the bycatch limit for each stock; and comparison of the cumulative incidental takes.

To issue a comparability finding for an export fishery operating within the jurisdiction of another coastal state or on the high seas under the jurisdiction of another coastal state the Assistant Administrator shall determine whether the harvesting nation maintains a regulatory program that provides for, or effectively achieves results comparable to the measures to reduce the incidental mortality and serious injury that the United States requires its domestic fisheries to take with respect to that transboundary stock.

For an export fishery not subject to management by a regional fishery management organization, the Assistant Administrator must determine whether the harvesting nation has abundance estimates, bycatch limits, estimates of mortality and serious injury for each stock, and maintains a take below that limit. The comparison of the incidental take in the export fishery and cumulative takes of any other export fisheries interacting with

the marine mammal stocks would not result in incidental mortality and serious injury in excess of the bycatch limit for that stock or stocks. In the case of an export fishery that is subject to management by a regional fishery management organization, a finding must be made that measures for marine mammal data collection and conservation and management measures are required under an applicable intergovernmental agreement or regional fisheries management organization to which the United States is a party.

To issue a comparability finding in the case of export fisheries operating on the high seas, the Assistant Administrator shall determine whether the harvesting nation maintains a regulatory program that provides for, or effectively achieves comparable results as, the U.S. regulatory program with regard to data collection, management measures, and reduction of incidental mortality and serious injury that the United States requires its domestic fisheries to take with respect to that marine mammal stock when they are operating on the high seas.

If any of the above conditions are not met, a comparability finding would depend, among other things, on whether the harvesting nation has developed and implemented regulations and made progress to reduce the incidental kill and serious injury below the established bycatch limit. In addition, the Assistant Administrator will take into account all relevant facts and circumstances, which may include:

- the history and nature of interactions with marine mammals in this export fishery,
- whether the level of incidental mortality and serious injury exceeds the bycatch limit for a marine mammal stock,
- the population size and trend,
- the population level impacts of the incidental mortality or serious injury of marine mammals in a harvesting nation's export fisheries,
- and the conservation status of those marine mammal stocks where available.

NMFS would also consider U.S. implementation of its regulatory program for similar marine mammal stocks and similar fisheries (considering gear or target species), including transboundary stocks governed by regulations implementing a take reduction plan (50 C.F.R 229.31-229.37), and any other relevant information received during consultations.

Because some nations may currently lack the capacity to assess the status of marine mammals in waters under their jurisdiction, the proposed rule anticipates that capacity building will need to be an integral part of the implementation of this alternative. The proposed rule states that NMFS will evaluate progress towards developing and implementing programs on a biennial basis. The consultation and comparability finding process is described in detail in the proposed rule.

While the Preferred Alternative contains the flexibility to allow a harvesting nation's export fishery to develop alternative measures to reduce bycatch that may be comparable in effectiveness to the U.S. regulatory program, NMFS cannot speculate at this time on what those measures may be. Therefore, the analysis of the Preferred Alternative in Section 4 focuses on evaluating the implementation of the conditions necessary to receive a comparability finding as outlined in this section.

2.3 ALTERNATIVES CONSIDERED BUT NOT FURTHER ANALYZED

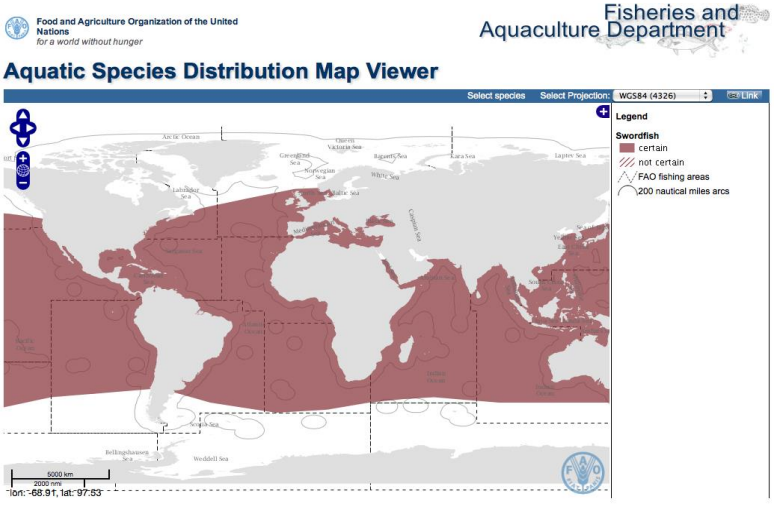
In the Advanced Notice of Proposed Rulemaking (75 FR 22731 (April 30, 2010)), NMFS offered nine options for consideration. Following public comment and review by federal agencies, the following alternatives were eliminated from further analysis.

Options	Action
Option 1: Marine mammal incidental mortality and serious injury (bycatch) in export fisheries is maintained at a level below PBR for impacted marine mammal stocks.	Option 1 was merged with Option 2, and the combination is discussed as the Quantitative Alternative (Alternative 1) described in 2.1.1, 2.1.2 and analyzed in 4.3.1, 4.3.2.
Option 2: Marine mammal incidental mortality and serious injury in export fisheries have been reduced to insignificant levels approaching a zero mortality and serious injury rate to the extent feasible, taking into account different conditions.	See comment above
Option 3: Marine mammal incidental mortality and serious injury in export fisheries are maintained at levels below PBR or at levels comparable to those actually achieved in comparable U.S. fisheries.	Analyzed as part of the Preferred Alternative (Alternative 2)
Option 4: Marine mammal incidental mortality and serious injury in export fisheries either cause the depletion of a marine mammal stock below its optimum sustainable population or impede the ability of a depleted stock to recover to its optimum sustainable population.	Eliminated from further analysis since it is incorporated in the Quantitative Alternative (Alternative 1).
Option 5: Incidental mortality and serious injury in export fisheries have, or are likely to have, an immediate and significant adverse impact on a marine mammal stock (the trigger for issuing emergency regulations in U.S. commercial fisheries pursuant to section 118 (g) of the MMPA).	Eliminated from further analysis because it relates to emergency action, which would not be a reasonable approach under any of the multi-year proposed approaches needed for negotiations with harvesting nations.
Option 6: Incidental mortality and serious injury in export fisheries are likely to jeopardize the continued existence of any endangered or threatened marine mammal species or stock (the prohibitive standard of the Endangered Species Act (ESA).	Eliminated from further analysis because "jeopardy standard" of the ESA only applies to federal actions that affect threatened or endangered species. It does not apply to all species of marine mammals regardless of their status.
Option 7: Incidental mortality and serious injury by export fisheries are likely to jeopardize the continued existence of any marine mammal species or stock regardless of whether it is ESA-listed as threatened or endangered.	Eliminated from further analysis because "jeopardy standard" of the ESA only applies to federal actions that affect threatened or endangered species.
Option 8: Marine mammal incidental mortality and serious injury in a foreign nation's export fisheries are managed effectively by a relevant international fisheries or conservation organization or by the fishing nation itself.	Incorporated in part into the Preferred Alternative (Alternative 2) for high seas export fisheries.
Option 9: Foreign nations that supply fish and fish product imports to the United States have implemented regulations to address marine mammal incidental mortality and serious injury in the nations' export fisheries that are comparable to regulations implemented by the United States, taking into account different conditions.	Incorporated into the Preferred Alternative (Alternative 2)

3.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

The purpose of the proposed action is to set standards and develop procedures to enable a finding that nations importing seafood into the United States use measures comparable in effectiveness to those the United States imposes on its domestic commercial fishing operations to reduce the incidental mortality and serious injury of marine mammals in these fisheries. The proposed regulation serves to implement Sec. 101(a)(2)(A) and 102 (c)(3) of MMPA with respect to imports of seafood. Although the proposed action is procedural, the effects on the operations of harvesting nations, should they take action to demonstrate comparable marine mammal bycatch mitigation measures and adopt such measures, will have an effect on the environment and resources that are the purpose of the MMPA's moratorium on taking marine mammals. In a similar action to implement provisions of the Moratorium Protection Act, a broad description of the affected environment was found to be useful in providing a context for public participation in the review and comment on the proposed regulatory actions. For purposes of the Moratorium Protection Act's discussion of bycatch of marine mammals, the affected environment included trans-boundary areas where the United States shares PLMRs with other nations and high seas areas where PLMRs occur.

CEQ regulations for NEPA call for an assessment of the affected environment commensurate with the impacts of a proposed action on that environment so that analyses are succinct and focused on the resources that are most likely to be affected. In this case, adoption of the standard and procedures do not have an environmental impact. Further, the outcome of subsequent decisions by harvesting nations to provide information regarding programs or measures governing their exporting fisheries comparable to the United States' measures are outside of NOAA's authority and conjectural, as are predictions of whether actions would be taken to ban imports of harvesting nation's fisheries that fail to receive a comparability finding. In addition, the imposition of trade-related measures could cause a nation's vessels to shift from importation into the U.S. market into another market. For these reasons, the description of the affected environment is speculative.



For purposes of providing context for analysis, the indirect effects on the environment that might flow from actions taken under the proposed rule can be assumed in areas where marine mammals co-occur with fishing operations, where incidental take of marine mammals has been documented, or where proscribed fishing gear is used. As an example,

swordfish alone (even though the proposed rule applies to all fish and fish products) are distributed in all temperate waters of the globe (See Figure 1). Likewise, "Because they are often highly migratory and trans-boundary, many marine mammals and their habitats are affected by the activities of more than one nation." (IMMAP, Appendix G). Therefore, this analysis considers marine mammals and marine mammal bycatch that occurs both on the high seas and within the Exclusive Economic Zone (EEZ) of harvesting nations.

3.1 DESCRIPTION OF THE PHYSICAL ENVIRONMENT

NOAA NAO 216-6 requires consideration of impacts to the physical environment that may result from the proposed action. The proposed action and alternatives are directed at establishing standards and procedures and therefore have no effect on the physical environment. However, to provide context for assessing the proposed alternatives, it is useful to provide a brief summary of the physical components of the environment that comprise habitat of marine mammals that are the affected species.

A description of the physical environment of high seas is provided in Chapter 3.1 of Appendix B. Marine mammal habitat is found throughout the high seas and within the EEZs of coastal nations. NOAA's NEPA policy "has been, and continues to be, that the scope of its analysis will be to consider the impacts of actions on the marine environment both within and beyond the U.S. Exclusive Economic Zone." Since NOAA's NEPA policy does not require an analysis of impacts of actions within a harvesting nation's EEZ, and such analysis would be speculative until such time as a harvesting nation adopts a regulatory program, no such analysis of foreign EEZs will be included.

Although the physical environment is not the only factor governing distribution of marine mammals (See 3.2 below), it does contribute. Key aspects of the physical environment are those that influence presence of prey: water temperature, salinity, density, chlorophyll concentration, and thermocline depth. Local features such as canyons, ridges, and other bottom topography influence marine mammal distribution, as do depth and ice cover (Perrin *et al* 2009). These aspects are discussed below in relation to particular species and groups of species. Kaschner *et al.* (2013) developed a predictive model showing overlap between areas of marine mammal species richness and off-shore seamounts. Read *et al.* (2010) produced a model to predict spatial distribution of marine mammal habitat.

3.2 DESCRIPTION OF BIOLOGICAL ENVIRONMENT—MARINE MAMMALS

Cetaceans are relatively large and have streamlined bodies adapted to the marine environment. Some species and populations are found in discrete areas, but others are highly migratory and are found worldwide. They can cover vast distances in search of food or migrating to breeding or calving grounds. The approximately 78 cetaceans—species of whales, dolphins and porpoises for which NMFS has authority under the MMPA— include 11 species of baleen whales (*Mysticeti*) and 67 species of toothed whales (*Odontoceti*). Bycatch of small cetaceans is reported in the NOAA Tech Memorandum Worldwide Bycatch of Cetaceans (Appendix C).

Quantifying marine mammal stock abundance, the scale of mortality and serious injury in commercial fisheries and understanding its effect on the recovery of marine mammals, especially depleted, threatened, or endangered stocks has been a key component of NMFS' efforts to minimize bycatch of marine mammals in U.S. fisheries, pursuant to several laws including the ESA, and the MMPA. NMFS regularly evaluates the status of more than 350 marine mammal stocks, and stock assessment reports are available online http://www.nmfs.noaa.gov/pr/sars/species.htmA summary of status under ESA and MMPA is summarized on the Protected Resources website http://www.nmfs.noaa.gov/pr/species/mammals/. Since passage of the Moratorium Protection Act in 2006, NOAA has submitted three biennial reports to Congress on progress in curbing bycatch of PLMRs, has promulgated regulations to identify nations, and has identified one country that has bycatch of PLMRs and is working with that nation to address the issue.

The United States also has acted to secure international bycatch reduction measures that are comparable to the standards and measures applicable to U.S. fishermen. Reports on NMFS activities to address bycatch are described in the most current Biennial Report to Congress (Appendix H), and are incorporated by reference. Among efforts to improve understanding of bycatch internationally, the agency has adopted a region-by-region action plan and has advocated action by RFMOs around the globe. The status of marine mammals and other living marine resources of importance to the United States is presented in Appendix D, as noted above, and includes the status of about 60 marine mammal species covered by conservation measures in treaties or agreements to which the United States is party.

Although the United States is party to more than two dozen international or regional agreements that include measures to manage international, regional and high seas fisheries, only five (Convention for the Conservation of Southern Bluefin Tuna, Inter-American Tropical Tuna Convention/Agreement on International Dolphin Conservation Program, International Convention for the Conservation of Atlantic Tunas, Agreement for the Establishment of the Indian Ocean Tuna Commission, Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Fisheries Ocean) include measures to collect information on marine mammal bycatch and of those only three have specific measures to reduce cetacean bycatch in purse seine fisheries. The measures in these agreements are presented in Appendix I. Appendix J summarizes all bycatch measures in RFMO agreements, including measures aimed at addressing marine mammal bycatch.

Marine mammals have been documented to be incidentally caught in most types of fishing gear including in purse-seine, longline, driftnet, gillnet, pound net, and trawl fisheries in the Atlantic and the Pacific. The NOAA Tech Memo (2007) at Appendix C reviews mortality of cetaceans in international fisheries. Distribution of fishing operations and bycatch of marine mammals also have been reported by NMFS in the International Marine Mammal Action Plan (IMMAP 2012) (Appendix G), Biennial Report to Congress (NOAA 2013) (Appendix H), Technical Memorandum on International Bycatch (NOAA 2009) (Appendix K), and in the environmental assessment prepared for regulations promulgated under the Driftnet Fishing Moratorium Protection Act (NOAA 2010) (Appendix B). The information from these reports is summarized, and

the reports are incorporated here by reference.

The incidental catch, or bycatch, in fisheries is one of the greatest threats to marine mammals (NOAA 2007) and is one of the highest priorities in the U.S. International Marine Mammal Action Plan (NOAA 2012). Thousands of these animals are killed each year through entanglement and hooking in fishing gear, including gillnets, trawl nets, purse seines, and longlines. The first global bycatch estimate predicted hundreds of thousands of marine mammals are incidentally captured annually (Read et al. 2006). Marine mammals and fishing operations are often concentrated in the same regions because they both tend to occur in areas of high productivity and dense prey (or target fish) concentrations. Most fishing gears are known to incidentally catch marine mammals and most, if not all marine mammals that occur in areas with active fisheries, are caught incidentally in at least one fishery (NOAA 2012). Interactions with fisheries may threaten recovery or survival of several marine mammal species including the harbor porpoise (*Phocoena phocoena*), vaquita (*Phocoena sinus*), finless porpoise (*Neophocaena phocaenoides*), Burmeister's porpoise (*Phocoena spinipinnis*), Hector's dolphin (*Cephalorhynchus hectori)*, Maui's dolphin (*Cephalorhynchus hectori maui*), humpback dolphin (*Sousa chinensis*), bottlenose dolphin (*Tursiops truncatus*), Irrawaddy dolphin (*Orcaella brevirostris*), and dusky dolphin (*Lagenorhynchus obscurus*). (NOAA 2007)

A summary of the species and fisheries that have interactions resulting in bycatch and mortality by ocean region is provided in technical memoranda in the appendices. Of particular interest is Section 3.2.1 of the environmental assessment provided as Appendix B, and Section 2.5 of the NOAA 2007 provided in Appendix C. Documented occurrence of cetacean bycatch in fisheries reported in the NOAA 2007 is summarized in Table 2, below. Shaded areas indicate the availability of abundance and bycatch estimates, status determination, and whether applicable agreements and mitigating measures are in place. The table does not reflect availability of abundance estimates or bycatch estimates for some species because many of the sources reported in the technical memorandum are more than a decade out of date. For a more detailed breakdown of species abundance and bycatch estimates by area, see Appendix C. Incidental capture and mortality of dolphins in purse seine tuna fisheries of the Eastern Pacific, and incidental mortality of whales, dolphins and porpoises in the longline and gillnet tuna and swordfish fisheries of the Atlantic and Mediterranean are the most thoroughly documented and reported. The summary table illustrates the absence of mitigation measures in most areas, and scarcity of reliable population and bycatch estimates in some regions.

Table 2. Documented occurrence of cetacean bycatch in fisheries (shaded areas indicate availability of abundance and bycatch estimates, status determination, and where applicable agreements and mitigating measures are in place).

Area/Species	Abundance Estimated	Bycatch estimated	Listed under IUCN, CITES or CMS	International, regional or bilateral agreement	Mitigating measures in place
Atlantic Ocean, Mediterranean & Black Seas					
Northwest Atlantic					
PHOCOENA PHOCOENA - HARBOR PORPOISE					
EUBALAENA GLACIALIS - NORTHERN RIGHT WHALE					
Northeast Atlantic					
PHOCOENA PHOCOENA - HARBOR PORPOISE					some areas
DELPHINUS DELPHIS - COMMON DOLPHINS					some areas
STENELLA COERULEOALBA - STRIPED DOLPHINS					
Western Central Atlantic					
SOTALIA FLUVIATILIS – TUCUXI					
Eastern Central Atlantic					
SOUSA TEUSZII - ATLANTIC HUMPBACK DOLPHIN					
Mediterranean and Black Sea					
STENELLA COERULEOALBA - STRIPED DOLPHINS					
DELPHINUS DELPHIS - COMMON DOLPHINS					
PHYSETER MACROCEPHALUS - SPERM WHALE					
PHOCOENA PHOCOENA - HARBOR PORPOISE					
Southwest Atlantic					
SOTALIA FLUVIATILIS – TUCUXI					
LAGENORHYNCHUS OBSCURUS - DUSKY DOLPHIN					
CEPHALOGHYNCHUS COMMERSONII - COMMERSON'S DOLPHIN					
PONTOPORIA BLAINVILLEI – FRANCISCANA					

Area/Species	Abundance Estimated	Bycatch estimated	Listed under IUCN, CITES or CMS	International, regional or bilateral agreement	Mitigating measures in place
Pacific and Indian Oceans					
Western Indian Ocean					
SOUSA CHINENSIS - INDIAN HUMPBACK DOLPHIN					
TURSIOPS TRUNCATES - BOTTLENOSE DOLPHINS					
TURSIOPS ADUNCAS - BOTTLENOSE DOLPHINS					
GRAMPUS GRISEUS - RISSO'S DOLPHIN					
Eastern Indian Ocean					
OCAELLA BREVIROSTRIS - IRRAWADDY RIVER DOLPHIN					
PLATANISTA GANGETICA - GANGES RIVER DOLPHIN					
Northwest Pacific					
PHOCOENOIDES DALLI - DALL'S PORPOISE					
NEOPHOCAENA PHOCAENOIDES - FINLESS PORPOISE					
Western Central Pacific					
TURSIOPS ADUNCAS - BOTTLENOSE DOLPHINS					
STENELLA LONGIROSTRIS - SPINNER DOLPHIN					
LAGENODELPHIS HOSEI - FRASER'S DOLPHIN					
SOUSA CHINENSIS - INDO-PACIFIC HUMPBACK DOLPHIN					
OCAELLA BREVIROSTRIS - IRRAWADDY (SNUBFIN) DOLPHIN					
Eastern Central Pacific					
PSEUDORCA CRASSIDENS - FALSE KILLER WHALES					
PHOCOENA SINUS - VAQUITA					
Southwest Pacific					
CEPHALORHYNCHUS HECTORI - HECTOR'S DOLPHIN					National sanctuary, voluntary measures
CEPHALORHYNCHUS HECTORI MAUI - MAUI'S DOLPHIN					National protected area
Southeast Pacific					
LAGENORHYNCHUS OBSCURUS - DUSKY DOLPHIN					National measures
PHOCOENA SPINIPINNIS - BURMEISTER'S PORPOISE					National measures

3.2 DESCRIPTION OF FISHERIES—GEAR TYPES

Fishing is conducted in coastal areas, along the continental shelf within nations' EEZs, and on the high seas. Figure 2 shows the Regional Fishery Bodies and FAO Major Fishing Areas for Statistical Purposes. According to the metadata associated with the FAO Major Fishing Areas for Statistical Purposes, these are "arbitrary areas, the boundaries of which were determined in consultation with international fishery agencies on various considerations, including (i) the boundary of natural regions and the natural divisions of oceans and seas; (ii) the boundaries of adjacent statistical fisheries bodies already established in inter-governmental conventions and treaties; (iii) existing national practices; (iv) national boundaries; (v) the longitude and latitude grid system; (vi) the distribution of the aquatic fauna; and (vii) the distribution of the resources and the environmental conditions within an area."
(http://www.fao.org/geonetwork/srv/en/main.home).

Figure 3 shows that most global fisheries production comes from shelf areas within the EEZs of nations. This represents all production, including aquaculture. Looking at capture fisheries only, among the top 10 reported by FAO as those with production volume of more than 1 million tons, were species that have a significant impact in the U.S. market: pollock, skipjack tuna, Atlantic herring, yellowfin tuna, and Atlantic cod. (FAO 2011) In a review of fishing gear and associated catch statistics, Watson et al. reported in 2006 that the largest marine fish catches globally were attributable to seine nets. At the time the study reported that "catches from hook and line gear have been slowly increasing and are now near levels associated with gillnets." The use of midwater trawls was on the rise in the 1980s but slowed in the 1990s (Watson *et al.* 2006). Information updated through 2006 shows that catch attributable to gear has shifted to greater use of midwater trawls within the EEZs of harvesting nations. In the high seas areas where tuna fishing occurs, the use of longline gear has increased (Sea Around Us Project 2011 http://www.seaaroundus.org/). See Figure 4.

Chuenpagdee (2003) compared bycatch effects of fishing in a review using expert knowledge about gears and interactions, and reported that marine mammal bycatch is highest in fisheries using bottom and midwater gillnets, followed by pelagic longlines, purse seines, pots and traps. Figure 5 presents information on the gears used in fisheries that account for the preponderance of U.S. seafood imports.

Figure 2. Regional Fishery Bodies and FAO Major Fishing Areas

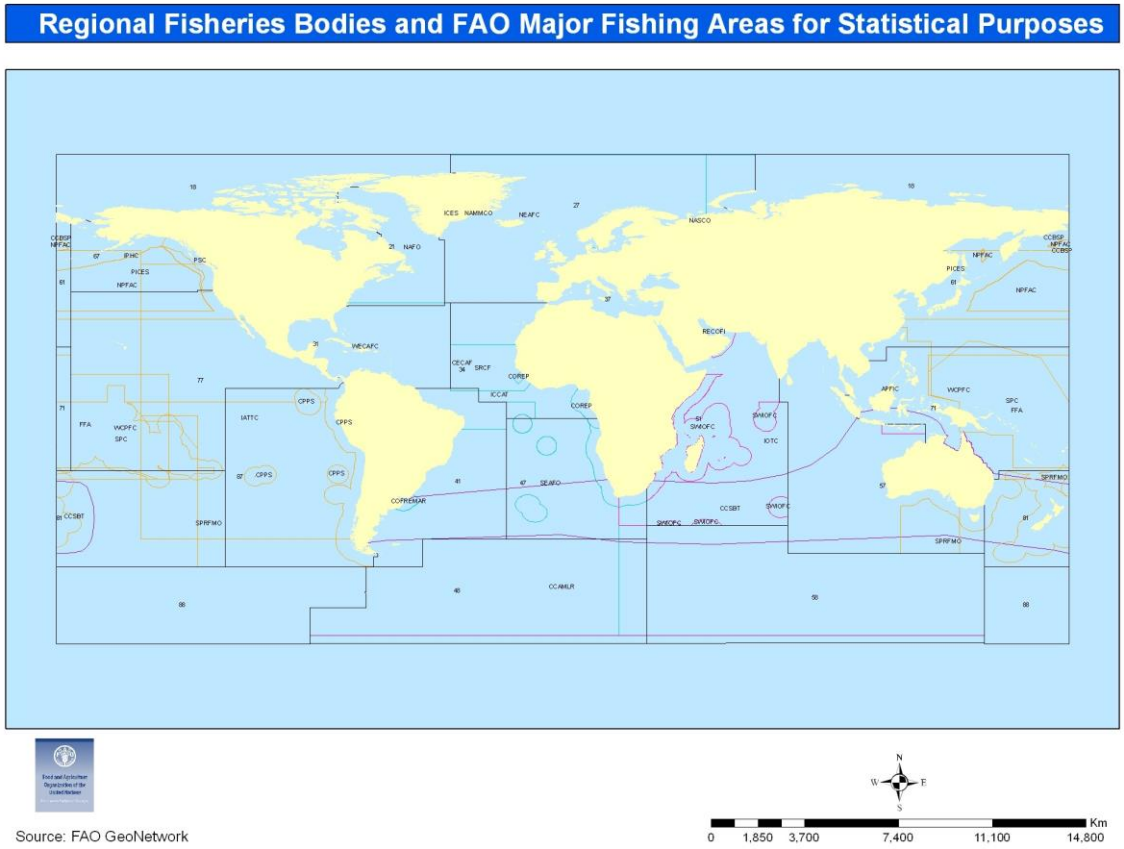


Figure 3. Global Catch from EEZ and High Seas Fisheries

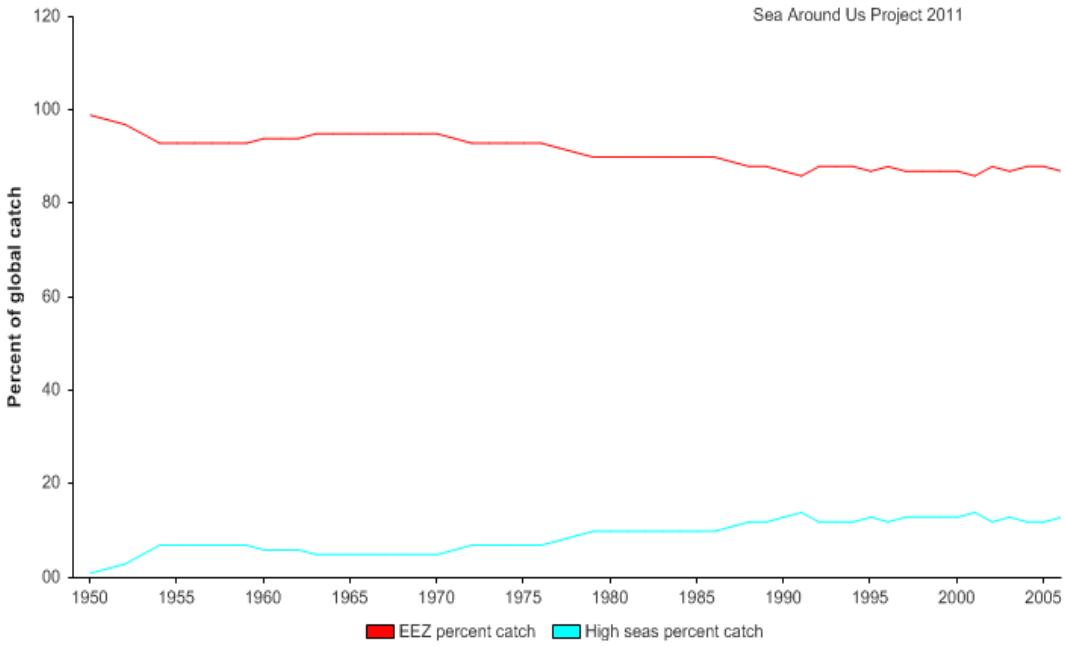


Figure 4. Global catch by gear type. Source: The Sea Around Us Project

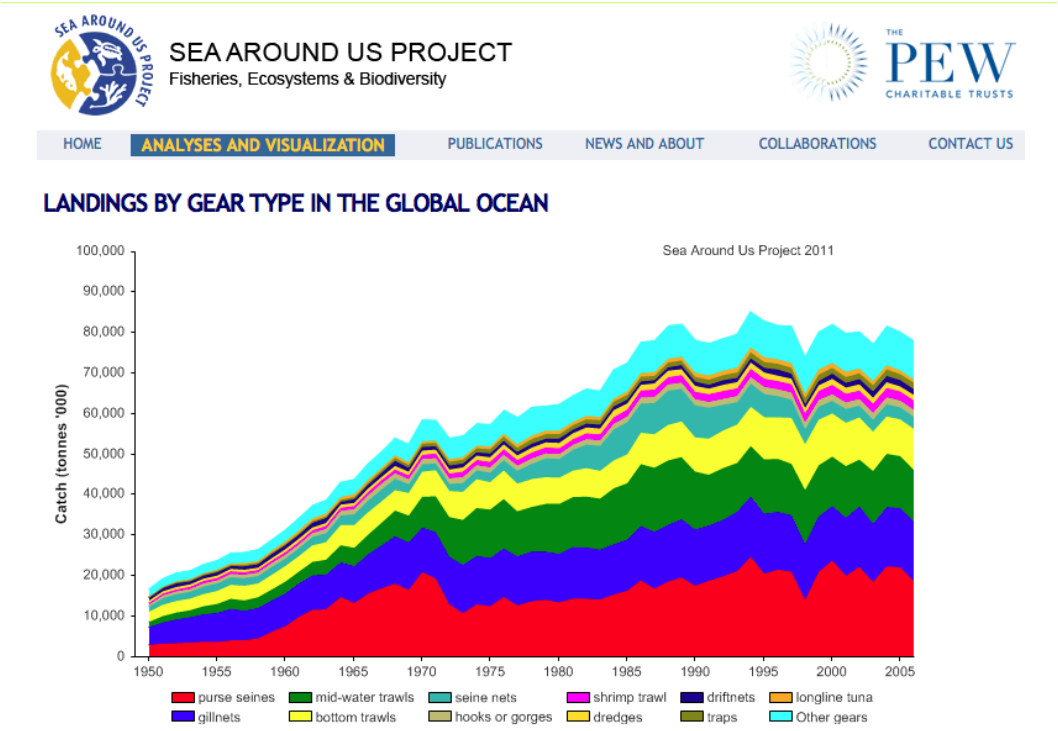


Figure 5. Gears used in fisheries of harvesting nations.

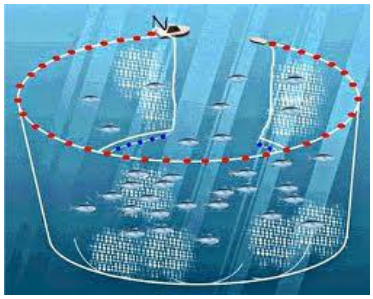
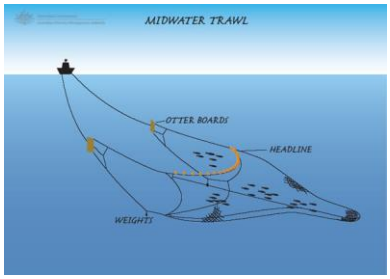
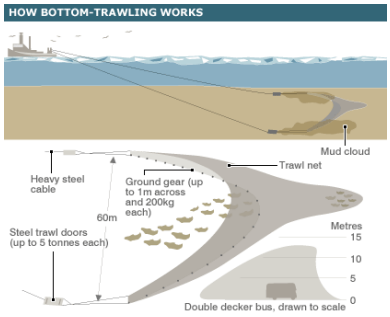
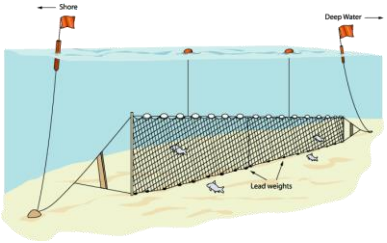
ILLUSTRATION	TYPE	DESCRIPTION
	Purse Seine	Purse seine, a type of surrounding net, are characterized by surrounding fish from all sides and underneath to capture.
	Pelagic Trawl/Midwater Trawl	These nets are designed and rigged to work at the surface or in the water column. Front sections are made of large mesh to herd schools of fish toward the back of the net.
	Bottom-trawling/Otter Trawl/Beam Trawl	These nets are designed to drag along the bottom, with the net opening maintained by a beam or otter boards. Pair trawls are nets towed by two vessels, where the distance between the boats keeps the net open.
	Bottom Gillnet/Set Gillnet	A set gillnet consists of a single net held vertically in the water by a floatline and a weighted groundline. The net is set on the bottom, or at a distance above it, and kept stationary by weights on both ends.

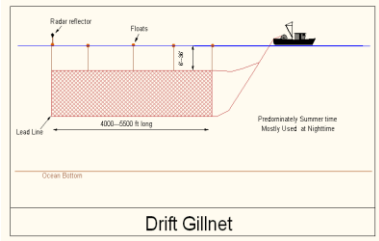
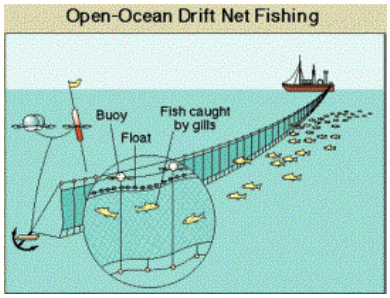
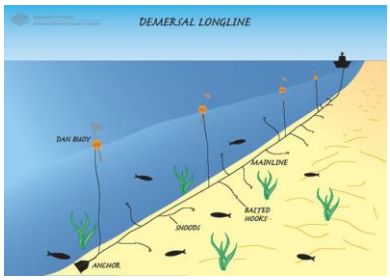
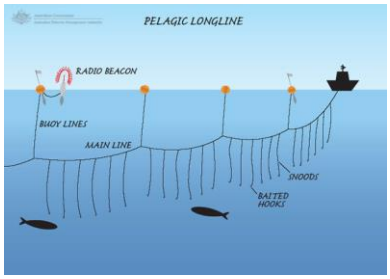
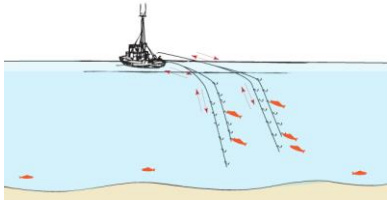
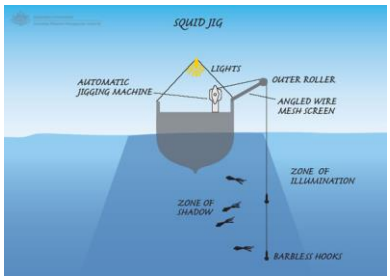
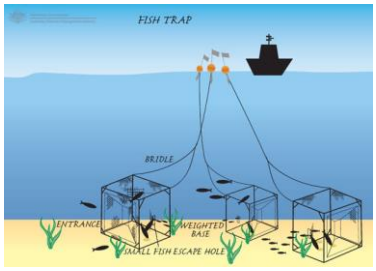
ILLUSTRATION	TYPE	DESCRIPTION
	Drift Gillnet	Drift gillnet gear is not anchored to the bottom and is free-floating on both ends, or free at one end and attached to the vessel at the other end.
	Open-ocean Drift Net/High Seas Drift Net	The drift gillnet is a wall of fine, large-meshed, synthetic netting with a line of corks at the top and leads or a steel chain at the bottom to maintain it vertically midwater, not far below the surface.
	Demersal Longline/Bottom Longline	These consist of a long line with baited hooks attached at intervals by means of branch lines called "snoods." They are set along the seabed, and are held in place on the ocean floor by an anchor.
	Pelagic Longline	This gear consists of a long line deployed across the ocean, attached to numerous baited “branchlines” that are suspended in the water between regularly spaced floats. Each branchline connects the mainline to a single, baited hook.
	Jigging	Jigging is another method based on hooks and lines. Jigging and trolling use movement to attract the fish to the hook.

ILLUSTRATION	TYPE	DESCRIPTION
	Squid Jigger	Squid jigging includes the use of lights to attract squid to the vessel at night.
	Fish Trap	Pots and traps are designed to attract the target fish with bait through an opening to a compartment to prevent the fish from escaping. They may rest on the bottom or float.

3.4. ECONOMIC ENVIRONMENT

The United States is both a significant producer and consumer of seafood, so fishery and aquaculture products make important contributions to the U.S. economy. A major fraction of U.S. production is exported, thus consumer demand for edible seafood far exceeds domestic supply, and imported fish products play a significant role in the U.S. seafood market.

3.4.1 Seafood Production

World production of fishery products from marine and inland capture fisheries has held steady at about 90 million metric tons for the ten year period from 2002 to 2011. Products from marine and inland aquaculture have trended upward over the same period, increasing from just under 40 million metric tons to over 60 million metric tons (NMFS 2013). Thus, the proportion of global seafood production from aquaculture sources has increased from just under 30 percent in 2002 to about 40% in 2011.

China was the leading nation in both total fishery landings and aquaculture production accounting for 35 percent of the total production. India is the second leading producer with 6 percent. Indonesia was the third with just over 5 percent. The United States, Vietnam, Russia, and Japan follow, each with about 3 percent of the global production. (NMFS 2013).

Over the ten-year period from 2003 to 2012, U.S. production volume from capture fisheries has held steady at about 3.4 million metric tons for human consumption and about 1 million metric tons for industrial uses (NMFS 2013). While some U.S. capture

fisheries have experienced reduced landings over this time frame attributable to catch limits imposed to rebuild stocks, the U.S. Fish Stocks Sustainability Index has exhibited consistent growth since 2000 (NMFS 2013a), thus indicating that further production increases for some rebuilding stocks may be anticipated.

U.S. aquaculture production has been relatively steady at about 300 thousand metric tons over the 2006 to 2011 period (NMFS 2013). Given the demand for seafood in the U.S. market, opportunities may exist to substitute competitively-priced, domestic aquaculture products for imported seafood.

3.4.2 U.S. Seafood Consumption

Based on apparent consumption models applied over the period from 2008-2010, the United States was the third-largest consumer of seafood in the world after China and Japan (NMFS 2013). In 2012, consumption of seafood in the United States amounted to 14.4 pounds of edible meat per person a reduction from the record high of 16.6 pounds in 2004. Consumer seafood sales in the U.S. are driven more by prepared meals from food service outlets rather than retail sales for home preparation. The amount of seafood consumed in foodservice is more than double the amount purchased for home use (Islandsibank 2011). Thus, consumption of seafood may be more affected by economic factors that influence the frequency of dining out, than is evident for other food items with higher rates of in-home use.

Of the U.S. total, fresh and frozen finfish accounted for 5.6 pounds, while fresh and frozen shellfish consumption was 4.9 pounds per capita. Canned fishery products accounted for 3.6 pounds per person (NMFS 2013). Shrimp, in all forms, is the single most popular species consumed by Americans, amounting to 3.8 pounds per person in 2012 (NMFS 2013). Canned tuna was the second most popular product in 2012 at 2.4 pounds per person per year, followed by about two pounds of salmon (fresh/frozen/canned) (http://www.aboutseafood.com/about/about-seafood/top-10-consumed-seafoods).

3.4.3 U.S. Seafood Trade

The United States exports the majority of its edible and industrial domestic fishery landings. In 2012, edible seafood exports totaled about 86 percent of edible fishery landings by round weight equivalent. Similarly, exports of industrial fisheries products equaled about 83 percent of domestic fishery landings (NMFS 2013). While some exports may be processed products derived from imported unprocessed fish, the level of exports indicates the strength of foreign markets and/or consumption patterns for certain products. Consequently, the demand for edible seafood in the United States is predominately met by imported products.

Over the ten-year period 2003-2012, imports of edible seafood have grown from 82 percent of total U.S. supply to 91 percent (NMFS 2013), likely driven by a number of factors including increasing production costs in U.S. fisheries, competitive import prices,

and increases in consumer demand for seafood products in general. The three most popular products imported into the United States are shrimp, tuna (fresh/frozen/canned), and salmon (NMFS 2013).

Although difficult to verify through trade statistics, it is estimated that about half of the U.S. imports of edible seafood are from aquaculture operations rather than wild capture operations (http://www.nmfs.noaa.gov/aquaculture/aquaculture_in_us.html). Imports of farmed species to the United States are dominated by shrimp, followed by Atlantic salmon, tilapia, and shellfish (scallops, mussels, clams, and oysters). Asian countries and Ecuador supply most of the shrimp to the U.S. market while Canada, Norway, and Chile supply most of the imported Atlantic salmon (http://www.nmfs.noaa.gov/aquaculture/aquaculture_in_us.html).

The United States imports seafood from more than 120 nations (Table 3), with the top exporters being China, Thailand, Canada, Indonesia, Vietnam, and Ecuador. The top 20 U.S. import partners ranked by volume (actual product weight) and also by product value are listed in Table 4. When ranked by value or volume, the top three exporters to the United States are China, Thailand, and Canada. The total import value of edible and nonedible fishery products has increased over the last decade amounting to $31 billion in 2012—an increase of $200 million compared with 2011 (NMFS 2013).

Table 3. List of Nations Exporting Fish and Fish Products to the United States (2012)

Argentina	Croatia	Ghana	Ivory Coast	Monaco	Russia	Tanzania
Australia	Cyprus	Greece	Jamaica	Morocco	Saudi Arabia	Thailand
Bahamas	Denmark			Namibia	Senegal	Tonga
Bangladesh	Dominican Republic	Greenland	Japan	Netherlands	Seychelles	Trinidad & Tobago
Barbados	Ecuador	Grenada	Kazakhstan	New Caledonia	Sierra Leone	Tunisia
Bahrain	Egypt	Guatemala	Kenya	New Zealand	Singapore	Turkey
Belgium	El Salvador	Guinea	Kiribati	Nicaragua	Slovenia	Turks & Caicos Isl
Belize	Estonia	Guyana	Latvia	Nigeria	South Africa	Uganda
Brazil	Ethiopia	Haiti	Lithuania	Norway	South Korea	Ukraine
Brunei	Falkland Isl.	Honduras	Madagascar	Oman	Spain	United Arab Emirates
Bulgaria	Faroe Isl.	Hong Kong	Malaysia	Pakistan	Sri Lanka	United Kingdom
Cameroon	Federated States of Micronesia	Iceland	Maldives Isl.	Panama	St. Helena	Uruguay
Canada	Fiji	India	Mali	Papua New Guinea	St. Pierre & Miquelon	Vanuatu
Chile	Finland	Indonesia	Malta	Peru	St. Vincent & Grenadine	Venezuela
China	France	Iran	Marshall Isl.	Philippines	Suriname	Vietnam
Colombia	French Polynesia	Ireland	Mauritania	Poland	Sweden	Western Samoa
Cook Islands	Gambia	Israel	Mauritius	Portugal	Switzerland	
Costa Rica	Germany	Italy	Mexico	Reunion	Taiwan	

Source: NMFS (http://www.st.nmfs.noaa.gov/commercial-fisheries/foreign-trade/applications/annual-product-by-countryassociation).

Table 4. United States Top Ten Seafood Trading Partners by Value and Volume Reported (2012)

Top Ten Trading Partners by Value Imported			Top Ten Trading Partners by Volume Imported		
Origin Country	**Metric Tons**	**Thousand USD**	**Origin Country**	**Metric Tons**	**Thousand USD**
China	561,252	2,650,442	**China**	561,252	2,650,442
Thailand	374,765	2,512,304	**Thailand**	374,765	2,512,304
Canada	287,537	2,507,979	**Canada**	287,537	2,507,979
Indonesia	122,427	1,174,925	**Vietnam**	175,302	1,074,675
Vietnam	175,302	1,074,675	**Indonesia**	122,427	1,174,925
Chile	92,556	897,148	**Ecuador**	118,069	782,657
Ecuador	118,069	782,657	**Chile**	92,556	897,148
India	65,860	609,701	**India**	65,860	609,701
Mexico	63,391	476,445	**Mexico**	63,391	476,445
Norway	35,950	307,768	**Norway**	35,950	307,768

Source: NMFS (http://www.st.nmfs.noaa.gov/commercial-fisheries/foreign-trade/applications/annual-product-by-countryassociation).

3.4.4 Processors, Wholesalers, Importers and Cannery Processing

In 2006, seafood processing plants in the United States processed 2.6 million metric tons and generated about $8.8 billion in revenue (Table 5). In recent years, however, more and more processing is occurring overseas. It is projected that the market for value added products will grow and that much of this demand will be met by imports (Islandsibank 2011). These imports may include increasing amounts of U.S. harvested fish that are processed overseas and returned to the U.S. market.

Details of the number of processing and wholesaling plants and their employment in the United States by individual state for 2012 are provided in Table 6 (NMFS 2013). These annual estimates are made by the Bureau of Labor Statistics for North American Industry Classification System (NAICS) sector 3117 (seafood processors) and NAICS sector 42446 (seafood wholesalers). According to these data, a majority of U.S. processing firms (99%) are small entities with less than 500 employees. The canneries in American Samoa that employ thousands of cannery workers are considered exceptions.

Table 5. Processing Activity by Species Group in the United States 2006

Group	Firms	Metric Tons	Revenue	Average Annual Employment	Employment per Firm
All Other Fish	155	1,237,423	$4,109,097,714	9,321	60
Shark	18	848	$4,492,464	1,007	56
Shrimp	109	191,832	$1,352,565,642	8,156	75
Swordfish	55	1,919	$27,275,143	2,611	47
Toothfish	10	62	$1,463,514	228	23
Tuna	96	232,399	$819,198,076	9,632	100
Groundfish	41	684,231	$1,927,557,213	4,237	103
All Firms	931	2,604,776	$8,748,261,732	30,652	33

Table 6. U.S. Processors and Wholesalers: Plants and Employment, 2012

Area and State	Processing (1)		Wholesale (2)		Total	
	Plants	Employment	Plants	Employment	Plants	Employment
	Number					
New England:						
Maine	35	718	172	1,191	207	1,909
New Hampshire	10	242	11	113	21	355
Massachusetts	52	2,336	167	2,061	219	4,397
Rhode Island	10	(3)	39	(3)	49	(3)
Connecticut	5	(3)	17	193	22	193
Total	**112**	**3,296**	**406**	**3,558**	**518**	**6,854**
Middle Atlantic:						
New York	22	397	256	1,880	278	2,277
New Jersey	13	521	86	909	99	1,430
Pennsylvania	4	(3)	31	649	35	649
Delaware	1	(3)	6	26	7	26
District of Columbia	-	-	2	(3)	2	(3)
Maryland	17	505	51	568	68	1,073
Virginia	36	1,441	59	493	95	1,934
Total	**93**	**2,864**	**491**	**4,525**	**584**	**7,389**
South Atlantic:						
North Carolina	28	671	59	430	87	1,101
South Carolina	2	(3)	24	161	26	161
Georgia	6	(3)	31	540	37	540
Florida	40	1,442	301	2,233	341	3,675
Total	**76**	**2,113**	**415**	**3,364**	**491**	**5,477**
Gulf:						
Alabama	32	1,432	16	283	48	1,715
Mississippi	22	2,120	21	116	43	2,236
Louisiana	62	1,898	101	616	163	2,514
Texas	33	1,553	112	1,020	145	2,573
Total	**149**	**7,003**	**250**	**2,035**	**399**	**9,038**
Pacific:						
Alaska	159	10,198	13	49	172	10,247
Washington	99	6,990	112	1,101	211	8,091
Oregon	26	1,210	21	422	47	1,632
California	50	1,163	324	4,185	374	5,348
Hawaii	5	63	39	538	44	601
Total	**339**	**19,624**	**509**	**6,295**	**848**	**25,919**
Inland States or Other Areas (4): Total	**55**	**2,536**	**223**	**2,750**	**278**	**5,286**
Grand total	**824**	**37,436**	**2,294**	**22,527**	**3,118**	**59,963**

(1) Data are based on North American Industry Classification System (NAICS) 3117 as reported to the Bureau of Labor Statistics. (2) Data are based on North American Industry Classification System (NAICS) 42446 as reported to the Bureau of Labor Statistics. (3) Included with Inland States. (4) Includes Puerto Rico and Virgin Islands
SOURCE: NMFS 2013

4.0 ENVIRONMENTAL CONSEQUENCES

Although the proposed action is procedural and administrative in nature and would qualify for a categorical exclusion from the requirement to prepare an EA, NMFS has prepared this EA to facilitate public involvement in the development of the proposed national standard and procedures. The following analysis is intended to provide the public with a context for reviewing the proposed action by examining the impacts on marine mammals associated with fishing, the methods the United States has used to reduce those impacts, and a comparison of how approaches under the MMPA and the High Seas Driftnet Moratorium Protection Act provisions of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 would affect marine mammals.

Because the action (proposed rule) is procedural in nature, defining a standard and promulgating procedures to determine whether a harvesting nation's fisheries are operating in a manner comparable to that standard, there are no significant direct impacts of the action. Indirect impacts and foreseeable environmental consequences of the action could include reduced rates of mortality and serious injury to marine mammals attributable to fishing operations and are discussed below. The comparison of alternative approaches to developing a standard and implementing procedures is presented as a comparison of how each of the alternatives achieves the purpose and need for action, as well as the anticipated indirect consequences to the environment under each approach.

Marine mammals are threatened by human activities in all of the world's oceans, including: fisheries bycatch and prey depletion, marine debris, vessel strikes, habitat degradation and disturbance, direct harvest or removals, and pollution. The effects of human activities in predominantly coastal areas now extend to high seas as fisheries, and oil and gas exploration and development, become more technologically and economically feasible in the deep sea. In addition to direct human impacts, marine mammals face increasing ecological pressures and ecosystem shifts associated with climate change. A detailed cumulative impacts discussion has not been conducted because the proposed action has the effect of developing procedures that result in a comparability finding, rather than an action with a direct or indirect impact on the environment or the threats facing marine mammals. Therefore, there is limited potential to incrementally contribute to cumulative impacts. The proposed action alternatives could, however, provide additional leverage to address marine mammal bycatch beyond what is available under existing authority.

4.1 FRAMEWORK FOR ANALYSIS

The analysis looks at how the proposed rule would operate if promulgated under MMPA using the alternative standards and procedures proposed here, and also how it would operate if promulgated under MSRA using the standards and procedures of that law as they now exist. The comparison examines how each approach would serve to accomplish the purpose and need of the proposed action. Considerable information on the practicalities and feasibility of possible procedures and approaches relative to harvesting

nations has been developed by NMFS and is presented in the proposed rule. This analysis does not consider all of those aspects but is focused on a discussion of impacts that are expected to result from:

1. The conduct of the proposed action itself or any of the alternatives (direct impacts).
2. Activities that are not a part of the proposed action or any of the alternatives but are reasonably foreseeable consequences of NOAA conducting the proposed action or alternatives (indirect impacts).

4.1.1 Basis for Promulgating Standards under MMPA

When Congress enacted the MMPA in 1972, one of its stated goals was that the "incidental kill or incidental serious injury of marine mammals permitted in the course of [U.S.] commercial fishing operations be reduced to insignificant levels approaching a zero mortality and injury rate" (16 U.S.C. 1371(a)(2)). The Congress also clearly recognized the importance of protecting marine mammals outside U.S. waters.

Section 101(a)(2) of the Act (16 U.S.C. § 1371(a)(2)) directs the Secretary of the Treasury to "ban the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of United States standards." That provision further directs the Secretary of Commerce to "insist on reasonable proof from the government of any nation from which fish or fish products will be exported to the United States of the effects on ocean mammals of the commercial fishing technology in use for such fish or fish products exported from such nation to the United States." Section 102 of the Act (16 U.S.C. § 1372(c)(3)) prohibits importation of "[a]ny fish, whether fresh, frozen, or otherwise prepared, if such fish was caught in a manner which the Secretary has proscribed for persons subject to the jurisdiction of the United States, whether or not any marine mammals were if fact taken incident to the catching of the fish." Although these requirements have been included in the Act since its original enactment, implementing regulations were promulgated in 1974, but never revised to reflect changes in domestic governance, and the provision has been rarely used. At present, the only proscribed fishing method is high seas driftnetting or the prohibition on the intentional killing of marine mammals in the course of commercial fishing.

Section 2 of the MMPA describes several objectives of the MMPA: (1) maintaining the health and stability of the marine ecosystem, (2) retaining marine mammals as a significant functioning element in the ecosystem of which they are a part, and (3) ensuring that marine mammals can remain at or recover to their optimum sustainable population (OSP). OSP is defined in MMPA section 3(9) as "the number of animals which will result in the maximum productivity of the population or the species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element" (16 U.S.C. 1362(9), 50 CFR 216.3). A species or population stock that is determined to be below its OSP level, or is listed as endangered or threatened under the ESA, is designated as "depleted" under the MMPA (16 U.S.C 1362(1)).

The MMPA establishes a moratorium on taking marine mammals within U.S. waters or by persons or vessels subject to U.S. jurisdiction, where "take" means to "harass, hunt, capture, or kill or attempt to harass, hunt, capture, or kill any marine mammal" (16 U.S.C. 1362(13)).

The MMPA originally prohibited the incidental take of marine mammals in U.S. commercial fisheries unless authorized by a general permit. In U.S. commercial fisheries, OSP was the standard used to issue a general permit authorizing the incidental takes of marine mammals in commercial fishing operations. General permits could not be issued for the take of marine mammals from a population that was below its OSP level.

When it became clear in the late 1980s that NMFS could not make the findings required to waive the MMPA moratorium and grant incidental take permits for U.S. fishermen, Congress enacted an interim exemption program to gather information about incidental takes of marine mammals in U.S. fisheries. Congress followed the interim exemption program with detailed provisions to govern the incidental take of marine mammals during fishing operations in U.S. waters. These provisions included calculation of the potential biological removal standard, to replace OSP, to set allowable take levels by species and population, categorized fisheries by frequency of interaction, and prescribed methods to reduce incidental takes, monitor fisheries, and enforce compliance.

In addition to setting the new standard of PBR, in the 1994 amendments, Congress reaffirmed the original goal of the MMPA to reduce the incidental kill or incidental serious injury of marine mammals in the course of commercial fishing operations to insignificant levels approaching zero. Since the program took effect, NMFS has assessed the status of marine mammal stocks, categorized all fisheries, implemented take reduction plans for dozens of fisheries, and compiled observer and monitoring reports of incidental takes. (*See* the Office of Protected Resources Marine Mammal Take Reduction Teams website for details. http://www.nmfs.noaa.gov/pr/interactions/trt/teams.htm)

4.1.2 Basis for Promulgating Standards under MSRA

In 2006, the Congress reauthorized the MSRA, which governs how the United States manages fisheries within its EEZ. The reauthorization amendments directed substantial attention to fishing issues outside U.S. waters, particularly IUU fishing and bycatch in high seas fisheries. The international provisions of the MSRA (High Seas Driftnet Fishing Moratorium Protection Act and the High Seas Driftnet Enforcement Act) are designed to "strengthen the ability of international fishery management organizations and the United States to ensure appropriate enforcement and compliance with conservation and management measures in high seas fisheries." (S.Rpt. 109-229 at 12)
The provisions included in the Moratorium Protection Act promote action by international and regional fishery bodies, improved communication and information exchange, expanded monitoring and reporting technology, and similar cooperative measures.

The MSRA also amended the 1992 High Seas Driftnet Fisheries Enforcement Act (Pub.

L. 102-582) to add prescriptive sections, including a requirement for a biennial report on international compliance; action to strengthen regional fishery management organizations; and identification of nations with bycatch of PLMRs in international waters or bycatch of PLMRs shared by the United States in waters beyond the U.S. EEZ. The criteria include whether the relevant regional fishery management organization has failed to implement measures to reduce bycatch; whether the nation engaged in PLMR bycatch is not a party to a relevant organization; and whether the nation has adopted a bycatch reduction program comparable to that of the United States, taking into account different conditions. (16 U.S.C. 1826k)

In cases where international fishery management organizations or the nations in question are unable to reduce the bycatch of PLMRs, amendments to the Moratorium Protection Act and the High Seas Driftnet Fisheries Enforcement Act (Enforcement Act) allow for denial of port privileges, import prohibitions, and other measures to enforce compliance.

Regulations to implement these provisions aimed at reducing bycatch of protected living marine resources, including marine mammals, were promulgated in 2011.

With a few exceptions, documentation of marine mammal bycatch in high seas fisheries is sparse and bycatch mortality limits are virtually non-existent. Even with several years of reports of PLMR bycatch under the 2006 amendments, until this year, NMFS has only identified one nation having bycatch of marine mammals in its fisheries. In every one of the three biennial reports to Congress submitted since the Moratorium Protection Act took effect, the report has included the following statement, explaining why the statutory basis for identifying nations with PLMR bycatch is difficult to meet:

> "Identification of nations for bycatch activities under Section 610(a)(1) of the Moratorium Protection Act may be based only on current activities of fishing vessels of that nation, or on activities in which those vessels have been engaged during the calendar year preceding submission of the biennial report to Congress in January. Qualifying activities are further restricted to those that result in the bycatch of PLMRs where the relevant international conservation organization has failed to implement effective measures to end or reduce such bycatch, or the nation is not a party to or a cooperating partner with such organization and the nation has not adopted and implemented a regulatory program governing such fishing practices that is comparable to that of the United States, taking into account different conditions." (NOAA 2013).

The difficulty of trying to accomplish MMPA objectives under the MSRA framework has been pointed out by the Marine Mammal Commission, NMFS, and the public and is discussed further in the analysis below at 4.3.3.

4.2 ENVIRONMENTAL IMPACTS

4.2.1 Direct Impact

The Preferred Alternative for the proposed action is to set the standard for marine mammal bycatch by harvesting nations as the same standard used for U.S. commercial fishing operations. The selection of this alternative, or any of the other alternatives, for a

standard of comparability has no direct impact on the marine environment or marine mammals, as it is an administrative and procedural action.

4.2.2 Indirect Impact

It is reasonably foreseeable that indirect consequences might occur in the future depending on action by harvesting nations that choose to demonstrate that their fleets are fishing in a manner that provides results comparable to those of the U.S. regulatory program and standard. Such indirect impacts might include compilation of information on the status of marine mammals heretofore unavailable. Information on the level of interactions between fishing operations and marine mammals could likewise be forthcoming under any of the alternatives, which all call for documentation of interactions in a harvesting nation's fleets. Enhanced knowledge of marine mammal population status and level of interaction would inform conservation actions by the U.S., harvesting nations, regional and international fishery bodies. A positive indirect effect would be harvesting nations demonstrating their ability to reduce mortality and serious injury of marine mammals in the course of fishing to below an established bycatch limit for their fisheries, in turn comparable bycatch reduction programs would contribute to the goal of the MMPA of keeping marine mammals at sustainable populations and part of the marine ecosystem.

4.2.3 Cumulative Impacts

Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7). Past, present and reasonably foreseeable future actions must be considered in evaluating the potential for cumulative impacts. Past impacts to marine mammals were discussed in the Affected Environment Section. This EA evaluates five alternatives to implement this procedural rule, concluding that these have either no effect or insignificant environmental effects. The impacts of each alternative were considered in the effects analysis. The proposed alternatives implement a procedural rule. With respect to the procedural rule itself, no cumulative impacts are expected.

Defining the standard for reducing marine mammal bycatch in the fisheries of harvesting nations as the same standard as that for U.S. fisheries could bring about a reduction in cumulative impacts in the context of all activities that are affecting marine mammals, as a result of technology transfer and increased communication occurring under the Moratorium Protection Act, implementation of the U.S. International Marine Mammal Action Plan, and efforts by international organizations such as IWC, CMS, and others to protect marine mammals. While speculative, these positive indirect effects might include increased information and knowledge about interactions, enhancement of the efforts in RFMOs such as CCSBT, IATTC, ICCAT, IOTC, WCPFC, transfer of technology and experience from fisheries that have proven techniques to reduce bycatch, documented interactions and their effects sufficient to encourage RFMOs to promulgate new bycatch measures within their jurisdictions, or increase support for current measures. Alternatively, future cumulative impacts to marine mammals may not decrease and may

stay the same under the five alternatives compared to the No Action Alternative because a nation may elect to not export fish and fish products to the United States in order to avoid enacting measures to decrease marine mammal mortality and serious injury in its commercial fisheries. Any cumulative impacts would potentially result from any future import bans. Further NEPA analysis may be conducted on any imposed import bans.

4.3 COMPARISON OF ALTERNATIVES

The following section provides a comparison of how the alternatives would define the U.S. standard and how that definition would achieve the purpose of the proposed rule and the objectives of MMPA's Section 101(a)(2). The section provides some comparison of the proposed procedures for implementing the standard, identifying and classifying fisheries, consulting with nations, and achieving either a finding of comparability or a prohibition on imports. How these actions would affect marine mammals is speculative, since the actions rely on harvesting nations providing reasonable proof (e.g. documentary evidence)to achieve the comparability finding. The following tables are meant as a high-level summary of the discussion in the analysis of alternatives provided below in Sections 4.3.1 through 4.3.4.

Table 6 provides a comparison of how the four alternatives analyzed would define the U.S. standard. The No Action Alternative (Alternative 5) and MSRA Alternative (Alternative 4) are the least specific and least responsive to the petition, and they do not meet the stated purpose and need for action of the proposed rule, which is to define the U.S. standard for prohibiting imports under MMPA 101(a)(2).

Table 6. Comparison of Definition of Standard in Alternatives

	MMPA Quantitative Alternative 1	**Preferred Alternative Alternative 2**	**MSRA Alternative 4**	**No Action Alternative 5**
Define standard	ZMRG + PBR	PBR + Comparability to domestic program under MMPA Sections 117/118	Take PLMRs in prior year + shared resources with U.S.; or party to common RFMO	Baseline

The type of documentation required under the four alternatives is summarized in **Table 7**. Under the MMPA quantitative alternative, the burden to assess stocks is on the harvesting nation/export fishery. Under the Preferred Alternative, the burden to assess stocks and document existence of a comparable bycatch reduction program is on the harvesting nation/ fishery, though the Preferred Alternative proposes consultation, technical assistance, technology transfer, and other efforts to help the harvesting nation conduct its initial assessment and make its documentary case for comparability. Under the MRSA alternative, the burden lies on the United States to understand the status of stocks, document their susceptibility to bycatch and to identify fisheries with bycatch.

Table 7. Comparison of Required Documentation in Alternatives				
	MMPA Quantitative Alternative 1	**Preferred Alternative Alternative 2**	**MSRA Alternative 4**	**No Action Alternative 5**
Assess marine mammal stocks	Harvesting nation requirement	Harvesting nation requirement	Burden on U.S. to identify, contribute to assessment	N/A
Monitor incidental mortality & serious injury	Harvesting nation requirement	Harvesting nation requirement	Burden on U.S. to identify; must have occurred in prior year	N/A
Comparable regulatory program	N/A	Harvesting nation requirement	Certification findings are flexible and poorly defined.	N/A

Table 8 provides a brief comparison of how the Preferred Alternative aligns with the purpose and need for action, existing MMPA requirements, and existing rules under the MSRA. This comparison contributes to understanding how existing and alternative approaches correspond to the purpose and need for the proposed action. The Preferred Alternative is in alignment with the MMPA Section 101 requirement and contributes to the purpose of the MSRA. The Preferred Alternative meets the stated purpose and need for the proposed action. Other alternatives meet some, but not all of the objectives of applicable laws and regulations.

Table 8. Preferred Alternative compared to Purpose and Need for Action				
		Existing MMPA	**Preferred Alternative**	**MSRA Regulations**
Purpose and Need for Action	Prohibit imports from countries that have not met MMPA requirements	**Provides authority to promulgate rule to implement MMPA**	**Responds to MMPA**	**Not responsive to MMPA**
Objectives	Define U.S standards; recommend procedures to implement MMPA requirements	Implement restrictions on taking of marine mammals, including in commercial fisheries	Implement 101(a)(2)(A) and 102(c)(3) for imports of fish and fish products	Enhance conservation and recovery of protected living marine resources

Table 9 provides a compilation of information in the Appendices about the top fish and fish product imports, the top exporting fisheries of harvesting nations, reported bycatch of marine mammals in those fisheries, the membership of the harvesting nations in regional fishery bodies, whether and what measures those bodies require for conservation of marine mammals. The table provides a comparison of how the alternative approaches would trigger identification and begin the process of consultation and comparability findings for harvesting nations with an export fishery having documented bycatch. Table

9 shows how—under the Alternative 5-No Action, Alternative 4-MSRA, and Alternative 2-Preferred Alternative—a sampling of harvesting nations with export fisheries would be treated under each of the three approaches. It illustrates that all export fisheries with marine mammal bycatch could be reached through the Preferred Alternative, including fisheries that operate within a nation's own EEZ, but only export fisheries that operate on a U.S.-shared resource or under the management of a RFMO to which the U.S. is party can be identified and consulted with under the Alternative 4-MRSA alternative. This comparison is discussed in detail in sections 4.3.2, 4.3.3, 4.3.4 and 4.3.5 below.

Table 9. Comparison of Alternatives for Harvesting Nations Exporting Top Seafood Products to U.S.					
Nations exporting Top 10 Seafood Products* to U.S.	**From fisheries with documented marine mammal interactions (literature)**	**Applicable RFMO measures exist**	**Alternative 5- No Action Alternative** **Would be subject to import ban**	**Alternative 4- MSRA Alternative** **Would be consider through RFMO membership**	**Alternative 2- Preferred Alternative** **Would be listed as an export fishery**
Canada	**Tuna: YES** **Salmon: YES** **Cod: YES** **Shellfish: Not Analyzed**	**WCPFC** **ICCAT: general bycatch only** **No link for salmon**	**NO**	**WCPFC, ICCAT**	**Yes**
Thailand	**Tuna: UNK** **Shrimp: POSSIBLE** **Pangasius: Not analyzed** **Crabs: Not analyzed**	**General bycatch, no marine mammal provisions in tuna RFMOs except for purse seines** **No applicability for shrimp farming**	**NO**	**IOTC**	**Yes**
China	**Tuna: YES** **Cod: YES** **Shrimp: UNK** **Pangasius: Not analyzed**	**Measures in tuna RFMOs**	**NO**	**IOTC, ICCAT, WCPFC, IATTC** **Not for cod**	**Yes**
Chile	**Tuna: YES** **Salmon: YES**	**Minimize bycatch of marine mammals during fishing**	**NO**	**CCAMLR (for toothfish)** **Not for tuna or salmon**	**Yes**
Indonesia	**Shrimp: POSSIBLE** **Tuna: YES**	**No applicability for shrimp farming** **No marine mammal measures in tuna fisheries**	**NO**	**NO** **IOTC, CCSBT**	**Yes**

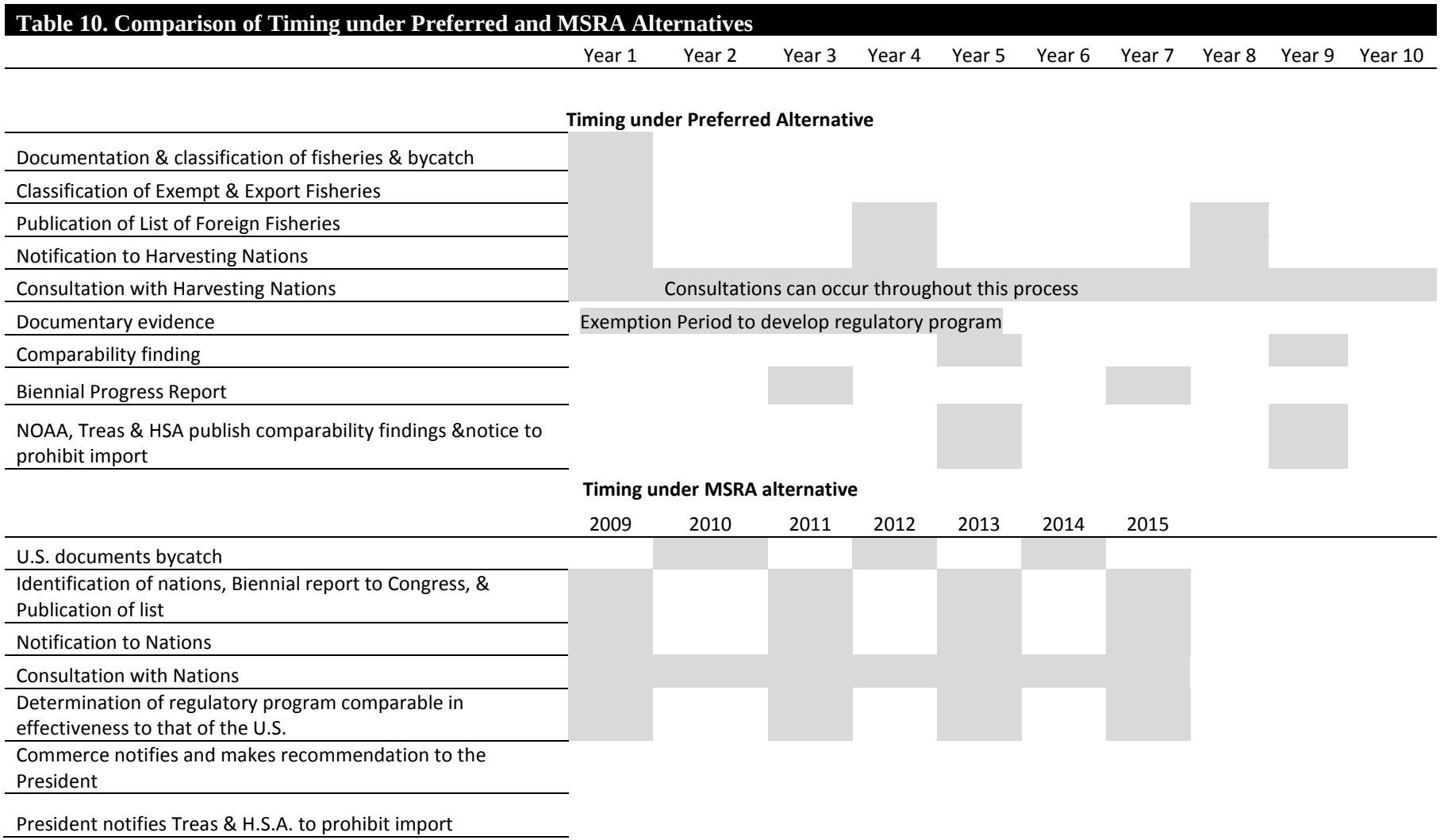
Table 9. Comparison of Alternatives for Harvesting Nations Exporting Top Seafood Products to U.S.					
Nations exporting Top 10 Seafood Products* to U.S.	**From fisheries with documented marine mammal interactions (literature)**	**Applicable RFMO measures exist**	**Alternative 5- No Action Alternative** **Would be subject to import ban**	**Alternative 4- MSRA Alternative** **Would be consider through RFMO membership**	**Alternative 2- Preferred Alternative** **Would be listed as an export fishery**
Vietnam	**Tuna: UNK** **Shrimp: POSSIBLE** **Pangasius: Not Analyzed**	**N/A**	**NO**	**NO**	**Yes**
Ecuador	**Tuna: YES** **Shrimp: POSSIBLE**	**IATTC/AIDCP** **No applicability for shrimp farming**	**NO**	**Yes**	**Yes**
Mexico	**Tuna: YES** **Shrimp: NO** **Swordfish/shark: YES**	**IATTC/AIDCP** **ICCAT: general bycatch only**	**Tuna via IATTC/AIDCP**	**Tuna only**	**Yes**
India	**Tuna: YES**	**No marine mammal measures in tuna fisheries with exception of purse seines**	**NO**	**IOTC, CCAMLR**	**Yes**
Russia	**Cod: UNK**	**General bycatch only**	**NO**	**CCAMLR, NAFO, ICCAT**	**Yes**
Philippines	**Tuna: YES**	**WCPFC measures**	**NO**	**ICCAT, CCSBT, WCPFC, IOTC**	**Yes**
Brazil	**Tuna: YES**	**General bycatch only**	**NO**	**CCAMLR, ICCAT**	**Yes**
Iceland	**Cod: YES**	**No marine mammal provisions; N/A for internal waters**	**NO**	**NAFO**	**Yes**
Taiwan	**YES**	**Ecologically related species bycatch provision**	**NO**	**CCSBT**	**Yes**

Table 9. Comparison of Alternatives for Harvesting Nations Exporting Top Seafood Products to U.S.					
Nations exporting Top 10 Seafood Products* to U.S.	**From fisheries with documented marine mammal interactions (literature)**	**Applicable RFMO measures exist**	**Alternative 5- No Action Alternative** **Would be subject to import ban**	**Alternative 4- MSRA Alternative** **Would be consider through RFMO membership**	**Alternative 2- Preferred Alternative** **Would be listed as an export fishery**
Venezuela	**Tuna: YES**	**Marine mammal measures**	**Yes via IATTC/AIDCP**	**IATTC, ICCAT**	**Yes**
Norway	**Farmed salmon: YES** **Cod: YES**	**General bycatch reporting, nothing specific to marine mammals; not applicable to internal waters**	**NO**	**CCAMLR, SEAFO, NAFO**	**Yes**
Australia	**Albacore tuna: YES**	**WCPFC measures**	**NO**	**CCSBT, WCPFC**	**Yes**
Spain	**Tuna: YES** **Hake: YES**	**General bycatch reporting, nothing specific to marine mammals**	**NO**	**ICCAT, GFCM, CCAMLR**	**Yes**
Sri Lanka	**Coastal tuna: YES**	**Internal waters**	**NO**	**NO**	**Yes**

*****The top 10 seafood products purchased by U.S. consumers are shrimp, canned tuna, salmon, pollock, tilapia, pangasius, catfish, crab, cod and clams. The 10 nations that export most of these products to the United States are, in order of volume and value of exports: Canada Thailand, China, Chile, Indonesia, Vietnam, Ecuador, Mexico, India, and Russia. For purposes of this analysis, we excluded freshwater species such as catfish, tilapia, and pangasius, and shellfish other than shrimp. Shrimp remained in the analysis because of its top ranking and because marine mammal interactions and effects have been reported in shrimp aquaculture operations and trawl fisheries.

Table 10 shows a comparison of the amount of time required to proceed from documentation of marine mammal bycatch by the United States to either a finding of comparability or certification that a nation has comparable measures, or a finding of no comparability or a negative certification leading to import prohibition. The shaded areas indicates when an action is occurring in that year. More detail on comparison of the alternative approaches is provided in sections 4.3.1 through 4.3.5.

Table 10. Comparison of Timing under Preferred and MSRA Alternatives



4.3.1 Quantitative Standard (Alternative 1)

This alternative would require export fisheries of harvesting nations to reduce incidental mortality and serious injury of marine mammals to insignificant levels approaching a zero mortality and serious injury rate, or 10 percent of potential biological removal in order to import fish and fish products. In order to do so, a harvesting nation would need to have a population abundance estimate to calculate the PBR of marine mammal stocks subject to interactions in its fisheries. PBR, or a similar metric, is recognized and applied in marine mammal conservation regimes internationally, but it is widely recognized that population estimates for many marine mammal populations around the world are dated or unknown.

Including the zero mortality rate goal in the standard would place the United States in conflict with fair competition rules of the World Trade Organization because application of such a rule would in effect require the harvesting nation's export fishery to comply with a standard that not all U.S. fisheries have achieved. The U.S. Marine Mammal Commission argues that there is no justification to discount the zero mortality rate goal and "recommends that the National Marine Fisheries Service include in the feasibility analyses all of the standards applicable to U.S. fisheries, regardless of whether those standards have yet to be met fully by U.S. fisheries." (MMC comments at 5) In contrast, NMFS is recommending that the lack of information for marine mammal populations outside U.S. waters would make it difficult to determine an "insignificant" mortality rate, complicated by the lack of bycatch information and readily available technologies to reduce bycatch

Under this alternative, the requirements are made on the harvesting nation to assess stocks, monitor, and reduce incidental injury and serious mortality. However, the quantitative standard alone does not meet the requirements of the MMPA to restrict imports of fish caught with technology that results in mortality or serious injury, and therefore lacks the performance-based elements that would occur in a program comparable to the U.S. program.

If the quantitative standard is used, it is unclear what procedures would be developed to implement the standard, if defined solely as PBR and ZMRG, but the Marine Mammal Commission suggests such procedures could include some cooperative means to assist in the calculation of PBR for a harvesting nation and then prohibit imports of fish and fish products from export fisheries where that rate was exceeded.

4.3.2 Programmatic and Performance Based Standard (Alternative 2-Preferred Alternative)

The Preferred Alternative defines the U.S. standard as the requirement in Section 117 of the MMPA to assess the status of marine mammal stocks, plus the Section 118 regulatory framework to reduce bycatch in U.S. commercial fisheries. This definition incorporates both the quantitative element—calculation of PBR or the bycatch limit—and the performance element by calling for bycatch reduction. The preferred alternative also

requires a finding of comparability for a harvesting nation's bycatch reduction program for a fishery, but provides flexibility for how bycatch reduction is to be accomplished and how priorities for action are set. The preferred alternative would implement 101(a)(2) by requiring harvesting nations that want to export fish and fish products to the United States to implement a program for their fisheries comparable in effectiveness to the program under which U.S. commercial fisheries operate.

Harvesting nations would be required to prohibit the intentional mortality and serious injury of marine mammals in commercial fishing operations exporting fish and fish products to the United States and develop and implement a stock assessment program to assess marine mammal stocks and monitor bycatch of marine mammals in their export fisheries or alternative measures to reduce bycatch. To be consistent with requirements for U.S. fisheries and marine mammal stocks in section 118 of the MMPA, the harvesting nation likewise would have to develop and implement a bycatch reduction program for relevant fisheries whose results are comparable to similar marine mammal stocks and U.S. fisheries. Such a program could include conditions such as registration, reporting and monitoring to demonstrate the effective result is comparable in effectiveness to the U.S. program's result. Alternatively the harvesting nation could implement alternative bycatch reduction measures that do not include population abundance and bycatch estimates, so long as the harvesting nation can demonstrate that these measures are comparable in effectiveness to the U.S. regulatory program.

Adopting a standard that incorporates a quantitative element—bycatch limit (PBR)—with the performance-based standard drawn from the U.S. regulatory program for domestic commercial fisheries has the potential, if harvesting nations complete the required documentation, to accomplish numerous objectives of the MMPA. These include improved information on the status of marine mammals, reduction of incidental takes of marine mammals, encouraging development of international arrangements for research and conservation, and protection adequate to keep marine mammals from declining "beyond the point at which they cease to be a significant functioning element in the ecosystem of which they are a part, and, consistent with this major objective, they should not be permitted to diminish below their optimum sustainable population." (16 U.S.C. 1361(2))

The Preferred Alternative merges numerous concepts drawn from several sources: the domestic fishery incidental take program, and the affirmative finding of the tuna-dolphin program. As a result, the standard is clear, and the procedures (although complex) have operated effectively for more than a decade for domestic fisheries and eastern tropical Pacific tuna fisheries.

NMFS would bear the initial burden of identifying fisheries that are likely to have incidental takes at levels that would qualify them as export or exempt fisheries, and for listing, and prioritizing such fisheries for consultation with harvesting nations. The United States would provide an initial list, to be refined by the harvesting nation. The responsibility is on the harvesting nation to provide documentary evidence or reasonable proof of stock status, bycatch levels, setting of biologically based bycatch limits,

programs to reduce to and stay within such limits, and any other alternative measures, with consultation and technical assistance from the United States.

The programmatic elements of this alternative, if implemented effectively, could contribute toward in a comparability finding that the fishery operates under a program that is comparable in effectiveness to the U.S. program.

Prohibition of imports would occur if no comparability finding could be issued.

4.3.3 Programmatic and Performance Based Standard (Alternative 3-Take Reduction Team Alternative)

The performance-based option that was not selected as the Preferred Alternative would have used the approach of take reduction plans (discussed above at 2.1.3), defining the U.S. standard as the specific, regulatory measures required of U.S. commercial fishing operations. This alternative is limited and would apply only in cases where the United States operated fisheries comparable to those of harvesting nations' fisheries and employed bycatch reduction requirements in those fisheries.

The use of take reduction plans was designed to fit particular circumstances in U.S. fisheries with marine mammal bycatch, and as such would not provide a single standard for all fisheries, fish, or exported fish products. The standard and requirements for harvesting nations would change as conditions and operating requirements changed in U.S. fisheries. In addition, this alternative would not cover the vast numbers of export fisheries and gear types that interact with marine mammals.

4.3.4 Moratorium Protection Act Standard (Alternative 4)

Using the Driftnet Moratorium Protection Act standard and procedures aimed at bycatch of protected living marine resources falls short of promulgating regulations to implement 101(a)(2) of the MMPA. As a preliminary matter, the MSRA is a fishery management law, directed mainly at fishing operations that are contrary to international and regional agreements. MSRA regulations result in a list of identified nations that may be positively or negatively certified by the Secretary of Commerce. Fishing vessels of nations that do not receive a positive certification may be subject to the denial of port privileges and could be subject to Presidential action at the recommendation of the Secretary of Commerce. While it does provide a mechanism to encourage reduction of bycatch of protected living marine resources, including marine mammals, the reach of these provisions is constrained.

For example, the scope of the Moratorium Protection Act identification and certification procedures is limited and cannot be applied to many exporting fisheries that would otherwise come under the import provision of the MMPA. These include:

1. Fisheries that occur entirely within the EEZs of the harvesting nation or other nations and do not affect stocks shared by the United States.
2. Fisheries on high seas where there is no occurrence of fish stocks shared by United States.

3. Fisheries in areas of RFMO or treaty jurisdiction where United States is not a party.
4. Fisheries on high seas where no documented bycatch of PLMRs occurs or cannot be inferred because the gear has not been documented to have PLMR bycatch or there is no occurrence of PLMR species that are protected under United States or international treaty in the area of the fishery.
5. Fisheries that intentionally kill marine mammals in the course of their fishing operations, including aquaculture operations.

In analyzing the MMPA versus the Moratorium Protection Act, the fishery/harvesting nation could not be reached by the provisions of the Moratorium Protection Act for 9 of 13 oceanic fisheries likely to be catching swordfish and tuna on the high seas. Table 9 provides examples of fisheries conducted by harvesting nations. Under the Moratorium Protection Act approach, four of the fisheries are conducted by nations that are not members of the RFMOs that trigger authority under the Moratorium Protection Act.

Fisheries that take place within a nation's EEZ, would not be subject to provisions of the Moratorium Protection Act. Consequently, bycatch of marine mammals would not be subject to the import provisions for fisheries operating within foreign EZZs including coastal gillnet and trawl fisheries for shrimp, cod, hake, mackerel, sole, turbot, and coastal sharks.

With a few exceptions, documentation of marine mammal bycatch in high seas fisheries is sparse, and bycatch mortality limits are virtually non-existent. Even though the United States has received information on bycatch of PLMRs, NMFS has been able to identify only one nation having bycatch of marine mammals in its fisheries under the rubric of the Moratorium Protection Act. In every one of the three biennial reports to Congress submitted since the Moratorium Protection Act passed, the report has included the following statement, explaining why the statutory basis for identifying nations with PLMR bycatch is difficult to meet:

> "Identification of nations for bycatch activities under Section 610(a)(1) of the Moratorium Protection Act may be based only on current activities of fishing vessels of that nation, or on activities in which those vessels have been engaged during the calendar year preceding submission of the biennial report to Congress in January. Qualifying activities are further restricted to those that result in the bycatch of PLMRs where the relevant international conservation organization has failed to implement effective measures to end or reduce such bycatch, or the nation is not a party to or a cooperating partner with such organization and the nation has not adopted and implemented a regulatory program governing such fishing practices that is comparable to that of the United States, taking into account different conditions." (NOAA 2013)

The inability to identify nations because of the statutory limitation on using only evidence of bycatch in the year preceding the biennial report, lack of basic information on trans-boundary marine mammals, and the high threshold for determining comparability of effectiveness were all concerns noted by the U.S. Marine Mammal Commission in its comments on the implementing regulations for the Moratorium

Protection Act. Other concerns about the use of this method to define standards for MMPA action are that the two laws have different regulatory and management objectives. Moreover, the Moratorium Protection Act is limited to fisheries that occur outside the EEZs of nations (unless it is a shared PLMR), does not have any provision to address intentional killing of marine mammals (such as deterrence from aquaculture areas), puts a greater burden of proof on the United States to make findings and document bycatch, and is ambiguous on the time within which corrective actions are to be made by nations that have bycatch of PLMRs.

4.3.5 No Action Alternative (Alternative 5)

Under the Status Quo—No Action Alternative, there would be no substantial change in the potential for reducing bycatch of marine mammals. Although it could be argued that this alternative could provide a possible mechanism for action under section 101(a)(2), as requested in the petition, it is not directly responsive to the petition and is counter to the weight of advice and recommendation from the Marine Mammal Commission and numerous stakeholder commenters.

The Secretary could choose to influence harvesting nations using the authority of the International Dolphin Conservation Program Act, the Pelly Amendment to the Fishermen's Protective Act, the Lacey Act, or the High Seas Driftnet Fishing Moratorium Protection Act, depending on the circumstances under which the exporting fishery operates, whether the United States and the harvesting nation are party to international or regional agreements, or share resources affected by the fishery.

The International Dolphin Conservation Program administered by the Inter-American Tropical Tuna Commission in the eastern tropical Pacific Ocean would remain in effect, limited to its region and specified marine mammal species. Convention for the Conservation of Antarctic Marine Living Resources, Convention for the Conservation of Southern Bluefin Tuna, International Convention for the Conservation of Atlantic Tuna, Agreement for the Establishment of the Indian Ocean Tuna Commission and Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean have addressed bycatch in conservation and management measures, but only the IOTC, WCPFC and CCAMLR have specific measures aimed at documenting bycatch of marine mammals. The others have general bycatch documentation but no marine mammal bycatch limits or conservation and management measures. The agreements have either limited observer programs or none to document the frequency of marine mammal bycatch in international waters.

The provisions of the Moratorium Protection Act to reduce bycatch of PLMRs would remain as a mechanism, though its effectiveness has yet to be proven. To date the United States has been able to identify only one nation with bycatch of marine mammals using the Section 609 and Section 610 provisions of the MSRA or its implementing regulations.

The United States contributes substantially to international knowledge and technical capacity to reduce marine mammal bycatch through its participation in international and regional forums, but the leverage to prohibit imports of fish and fish products caught in a

manner contrary to MMPA's 101(a)(2) provisions would be unavailable under the No Action alternative, except as an indirect consultative exercise with neither consistency nor continuity.

In summary, Table 11 provides a comparison of each of the alternatives for the following issues:

- How the standard is defined;
- How fisheries are identified;
- Whether identified fisheries can be addressed by the procedures;
- What elements will be examined for a comparability finding;
- Whether the harvesting nation provides documentary evidence;
- How an import prohibition is triggered; and
- How long between identification of a fishery and import prohibition.

Table 11. Summary comparison of issues and alternatives.

	MMPA Quantitative (Alternative 1)	**Preferred Alternative (Alternative 2)**	**MSRA Regulations (Alternative 4)**	**No Action (Alternative 5)**
Define standard	ZMRG + PBR	Bycatch limit (PBR) + measures Comparable in effectiveness to domestic program under 117/118	Take PLMRs in prior year + share resources with U.S.; OR party to common RFMO	N/A
Identify fisheries	Consultation between U.S. and harvesting nation	U.S. makes preliminary identification; harvesting nation finalizes	Based on information in biennial report to Congress; excludes certain fisheries	N/A
Assess marine mammal stocks	Harvesting nation requirement	Harvesting nation requirement	Burden on U.S. to identify, contribute to assessment	N/A
Monitor incidental mortality & serious injury	Harvesting nation requirement	Harvesting nation requirement	Burden on U.S. to identify; must have occurred in prior year	No requirement on fishery or harvesting nation
Document comparable regulatory program	N/A	Harvesting nation requirement	Certification findings are flexible and poorly defined.	No requirement on fishery or harvesting nation
Imports prohibited	If/when export fishery exceeds PBR	If/when procedural steps are completed and no comparability finding is issued	If/when procedural steps are completed and result in negative certification	If authority provided under existing international agreement
Time to import decision	Discretionary	5 years	Unspecified once there is a negative certification.	Dependent on authority used

4.4 Socioeconomic Impacts

The proposed regulations would result in the development of a procedural regulation. The procedures proposed in this rulemaking do not apply directly to any U.S. business entity, small or large, as the rulemaking is aimed at foreign countries that harvest seafood that is exported to the U.S. market. However, U.S. businesses involved in the supply chain for seafood products, and U.S. consumers of seafood, could be indirectly affected by trade measures applied against foreign export fisheries that do not received comparability findings.

The number of fisheries, importers, processors, wholesalers, retailers or consumers affected by any alternative is unknown because the exact volume and value of product, and the number of jobs supported primarily by imports within the processing, wholesale and retail sectors cannot be ascertained based on available information. In general, however, the dominant position of imported seafood in the U.S. supply chain is indicative of the number U.S. businesses that rely on seafood harvested by foreign entities. Nevertheless, while it is impossible to know how these socioeconomic impacts will be distributed spatially, unless fish and fish products from a relatively large number of fisheries from several countries were denied entry, a highly unlikely outcome, businesses could simply substitute for the relatively small amounts of product by obtaining domestic supplies or alternative foreign sources. Because importers, processors, and retailers can maintain input supplies by sourcing product from different harvesting nations, or potentially from domestic production, negative socioeconomic impacts will be small or non-existent. For consumers, such small changes in product flow are unlikely to change prices or availability. Therefore, no adverse impacts are anticipated by the proposed action. There would not likely be differential effects on small entities given the current predominance of imported fish products in the marketplace. Larger processing and wholesaling firms may be more directly engaged with importation activities, and may be faced with sourcing decisions. Smaller importers and small retailers will not have any particular compliance costs other than sourcing, and may be able to work with larger importers in the short term to avoid disruptions. This conclusion is supported by the Environmental Assessment of the potential impacts of regulations establishing certification procedures pursuant to the High Seas Driftnet Fishing Moratorium Protection Act. (NOAA 2010, Appendix B) incorporated here by reference.

For many of the same reasons, potential benefits are difficult to quantify. U.S. citizens hold positive use and non-use values for the preservation of marine mammals and all alternatives besides the no-action alternative will increase protection for these species. Decreasing marine mammal bycatch will produce positive economic values. While this EA does not quantify the increases possible with additional protection under this rule, qualitatively it is known that globally marine mammals have positive use and non-use values. The use values in this case are non-consumptive use values obtained through marine mammal watching activities.

All of the alternatives, with the exception of the no action alternative, may have the effect of raising the cost of imports, at least in the long run. Complying with regulations to

reduce marine mammal bycatch and mitigate the adverse impacts of fishing on marine mammals by using practices and gear that are comparable to those used by U.S. fishermen may result in increased costs for export fisheries. The extent of these regulatory costs cannot be estimated. This may have an impact on consumers, as prices could increase. It is unknown whether the benefits to consumers from increased preservation of marine mammals will outweigh any potential increase in seafood prices. However, if marine mammal bycatch and bycatch of non-target species in general continues unchecked, sustainability will suffer, reducing global supplies of seafood, forcing prices up in the long term. Whether these regulatory costs increase import prices enough to close the current gap between domestic prices and import prices remains to be seen. If import prices rise enough to cause switching in the U.S. market from imports to domestically harvested fish, U.S. commercial fishermen may benefit.

Finally, constructive engagement with harvesting nations is the preferred pathway to meeting the goals and objectives of this action. Much of this constructive engagement will involve increasing the capacity of harvesting nations to manage their marine mammal stocks in a manner comparable in effectiveness to the United States. As such, U.S. industry and researchers could be instrumental in providing this capacity to harvesting nations. U.S. industry may provide consulting services and sales of technology needed to meet the goals of this rule. Additionally, cooperative research exploring better technologies will provide income and jobs for commercial fishermen, researchers, and related industries. Industries that can support capacity building in harvesting nations targeted by this rulemaking will benefit.

It is impossible currently to quantitatively estimate these costs and benefits to all of the various stakeholders affect by this rule since so little is known about the volume of current bycatch and actions that harvesting nations may take in their fisheries to comply with this rule. As noted above, NMFS does not anticipate significant economic impacts from any of the alternatives analyzed. Due to the consultative and procedural nature of preferred alternative (Alternative 2), it is highly likely that the costs of temporary disruptions in supply for specific products could be ameliorated in the short term by substituting different products or by locating alternative sources. Given the preferred alternative's time frame for the consultative process, and the evaluation period for comparability findings, the affected public will have sufficient advance notice to mitigate impacts. In order to meet the objectives of the MMPA, NMFS cannot exempt small entities, change the reporting requirements only for small entities, or use performance or design standards in lieu of the regulatory requirements in the rule.

Because the proposed regulations are purely procedural in nature, and only set out how NMFS is to make decisions regarding marine mammal protection through comparability findings for nations that export fish products to the United States, there are no direct economic impacts on small or large entities. Because the proposed regulations will not have a significant economic impact on a substantial number of small entities, an initial regulatory flexibility analysis is not required.

4.5 OTHER NEPA CONSIDERATIONS

The proposed regulations would result in the development of a procedural regulation; and, as such, no unavoidable adverse impacts on the human environment are anticipated in association with the proposed action. Similarly, the proposed regulation would not result in any irretrievable or irreversible commitment of resources. The proposed action would not result in any short-term uses or effects to the environment; thus, there would be no adverse effects to the long-term productivity of the environment. Depending on the action by others that may ensue from the development of standards and procedures, it is anticipated that the proposed procedures should benefit long-term conservation of marine mammals.

5.0 REGULATORY IMPACT REVIEW

A Regulatory Impact Review (RIR) is conducted to comply with Executive Order 12866 (E.O. 12866) and analyzes the economic benefits and costs of this proposed action to the nation. The information contained in this document, taken together with the data and analysis incorporated by reference, comprise the complete RIR.

The requirements for all regulatory actions specified in E.O. 12866 are summarized in the following statement from the order:

> In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits should be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nonetheless essential to consider. Further, in choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.

E.O. 12866 further requires that the Office of Management and Budget (OMB) review all proposed regulations that are considered to be "significant." A significant regulatory action is one that is likely to:

- Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, local or tribal governments of communities;
- Create serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the president's priorities, or the principles set forth in this Executive Order.

OMB has determined that the proposed action is significant for the purposes of E.O. 12866.

5.1 DESCRIPTION OF MANAGEMENT OBJECTIVES

Please see Section 1.3 of the EA for a full description of the objectives of this rulemaking. This action is necessary to implement the import provisions of MMPA section 101(a)(2) and to enhance the conservation and recovery of marine mammals, by encouraging nations to implement regulatory programs that reduce the bycatch of marine mammals to sustainable levels (bycatch limit) and that are comparable in effectiveness to the U.S. regulatory program.

Additionally, the MMPA envisions constructive engagement through RFMOs and intergovernmental agreements to implement effective measures and bilateral arrangements between the United States and other fishing nations to achieve these objectives.

5.2 DESCRIPTION OF THE FISHERIES

Please see Section 3.2 of the EA for a description of the industries that could be affected by this rulemaking.

5.3 PURPOSE AND NEED

Please see Section 1.1 of the EA for a description of the problem and the purpose and need for this rulemaking.

5.4 DESCRIPTION OF MANAGEMENT ALTERNATIVES

Please see Section 2.0 of the EA for a summary of each alternative. Please see Section 4.2 of the EA for analysis of the expected ecological impacts.

5.5 ECONOMIC ANALYSIS OF EXPECTED EFFECTS OF EACH ALTERNATIVE RELATIVE TO THE BASELINE

No U.S. industrial sector is likely to be directly affected by the rulemaking. However, indirect effects may result in temporary and long-term responses that may be both positive and negative for various sectors of the U.S. seafood supply chain. If products of a particular foreign fishery are prohibited from the U.S. market, there may be short term disruptions in availability of those products, potentially impacting U.S. businesses until alternative sources can be found. In addition depending on the supply and the elasticity of the markets alternative fish and fish products may either be less preferred or cost more than the product subject to trade Sections 4.3 and 5.5.1 summarize the net economic benefits and costs of this rulemaking.

5.5.1 Net Economic Benefits

Where a foreign fishery is subject to a trade restriction, and buyers (e.g., importers, wholesalers, retailers) select a seafood product from an alternative source, then the proposed regulations may produce economic benefits for that alternative source. That alternative source could be U.S. fishermen, but it would depend upon the market dynamics for that particularly fishery.

If fisheries of harvesting nations implement regulatory requirements that are comparable in effectiveness to requirements imposed on U.S. fishermen to reduce bycatch of marine mammals, then the cost of harvesting fish could increase for the foreign fishery. This could potentially result in indirect benefits to U.S. fishermen who participate in the fishery, or whose seafood competes in the marketplace with the foreign seafood product. To the extent that foreign fishermen cost of production increases in order to reduce their

marine mammal bycatch to levels comparable to U.S. fishermen, an equilibration may occur, allowing domestic product to be priced more competitively.

Other sectors may benefit from this rule, both in the U.S. and within the harvesting nation. The aim of constructive engagement with harvesting nations is to increase the capacity of harvesting nations to manage their marine mammal stocks in a manner comparable in effectiveness to the United States. As such, U.S. business sectors and researchers could be instrumental in providing this capacity to harvesting nations. U.S. business sectors may provide consulting services and sales of technology needed to meet the goals of this rule. Additionally, cooperative research exploring better technologies will provide income and jobs for commercial fishermen, researchers, and related industries. Industries that can support capacity building in harvesting nations targeted by this rulemaking may benefit. Also, a benefit from thriving marine mammal populations for harvesting nations may increase eco-tourism opportunities.

5.5.2 Net Economic Costs and Impact of Trade Sanctions

Under the proposed regulations, if a harvesting nation's fishery fails to receive a comparability finding from the Assistant Administrator, importation into the United States of fish and fish products from that fishery will be prohibited. This may result in both temporary and long-term indirect costs for various sectors of the U.S. seafood supply chain (e.g. processors, restaurants, and other businesses that purchase seafood). However, NMFS does not anticipate that there would be a significant, long-term impact on the U.S. economy.

Because the process leading to a comparability finding is consultative and will take several years, it is very difficult and may not be meaningful to estimate the benefits, costs, and impacts of such findings. The analytical framework to evaluate the possible economic effects if a harvesting nation's fishery fails to receive a comparability finding and fish and fish products from that fishery are prohibited from importation into the United States, is based on the following assumptions:

First, the harvesting nations most likely to face import restrictions are those with the greatest number of fisheries, since those nations must develop a regulatory program for each fishery and adopt fishery specific measures to reduce the bycatch to levels below the bycatch limit.

Second, fisheries that operate on the high seas, may readily qualify for a comparability finding providing they demonstrate they are implementing marine mammal data collection and conservation and management measures adopted by an intergovernmental agreement or RFMO to which the United States is party.

Third, aquaculture facilities may also readily qualify for a comparability finding providing they demonstrate they do not intentionally kill or injure marine mammals in the course of their operations and have no accidental entanglement of marine mammals or

demonstrates that it has procedures to reliably certify that exports of fish and fish products to the United States are not the product of an intentional killing or serious injury of a marine mammal.

Fourth, commercial fishing operations that meet the definition of exempt fishery will not be subject to the requirement to develop and implement a regulatory program comparable in effectiveness to the U.S. regulatory program. As the default action in instances where there is insufficient data to evaluate a fishery is placement into the "export" category, some fisheries may be re-designated as "exempt" once adequate information is available.

Fifth, providing harvesting nations with an initial five-year period, prior to the first comparability finding, to develop and implement their regulatory program, the flexibility in the rule to demonstrate progress, develop alternative measures, and an additional four years to further refine their program after the first comparability finding, will reduce the number of fisheries subject to import restrictions.

The analysis considered the number of harvesting nations and the types of fish products exported to the United States. Freshwater fish, non-specific fish and fish products, and fish and fish products unfit for human consumption are excluded from this analysis. In 2012, 122 nations exported fish and fish products into the United States (Section 3.4.3 Table 3). These exports include fish and fish products where the nation may be: 1. The harvesting nation; 2. a processing/intermediary nation; and 3. a harvesting nation and an intermediary nation. Fifty-five percent (66) of those nations export five or fewer fish products, and 74 percent of the nations export 10 or fewer fish products (Figure 6). Only nine nations export between 16 but less than 20 fish products (Iceland, India, Indonesia, New Zealand, Norway, Peru, Philippines, Portugal, and Spain). Another nine nations export 26 or more fish products (Canada, Chile, China, Japan, Mexico, Taiwan, Thailand, South Korea, and Vietnam. The top 10 exporters of fish products (by volume and value) to the United States are Canada, Thailand, China, Chile, Indonesia, Vietnam, Ecuador, Mexico, India and Russia. (U.S. Census Bureau, Foreign Trade Division. http://www.NationMaster.com/graph/eco_tra_wit_us_us_imp_of_fis_and_she-trade-us-imports-fish-shellfish).

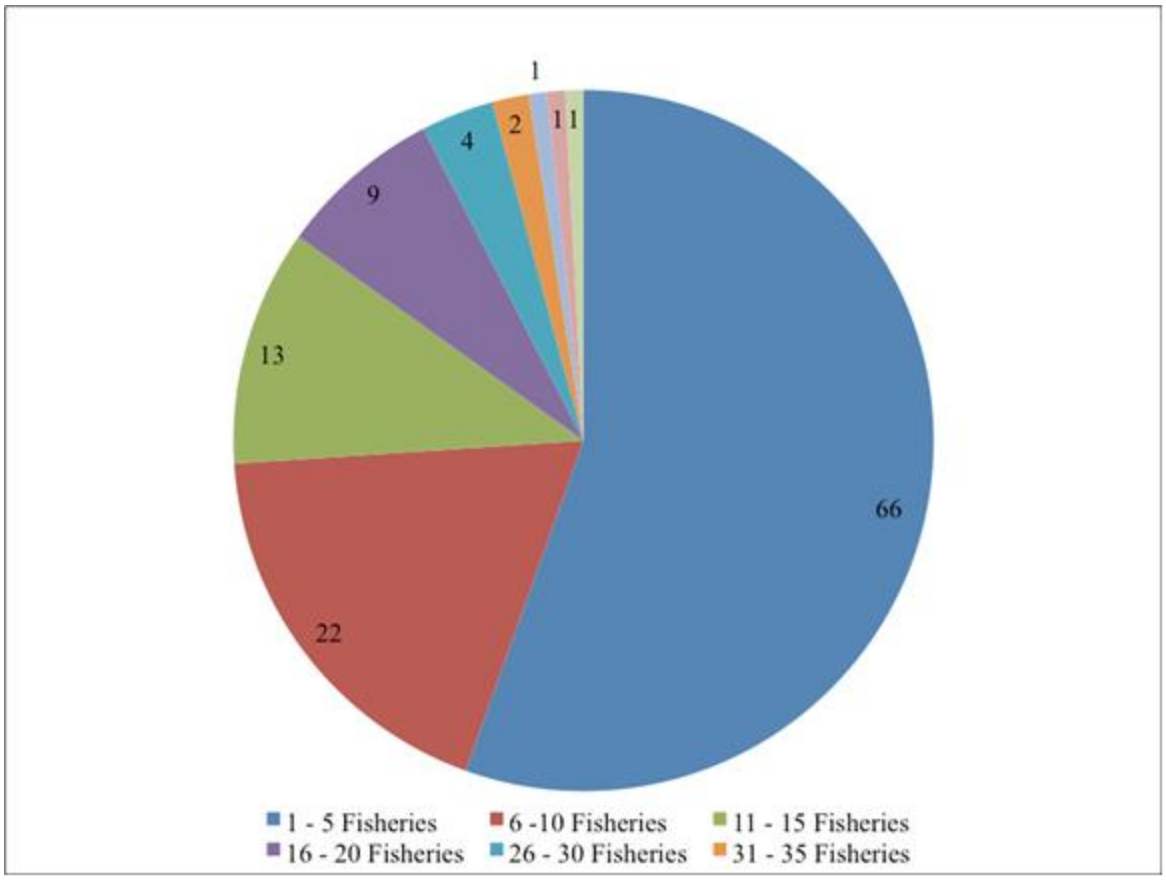


Figure 6. The number of fish and fish product exports by nations, in intervals of five.

The fish and fish products imported from the 18 harvesting nations exporting more than 15 different products to the U.S. are indicated in Tables 12 and 13. These tables demonstrate that several nations are the source of the same species of fish. However, it does not demonstrate that the market share for all fish species is distributed broadly, such that a trade restriction on one fishery would not significantly impact the market for that species/category.

Table 12. Nations that export between 16 and 20 fish and fish products to the United States

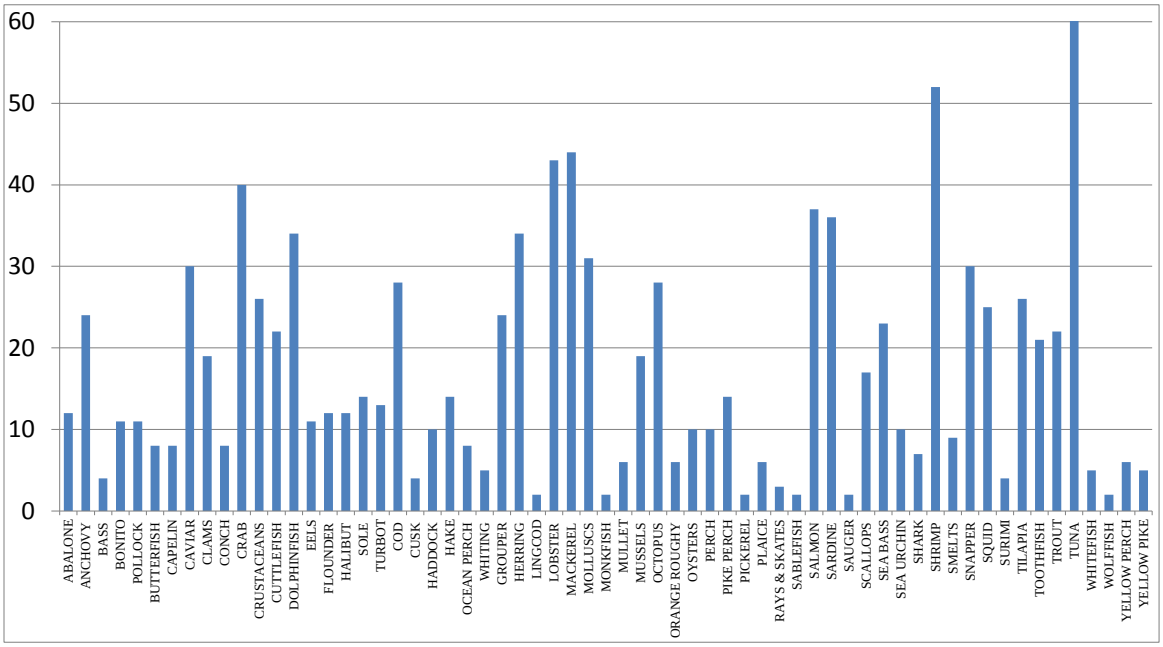
Iceland	India	Indonesia	New Zealand	Norway	Peru	Philippines	Portugal	Spain
Capelin	Anchovy	Clam	Abalone	Capelin	Abalone	Anchovy	Crustaceans	Anchovy
Caviar	Crab	Crab	Clams	Caviar	Anchovy	Bonito	Cuttlefish	Bass
Crustaceans	Crustaceans	Cuttlefish	Crustaceans	Crab	Butterfish	Clam	Eels	Bonito
Flounder	Cuttlefish	Dolphinfish	Dolphinfish	Crustaceans	Clam	Crab	Sole	Caviar
Halibut	Dolphinfish	Grouper	Cod	Halibut	Conch	Cuttlefish	Cod	Clam
Plaice	Cod	Mackerel	Hake	Turbot	Crab	Dolphinfish	Haddock	Crustaceans
Sole	Hake	Molluscs	Grouper	Cod	Cuttlefish	Pollock	Hake	Cuttlefish
Cod	Whiting	Octopus	Lobster	Haddock	Dolphinfish	Grouper	Whiting	Sole
Cusk	Grouper	Salmon	Molluscs	Pollock	Whiting	Herring	Mackerel	Cod
Haddock	Mackerel	Sardine	Mussels	Herring	Mackerel	Lobster	Molluscs	Lobster
Pollock	Molluscs	Shrimp	Orange Roughy	Mackerel	Molluscs	Mackerel	Octopus	Mackerel
Mackerel	Octopus	Snapper	Oysters	Salmon Farmed	Octopus	Molluscs	Sardine	Molluscs
Molluscs	Sardine	Squid	Salmon (F) Farmed	Salmon Wild	Sardine	Octopus	Shrimp	Mussels
Monkfish	Shrimp	Surimi	Salmon (W)	Sardine	Scallops	Sardine	Smelts	Octopus
Salmon (F)	Snapper	Swordfish	Snapper	Squid	Shrimp	Scallops	Squid	Sardine
Salmon (W)	Squid	Tilapia	Squid	Trout	Smelts	Shrimp	Tuna	Scallops
Shrimp	Tuna	Toothfish	Swordfish		Squid	Squid	Wolffish	Shark
Trout		Tuna	Toothfish		Tilapia	Tilapia		Shrimp
Wolffish					Toothfish	Tuna		Squid
					Trout			Tuna

Table 13. Nations that export more than 25 fish and fish products to the United States

Canada	Chile	China	Japan	Mexico	South Korea	Taiwan	Thailand	Vietnam
Anchovy	Abalone	Abalone	Lobster	Abalone	Anchovy	Abalone	Anchovy	Anchovy
Bass	Anchovy	Anchovy	Molluscs	Clam	Atka Mackerel	Anchovy	Capelin	Catfish
Capelin	Bass	Bass	Abalone	Crab	Bonito	Caviar	Clam	Clam
Caviar	Clams	Bonito	Anchovy	Crustaceans	Capelin	Crustaceans	Crab	Crab
Clams	Crab	Yellowtail	Atka Mackerel	Cuttlefish	Caviar	Cuttlefish	Crustaceans	Crustaceans
Conch	Crustaceans	Pollock	Bonito	Dolphinfish	Clam	Dolphinfish	Cuttlefish	Cuttlefish
Crabs	Dolphinfish	Butterfish	Capelin	Flounder	Crab	Eels	Dolphinfish	Dolphinfish
Crustaceans	Flounder	Caviar	Caviar	Halibut	Cuttlefish	Ocean Perch	Eel	Eels
Flounder	Halibut	Clams	Clam	Cod	Eels	Hake	Flounder	Sole
Halibut	Hake	Conch	Cobia	Grouper	Flounder	Whiting	Sole	Cod
Plaice	Whiting	Crab	Crab	Lingcod	Halibut	Lobster	Cod	Hake
Sole	Lobster	Crustaceans	Crustaceans	Lobster	Sole	Mackerel	Herring	Whiting
Turbot	Mackerel	Cuttlefish	Cuttlefish	Mackerel	Turbot	Molluscs	Lobster	Ocean Perch
Cod	Molluscs	Dolphinfish	Dolphinfish	Molluscs	Cod	Mullet	Mackerel	Grouper
Cusk	Mussels	Eels	Eels	Mussels	Cusk	Octopus	Molluscs	Herring
Haddock	Salmon (F)	Flounder	Halibut	Octopus	Haddock	Perch	Mullet	Lobster
Hake	Salmon (W)	Halibut	Cod	Oysters	Hake	Pike Perch	Mussels	Mackerel
Ocean Perch	Scallops	Sole	Cusk	Sardine	Pollock	Yellow Pike	Octopus	Molluscs
Pollock	Seabass	Turbot	Herring	Scallops	Herring	Sablefish	Orange Roughy	Mullet
Whiting	Shrimp	Cod	Lobster	Sea Bass	Mackerel	Sardine	Oysters	Octopus
Herring	Squid	Cusk	Mackerel	Sea Urchin	Molluscs	Seabass	Perch	Orange Roughy
Lingcod	Surimi	Haddock	Molluscs	Shark	Monkfish	Sea Bass	Pike Perch	Perch
Lobster	Swordfish	Hake	Octopus	Shrimp	Octopus	Shrimp	Yellow Pike	Pike Perch
Mackerel	Tilapia	Ocean Perch	Oysters	Snapper	Oysters	Squid	Salmon	Yellow Pike
Molluscs	Toothfish	Whiting	Pike Perch	Squid	Sardine	Tilapia	Sardine	Pickerel
Monkfish	Trout	Grouper	Yellow Pike	Swordfish	Sea Urchin	Tuna	Shrimp	Salmon
Mussels	Tuna	Herring	Salmon	Trout	Scallops		Snapper	Sardine
Oysters		Lobster	Sardine	Tuna	Shrimp		Squid	Scallops
Sablefish		Mackerel	Scallops		Squid		Tilapia	Shrimp
Salmon (F)		Molluscs	Sea Urchin		Swordfish		Tuna	Smelts
Salmon (W)		Monkfish	Shrimp		Toothfish			Squid
Sardine		Mussels	Smelts		Tuna			Surimi
Sauger		Octopus	Squid		Whitefish			Swordfish
Scallops		Orange Roughy	Swordfish					Tilapia
Sea Urchin		Oysters	Toothfish					Trout
Shark Fins		Salmon	Tuna					Tuna
Shrimp		Sardine						
Smelts		Scallops						
Squid		Shark Fins						
Trout		Shrimp						
Tuna		Smelts						
Whitefish		Snapper						
		Squid						
		Surimi						
		Tilapia						
		Toothfish						
		Tuna						
		Wolffish						

Figure 7 shows the number of nations (Y-axis) exporting specific fish and fish products to the United States, with tuna, shrimp, salmon (including salmon, farmed salmon, wild salmon) molluscs, mackerel, and sardines representing some of the largest imports (by number of countries) into the United States. Tuna fisheries are conducted primarily on the high seas, whereas shrimp and salmon fisheries are a combination of live capture and aquaculture operations (http://www.st.nmfs.noaa.gov/commercial-fisheries/foreign-trade/applications/annual-product-by-countryassociation).

Figure 7. The number of countries exporting (Y-axis) specific fish and fish products (X-axis) to the United Stated. Source: NMFS



For the purpose of estimating potential economic impacts of the rule, NOAA has developed the following analysis, focusing on the two significant drivers of those potential impacts: the likelihood that import prohibitions of the same species from several fisheries will occur, and the impact on the consumer if certified and domestic fisheries are unable to fill the gap left by the import prohibitions.

More than 63% of the products listed in Figure 7 are imported into the United States from 10 or more nations. Using Figure 7, three examples can be analyzed to evaluate the impact of an import prohibition on the seafood market. The first scenario is a fish species imported from fewer than ten nations, the second is a fish product imported from between 10 and 40 nations, and the last is a fish product imported from more than 40 nations.

There are two important caveats with this approach. First, is that while the United States imports this fish and fish product, NMFS does not have information linking this import to a specific fishery and gear type. Without that information, NMFS does not have data on marine mammal bycatch in the associate fisheries and cannot determine their category or level of risk.

Second, seafood supply chains are complex and there are often intermediary nations that process large amounts of the global supply of one or more species. It is highly uncertain how these nations will react in the event of a trade importation on a specific fishery. In a low cost scenario of the rule, intermediary nations may either refuse to accept product from a banned fishery or establish a traceability system sufficient to certify that the banned product is not being exported to the U.S. market. In a high cost scenario, intermediary nations may continue to co-mingle the product subject to a prohibition with other fisheries that received a comparability finding. In this circumstance, all product exported by the intermediary nation that contain the species would be subject to a prohibition. Therefore, the cost of the rule is influenced by the role and behavior of intermediary nations and there may be scenarios where a large portion of the supply of certain species to the U.S. market may be no longer admissible.

For the first example, in 2015, 6 nations provided nearly 1.5 million kilos of orange roughy valued at approximately $19 million to the United States. The table below is a rough approximation of the distribution, amount, and value among the nations exporting this product to the United States. With the exception of New Zealand, the impact of an import prohibition on any of the other nations would directly affect a relatively small amount of product to the U.S. market. Therefore, the impact of an import prohibition is likely to be negligible contingent upon the role and behavior of any intermediary nations. In this instance, NMFS believes that the likelihood of an import prohibition is remote because New Zealand is a developed nation with laws in place that could serve the basis for a comparable regulatory program if it were determined that this fishery had marine mammal bycatch.

County	Kilos	Dollars	Percentage of Import Market
China	380,000	5,000,000	26
China-Taipei	36,000	230,000	2.5
Indonesia	2,000	9,000	<1
New Zealand	980,000	13,000,000	68
Peru	45,000	316,000	3
Thailand	25,000	250,000	2
TOTAL	1,468,000	18,805,000	

As another example, in 2015, 6 nations provide approximately 200,000 kilos of plaice valued at approximately $1.5 million to the United States. A caveat to this analysis, while the United States imports this fish and fish product, NMFS does not have information linking this import to a specific fishery and gear type. Without that information NMFS does not have data on marine mammal bycatch in the associate fisheries and cannot determine their category, level of risk, or probability that an import prohibition may be imposed. The table below is a rough approximation of the distribution, amount, and value among the nations exporting this product to the United States. An import prohibition on the nations all exporting less than 1 percent of the

market would directly affect a relatively small amount of product to the U.S. seafood market. Therefore, the impact of an import prohibition is likely to be negligible contingent upon the role and behavior of any intermediary nations. An import prohibition of Canada, Iceland, or the Netherlands would have more than a negligible impact but one that the market could likely still absorb. Plaice is one flatfish species of several that are sold across a wide spectrum of market outlets, from upscale restaurants selling fresh "sole" or "flounder" to fresh and frozen retail markets. Flounder is an acceptable and commonly used market name for plaice. With the exception of some small, niche upscale markets, consumer preference is similarly adaptable to many flatfish species. Therefore, there are a variety of flatfish species imported and harvested domestically that could easily fill this void in the market. To put the import volume of plaice that is potentially impacted in this scenario, imports of all flatfish in 2015 totaled in excess of 34.7 million kilograms, and U.S. flatfish exports totaled 117 million kilos in the same year.

An import prohibition of the three largest exporters (Canada, Iceland, Netherlands) would be unlikely as these nations are developed nations with either some capacity or existing legislation that would favor their securing a comparability finding if one was required for these fisheries. Additionally, domestic landings of plaice, in 2014, were 1,332,600 kilos at a value of $4,865,628 for 4 times the value of all imports combine. An import prohibition of any of these nations would likely benefit U.S. fisheries or other nations exporting flatfish products to the U.S. However impact on pricing would be unlikely due to the modest contribution of these fisheries to the sole and broader whitefish markets in the U.S.

County	Kilos	Dollars	Percentage of Import Market
Canada	49,000	135,000	24
Costa Rica	300	4,000	<1
Iceland	70,000	826,000	35
Netherlands	80,000	567,000	40
South Korea	280	3,900	<1
United Kingdom	1,100	23,000	<1
TOTAL	200,680	1,558,900	

The second analysis is of fish and fish products sourced from between 10 and 30 nations. Twenty-four nations supply the United States with more than 4 million kilos of anchovy valued at more than $39 million. Five nations dominate the market, but no one nation exports more than 26% of the market. The same caveat applies to this analysis; NMFS does not have information linking anchovy imports to specific fisheries and gear type with known marine mammal bycatch. Therefore, NMFS cannot determine if these fisheries would be export or exempt, the level of risk posed by these fisheries to marine mammals, or the probability that an import prohibition may be imposed. The nations represented in this table include fisheries that would appear to operate in the Atlantic and Pacific Oceans and the Mediterranean Sea. NMFS would not expect an import

prohibition across all oceans due to the difference in fishing methods and marine mammals encountered. Morocco has the largest market share, and if it is subject to an import prohibition, U.S. importers could source product from other nations in that region or from nations in other oceans. Were those nations unable to replace the exports of Morocco, some increase in pricing might be expected. For example, a resultant increase of 10% would result in a total impact to the U.S. consumer of approximately $4 million.

Country	Kilos	Dollars	Percentage of Market
Argentina	549,969	2,506,680	13.10%
Chile	117,994	995,996	2.81%
China	915	15,653	0.02%
China-Hong Kong	15,514	110,631	0.37%
China-Taipei	2,629	16,701	0.06%
Egypt	10,600	73,299	0.25%
France	11,651	85,538	0.28%
Greece	7,780	79,110	0.19%
India	34,609	112,220	0.82%
Italy	593,927	5,550,413	14.15%
Japan	6,227	92,926	0.15%
Malaysia	17,977	123,465	0.43%
Morocco	1,080,927	13,905,041	25.75%
Norway	363	3,357	0.01%
Peru	775,224	7,396,801	18.47%
Philippines	464	3,918	0.01%
South Korea	456,988	3,094,511	10.89%
Spain	303,497	3,711,624	7.23%
Sri Lanka	4,397	18,532	0.10%
Sweden	5,471	23,827	0.13%
Thailand	52,456	358,046	1.25%
Turkey	102,606	715,690	2.44%
United Kingdom	3,144	22,789	0.07%
Vietnam	42,584	196,731	1.01%
Grand Total: 2015	**4,197,913**	**39,213,499**	

Finally, as further evidence to evaluate whether the U.S. market can substitute comparable domestic or foreign product for prohibited fish Tables 14-16 show the relative amount provided by country of origin for shrimp, tuna, and salmon, the top three consumed seafood items in the U.S. In this section, and using the example of tuna, the size of the global market is quite evident and significant allowing any import restriction on one nation to be modified or absorbed from other exporting nations. However, there

are important intermediary nations in the processing of tuna and the cost of a trade prohibition to the U.S. consumer would be contingent upon the role and behavior of intermediary nations.

More than 60 nations import tuna into the United States. Table 14 illustrates the exporters of canned tuna to the United States by country of origin, weight and value. More detailed information on tuna imports is available at http://www.st.nmfs.noaa.gov/commercial-fisheries/foreign-trade/applications/annual-product-by-countryassociation. In 2015, the United States imported more than 262 million kilos of tuna valued at more than $1.4 billion dollars. The largest exporter is Thailand, who exported more than 93 million kilos of tuna to the United States. Thailand is both a harvesting nation, landing roughly 26 million kilos, and intermediary nation, by way of its canning operations. Currently, Thailand processes almost one-quarter of the world's canned tuna (736,000 mt in 2008). Other nations exporting more than 20 million kilos include Vietnam, the Philippines, Indonesia, Ecuador, and China. Several of these nations are also processors, including Ecuador, which is the second largest processing site accounting for almost 12% of global annual production (362,400 mt in 2008).

Tuna is caught in numerous gear types including purse seine nets, longline, hook and line, trolling, trap, harpoon and gillnets. Marine mammals interact with several gear types used in fisheries managed by tuna regional fishery management organizations (RFMOs). They most commonly interact with or are caught in purse seine, longline, and gillnet gear. With the exception of the eastern tropical Pacific Ocean, accurate abundance and bycatch estimates for marine mammals are lacking in areas where marine mammal distribution overlaps tuna fisheries, making quantitative analysis of bycatch extremely difficult. Nevertheless, there has been progress in quantifying tuna RFMO fishery impacts on or bycatch of marine mammals and several RFMOs have either passed or introduced measures to mitigate or reduce marine mammal mortality. For example, both the Western Central Pacific Fisheries Commission and the Indian Ocean Tuna Commission have adopted measures that prohibit the intentional encirclement of marine mammals in purse seine sets and also require safe handling and release in the event that a marine mammal is encircled. Similar measures have been introduced for purse seine fisheries operating under the International Convention for the Conservation of Atlantic Tunas. Therefore, these conservation and management measures would govern the purse seine fisheries of Thailand, Vietnam, Philippines, Indonesia and China. Ecuador, which has an affirmative finding for its yellowfin tuna purse seine fisheries, exports are governed predominantly by the Agreement on the Dolphin Conservation Program Act and Section 101(a)(2)(B) of the MMPA. Because these regulatory programs are in place for purse seine fisheries, import prohibitions are unlikely for such fisheries.

Evaluation of marine mammal bycatch and, where necessary, adoption of conservation and management measures is still needed for other gear types. Absent information on marine mammal bycatch in these gear types, categorization of the fisheries, and an understanding of the portion of tuna exported to the United States from those gears, meaningful further economic analysis is difficult. As stated in the rule, the United States will work to secure conservation and management measures within the relevant RFMOs

applicable to gear types with marine mammal bycatch or for which the U.S. has a regulatory program governing its domestic fisheries. A comparability finding for such high seas tuna fisheries would require that harvesting nations : (a) implement marine mammal data collection and conservation and management measures applicable to that fishery required under any applicable intergovernmental agreement or regional fisheries management organization to which the United States is a party; and (b) implement in the export fishery, with respect to any transboundary stock interacting with the export fishery, any measures to reduce the incidental mortality and serious injury of that stock that the United States requires its domestic fisheries to take with respect to that transboundary stock; and (c) with respect to any other marine mammal stocks interacting with the export fishery while operating on the high seas, any measures to reduce incidental mortality and serious injury that the United States requires its domestic fisheries to take with respect to that marine mammal stock when they are operating on the high seas.

Without predetermining comparability findings in the future, NMFS does not envision application of import restrictions on tuna fisheries that could negatively impact the U.S. market. The large number of nations providing tuna to the U.S. market further supports the elasticity in that market to absorb most import prohibitions, though the true costs would be contingent upon the willingness and ability of intermediary nations to ensure prohibited product is not exported to the U.S. Also, an assumption that an import prohibition on a particular harvesting nation will mean that all tuna exports from it and any intermediary nation may not be valid. NMFS also does not envision difficulties in nations complying with the intermediary provisions requiring nations to either certify that it does not import, or does not offer for import into the United States, fish or fish products subject to an import prohibition; or that it has procedures to reliably certify that exports of fish and fish products from the intermediary nation to the United States do not contain fish or fish products caught or harvested in a fishery subject to an import prohibition. The requirements of both the Dolphin Protection Consumer Information Act and the existing intermediary nation provisions under the affirmative finding requirements for yellowfin tuna caught from the eastern tropical Pacific Ocean under the MMPA lay the groundwork to trace tuna and tuna products from harvest to point of entry into the United States.

Table 14. 2015 Tuna imports to the United States by country of origin, weight, and value.

Country	Kilos	Dollars	Country	Kilos	Dollars
AUSTRALIA	800,774	9,680,217	BARBADOS	192,972	1,882,348
BRAZIL	1,104,310	9,502,497	CANADA	2,298,661	21,743,501
CAPE VERDE	150,440	589,435	CHILE	2,235	24,255
CHINA	23,956,162	104,227,010	CHINA - TAIPEI	690,887	8,477,291
COLOMBIA	2,015,485	12,321,484	COSTA RICA	1,489,708	13,725,982
CROATIA	101,454	857,356	ECUADOR	21,719,543	128,455,660
EL SALVADOR	12,275	99,683	FIJI	13,034,833	73,602,727
FRANCE	6,999	51,836	FRENCH POLYNESIA	1,029,636	8,058,114
GERMANY	64	2,407	GREECE	6,037	84,644
GRENADA	636,831	4,400,498	GUATEMALA	2,987	20,675
GUYANA	1,792	21,726	ICELAND	3,245	60,531
INDIA	16,301	185,450	INDONESIA	23,066,920	168,682,840
ISRAEL	9,761	57,977	ITALY	105,020	1,163,730
IVORY COAST	19,727	237,184	JAPAN	661,830	7,817,631
KIRIBATI	95,904	1,000,162	LATVIA	1,618	8,111
MALAYSIA	143,972	1,109,672	MALDIVE IS.	1,909,556	19,222,444
MALTA	123,515	731,879	MARSHALL IS.	1,439,962	7,074,290
MAURITIUS	7,161,996	39,946,002	MEXICO	6,453,827	31,095,792
MOROCCO	13,561	29,568	MOZAMBIQUE	8,516	41,759
NETHERLANDS	410	4,784	NEW ZEALAND	1,456	13,559
NORWAY	315	9,800	PALAU	8,510	17,020
PANAMA	981,654	7,822,647	PERU	83,736	499,905
PHILIPPINES	20,138,804	101,837,807	PORTUGAL	282,729	1,818,457
SENEGAL	203,196	1,061,793	SEYCHELLES	2,848	31,591
SINGAPORE	105,552	980,217	SOLOMON IS.	449,431	2,543,909
SOUTH AFRICA	294,583	2,155,009	SOUTH KOREA	1,028,336	9,093,724
SPAIN	1,175,741	18,126,182	SRI LANKA	3,471,812	40,172,904
SURINAME	1,013,754	5,486,902	THAILAND	93,598,649	396,683,634
TONGA	42,374	186,101	TRINIDAD & TOBAGO	2,059,678	24,044,944
TUNISIA	7,304	135,274	TURKEY	96,749	540,525
UNITED ARAB EMIRATES	1,500	2,850	UNITED KINGDOM	4,594	51,812
VANUATU	19,898	201,477	VENEZUELA	514,868	5,859,868

Country	Kilos	Dollars	Country	Kilos	Dollars
VIET NAM	26,152,670	152,193,278	WESTERN SAMOA	54,539	516,466
Grand Total: 2015	**262,285,006**	**1,448,386,807**			

Tables 15 and 16 provide information on sources of shrimp and salmon. Because of the large proportion of shrimp and salmon aquaculture represented in these figures, and the fact that many aquaculture facilities are expected to fall into the exempt fishery category, NMFS does not anticipate the application of import restrictions that will result in disruptions to the U.S. market. More than 50 nations import shrimp into the United States, Table 15 illustrates the distribution share of the U.S. shrimp imports in volume and value from major exporters in 2015.

Table 15. Shrimp imports, by country of origin, volume and value for 2015

Country	Kilos	Dollars	Country	Kilos	Dollars
ARGENTINA	5,071,414	43,847,270	AUSTRALIA	2,545	48,361
BANGLADESH	2,125,653	35,423,477	BELIZE	477,571	5,888,140
BRAZIL	553	2,291	BRUNEI	24,780	315,282
BURMA	445,926	8,044,777	CANADA	4,070,287	30,562,147
CHILE	40,727	483,800	CHINA	28,587,522	189,314,833
CHINA - HONG KONG	99,482	764,773	CHINA - TAIPEI	209,813	2,158,423
COLOMBIA	168,136	1,953,502	COSTA RICA	128,881	1,335,711
CYPRUS	19,101	135,935	DENMARK	23,916	277,137
ECUADOR	85,701,591	634,897,117	EL SALVADOR	48,576	438,265
GREENLAND	2,225	49,586	GUATEMALA	3,946,871	35,413,416
GUYANA	7,269,731	45,431,796	HAITI	201	3,047
HONDURAS	4,757,348	32,333,348	INDIA	135,351,811	1,281,405,525
INDONESIA	114,415,898	1,100,224,307	IVORY COAST	1,200	8,000
JAPAN	41,335	432,072	MALAYSIA	8,294,673	75,435,616
MEXICO	27,995,384	320,381,229	MOROCCO	2,520	91,711
NETHERLANDS	998	5,500	NEW CALEDONIA	16,704	274,906
NICARAGUA	2,310,943	15,322,526	NIGERIA	178,189	4,688,873
PAKISTAN	863,546	10,598,070	PANAMA	3,199,041	33,246,232
PERU	10,274,011	83,707,354	PHILIPPINES	2,337,944	16,024,272
PORTUGAL	22,376	480,120	SAUDI ARABIA	355,332	2,207,786
SENEGAL	30,060	900,495	SINGAPORE	149	3,447
SOUTH KOREA	106,438	765,282	SPAIN	84,654	1,270,536

SRI LANKA	108,216	751,436	SURINAME	370,233	2,516,775
THAILAND	73,866,041	755,372,976	TUNISIA	2,692	48,292
UNITED ARAB EMIRATES	281,374	2,444,909	UNITED KINGDOM	3,042	55,399
VENEZUELA	2,318,387	12,582,398	VIET NAM	60,678,982	660,377,878
Grand Total: 2015	**586,735,023**	**5,450,746,356**			

More than 35 nations import salmon into the United States; Table 16 illustrates the distribution share of the U.S. salmon imports in volume and value from major exporters in 2014. U.S aquaculture facilities are Category III fisheries, having a remote likelihood of marine mammal mortality and serious injury. By analogy, NMFS anticipates that most aquaculture facilities will be designated exempt in the List of Foreign Fisheries. In that situation, harvesting nations with exempt aquaculture facilities to receive a comparability finding operating within the harvesting nation's exclusive economic zone (EEZ) and territorial sea, the high seas, or in the waters of another state, the harvesting nation must demonstrate it has prohibited the intentional mortality or serious injury of marine mammals in the course of it aquaculture operations unless the intentional mortality or serious injury of a marine mammal is imminently necessary in self-defense or to save the life of a person in immediate danger; or that it has procedures to reliably certify that exports of fish and fish products to the United States are not the product of an intentional killing or serious injury of a marine mammal unless the intentional mortality or serious injury of a marine mammal is imminently necessary in self-defense or to save the life of a person in immediate danger. NMFS believes that this approach offers maximum flexibility for such operations, while remaining true to the clearest U.S. standard of the MMPA that currently governs U.S. aquaculture operations.

Table 16 Salmon imports, by country of origin, volume and value 2015

Country	Kilos	Dollars	Country	Kilos	Dollars
AUSTRALIA	800	6,907	BRAZIL	2,998	21,600
CANADA	91,171,604	596,812,314	CHILE	133,713,671	1,155,228,458
CHINA	37,573,209	226,744,220	CHINA - TAIPEI	630	5,180
COSTA RICA	13,257	89,914	DENMARK	189,932	2,870,375
ECUADOR	2,757	23,313	FAROE IS.	13,048,279	88,946,018
FRANCE	66,054	1,429,777	GERMANY	4,149,067	44,277,646
GREECE	559,971	12,973,978	ICELAND	2,175,952	19,731,281
IRELAND	238,308	2,636,630	ISRAEL	7,633	103,980
ITALY	2,617	35,907	JAPAN	42,592	402,954
LATVIA	9,334	58,748	LITHUANIA	9,282	88,149
MALDIVE IS.	5,867	111,576	NETHERLANDS	2,290,225	49,905,467
NEW ZEALAND	1,320,839	14,114,741	NORWAY	38,481,465	346,008,086
PERU	3,140	33,950	POLAND	516,839	7,497,767
PORTUGAL	67,108	526,526	RUSSIAN FEDERATION	722,115	5,133,304
SOUTH KOREA	11	5,905	SPAIN	1,369	42,153
SWEDEN	94,727	1,693,561	SWITZERLAND	49	8,404
THAILAND	4,839,343	32,216,707	UKRAINE	16,599	150,936
UNITED KINGDOM	12,931,672	100,919,362	VENEZUELA	1,112	9,210
VIET NAM	348,695	2,400,594			
Grand Total: 2015	**344,619,122**	**2,713,265,598**			

As discussed, this rule may indirectly affect U.S. seafood importers, processors, wholesalers, retailers and consumers. Although NMFS anticipates that there will be a small number of fisheries that will be denied a comparability finding, it cannot speculate at this time as to which nations or fisheries may fail to comply with this rule, and so any further economic analysis would be speculative and based on scientifically unfounded assumptions pertaining to the risk that any one fishery poses to marine mammals.

NMFS notes that for the purposes of its analysis under the Paperwork Reduction Act, it has assumed that import restrictions will be imposed on 10 fisheries and similar products will require certificates of admissibility. The original estimate to complete the Certification of Admissibility Form was 10 minutes, including gathering supporting documentation. We estimated 90 respondents for a total of 900 responses and 150 total hours on an annual basis. In addition to the paperwork burden, there are numerous factors that determine whether there is a discernible impact to the U.S. consumer, and we have described those impacts without making assumptions regarding which nations may fail to receive a comparability finding.

NMFS sought comment on which fisheries the public believed may not receive comparability findings and any potential economic impacts to the U.S. market. Both the Maine lobster industry and the Maine Department of Marine Resources (DMR) expressed concern that a significant portion of Maine's lobster is sent to Canada for processing and comes back to the United States as a product of Canada. These entities also expressed concern that seafood traceability may be inadequate and existing traceability technologies may not be operationally sufficient, due to comingling of product and scale of operations, to track lobster through the product supply chains should any trade restrictions be imposed by this rule. These entities claimed that application of an import prohibition on Canadian lobster could prevent millions of pounds of Maine-caught lobster from being sold in the U.S. and requested that NMFS review the economic impact of such actions. There is no basis now to speculate that any import prohibition would ensue on Canadian lobster. In 2015, the United States imported 55,599,274 kilos of lobster at a value of $1,185,792,781. This includes American lobster processed in Canada. Of that amount, 31,472269 kilos valued at $429 million was live lobster which is likely Canadian product and not re-exported U.S. product. Likewise 15,135,959 kilos was frozen product valued at $471,501,248, again likely to be Canadian product. According to Maine DMR, in 2014, Maine imported $238 million of seafood from Canada. However, DMR did not stipulate what percentage of these imports is Maine-caught lobster being re-imported to the United States. U.S. import statistics indicate that the U.S. imports $261 million or 8,484,147 kilos of processed product (e.g., cooked and prepared dinners) from Canada. Some portion of this is likely to be U.S. lobster processed in Canada; however, the exact percentage is unknown. NMFS believes that Maine and other states in the United States that process lobster could absorb the roughly 8 million kilos of processed product, if necessary. Maine is increasing its lobster meat processing capabilities. In 2010, there were five companies processing lobster. In 2013 that number increased to 15 firms processing approximately 20 million pounds of meat. As Maine continues to increase its processing capacity, any potential economic impact from an import restriction will be lessened.

Also, contrary to the comments received, Canada, in response to other global seafood traceability movements, is developing lobster traceability programs. In 2011, the Canadian Council of Fisheries and Aquaculture Ministers undertook the "Lobster Traceability Pilot Project," the objective of which was to "test the implementation of a seafood traceability system with practical experience, with real-life situations and challenges, and with a small number of participants at each step of the lobster value chain

(a small number of fishermen, a few processors, one or two distributors, etc.)." The pilot report covers traceability requirements and models based on government regulations and existing traceability programs. The pilot report identified that the primary requirement of any traceability program must be that it can fully trace lobster, at any point in the supply chain, back to the source within 24 hours. The pilot report recommended that the basic model for traceability, and one implemented by the U.S. Bioterrorism Act, is known as "one up, one down". This mandates that each organization in the supply chain must be able to identify from whom, where, and when the product was received and to whom, where, and when the product was sent. Additional requirements to support traceability include standards for batch sizing and sourcing, standardized product labeling, and data storage. Since this pilot report, several harvesters and processors have adopted traceability programs, including the lobster fishery on the Gaspe Peninsula in Quebec. And the Fisheries, Science Stewardship and Sustainability Board implemented a Newfoundland, Labrador lobster traceability program. As not only Canadian importers and processors, but other nations as well continue to develop and roll-out additional tracking, verification, and traceability procedures that allow for the tracking of seafood products through the supply chain in response, not to this rule, but to other global forces, the impact to U.S. seafood markets will be diminished.

There are several factors that prevent NOAA from quantifying the cost of the rule. NOAA does not currently possess the data necessary to determine with any specificity which imports correspond to a specific fishery and gear type and of those fisheries which are export fisheries currently operating in excess of U.S. standards or which fisheries will likely fail to receive a comparability finding. Moreover, some harvesting nations that are in excess of U.S. standards now may subsequently refine their program and receive a comparability finding. NOAA is unable to estimate the number of export fisheries that would continue to be operating in excess of U.S. standards after the initial five-year period, prior to the effective date for a comparability finding. NOAA would also need to determine whether each fishery subject to trade restrictions supplies a large proportion of the U.S. market for that particular type of seafood.

As we have discussed above, there are several factors that suggest the economic impacts of the rule may be low. There is evidence to suggest that market share is distributed broadly within some categories of seafood consumed in the U.S., and comparable substitutes to prohibited seafood likely will be available to U.S. businesses. However, there may be categories of seafood where one nation is a relatively large source of exports to the U.S. Nevertheless, a number of large importers to the United States have substantial marine mammal protection regulations (e.g. Chile and Peru). A trade ban in such a circumstance could directly impact the U.S. market depending on global supply and demand. Similarly, a ban on multiple countries that together account for a relatively large share of exports to the U.S. could impact the U.S. market. If one or more intermediary nations were to be unable or unwilling to prevent prohibited product from being exported to the U.S., it could also impact the U.S. market.

Because harvesting nations have significant time to develop their regulatory program for their fisheries, and there is consultative process and assistance available to nations, the

likelihood of import prohibitions is further reduced, but not eliminated. Additionally, the rule also contains considerable flexibility, allowing the NMFS to consider alternative measures, the implementation of the U.S. regulatory program compared to the regulatory program of a harvesting nation, and the ongoing progress of a nation in developing and refining its regulatory program to meet the applicable conditions. Consequently implementation of this rule provides domestic importers, wholesalers, and processors with time to identify comparable sources of fish and fish products in the event that a fishery fails to receive a comparability finding and an import prohibition is put into place. This may mitigate short term disruptions in the flow of seafood imports and help reduce adverse indirect impacts to the U.S. economy.

NMFS does not anticipate that national benefits and costs would change significantly in the long term as a result of the implementation of the preferred alternative.

5.5.3 Cost to Government to Implement the Rule

The tasks and the actions to administer the rule are set out in Table 17. NMFS estimates that implementation of this rule will cost approximately $0.9 million per year, which is based on the cost of NMFS and contract staff to carry out these activities. NMFS estimates that a total of 3.5 full time employees (FTEs) and two contract employees with subject matter expertise will be required. The 3.5 FTEs are already part of the plan for hiring for the Office of International Affairs and Seafood Inspection (3 FTEs) and the Office of Sustainable Fisheries (0.5 FTEs) and therefore this activity will not require additional personnel or funds. Contractors will be hired to work with other countries in capacity building activities and assisting in collecting the information to be submitted as required by this rule. As the work shifts from outreach to comparability studies the FTEs and contractors will also shift from training and capacity building activities to managing and evaluation of the packages submitted by countries.

Table 17. Marine Mammal Protection Act Import Rule Tasks for 2016-2022

Task/Number of FTE's Working on Task (Note: these are *not* the number of FTE/Contractors needed)	**2016**					**2017**/*2020*												**2018**/*2021*												**2019**/*2022*											
	A	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Upon publication of the final rule, prepare country cable and work with State Department to distribute to 122 nations; (One staff person referred to as MMPA-1)																																								
Development and maintenance of the marine mammal bycatch and list of fisheries database by nation and fishery (info will be revised using progress reports and data submitted in the LFF; Staff include MMPA 1 and one ½ time database managers and one analyst (analyst could work on MMPA and MSRA)																																								
Undertake outreach to nations to educate them about the rule and assist in their implementation with the requirements of the rule (involves meetings and travel to major trading partners) includes ongoing consultations in out years; (Two part-time contractors, plus MMPA-1 for the first year, one existing staff plus one FTE that is planned to be hired hereafter referred to as MMPA-2																																								
Prepare and mail individual letters to nations providing available import and bycatch data and ask that they provide information as required by the rule. (MMPA-1 plus administrative assistance)																																								
Receipt of nation data and data entry into the database (MMPA-1 plus PT of MMPA-2)																																								
Evaluation of data and development of the List of Foreign Fisheries *(Repeated in 2020)* (MMPA-1 and MMPA-2)																																								
Publication of the Draft List of Foreign Fisheries in the Federal Register for Public Comment *(Repeated in 2020)* (MMPA-1 and MMPA-2)																																								
Distribution of the Draft List of Foreign Fisheries to each nation *(Repeated in 2020)* (MMPA-1 and MMPA-2)																																								
Encouraging nations to submit applications for grant funds for capacity building (MMPA-1 and MMPA-2)																																								
Review of grants and awards *(Repeated in 2020,*																																								

Task/Number of FTE's Working on Task (Note: these are *not* the number of FTE/Contractors needed)	**2016**					**2017/*2020***												**2018/*2021***												**2019/*2022***											
	A	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
2021 ,2022) (MMPA-1 and MMPA-2)																																								
Evaluation of comments, preparation of response to comments, and finalization of the List of Foreign Fisheries *(Repeated in 2020)* (MMPA-1 and MMPA-2)																																								
Publication of the final List of Foreign Fisheries in the Federal Register *(Repeated in 2020)* (MMPA-1)																																								
Review submission of Progress Reports (MMPA-1 and MMPA-2)																																								
Review submission for Comparability Finding (MMPA-1 and MMPA-2 and contractor)																																								
Determinations and Pre-comparability findings(MMPA-1 and MMPA-2)																																								
Publication of Comparability Findings in FR(MMPA-1 and MMPA-2)																																								
Notification to Nations of Comparability Findings(MMPA-1 and MMPA-2)																																								

5.6 CONCLUSION

Under E.O. 12866, a regulation is a "significant regulatory action" if it is likely to:

1) have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights, and obligations of recipients thereof; or

4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

OMB subsequently determined that this action was significant for the purposes of E.O. 12866 due to the potential impact on the seafood sector.

No U.S. industry sector would be directly affected by the rulemaking, although indirect effects may cause disruptions in the flow of seafood imports, potentially impacting U.S. businesses. Without knowing the fish products subject to a trade restriction, it is impossible to estimate how these indirect impacts will be distributed across U.S. businesses. There are several factors that suggest impacts in many instances will be small and short-lived or non-existent, though there may be potential scenarios that could result in the rule having more than negligible impacts. Additionally, if fisheries of other nations become subject to regulatory requirements that are comparable in effectiveness to requirements imposed on U.S. fishermen for conservation of marine mammals, there could be benefits to U.S. fishermen. Whether or not regulatory costs induced in foreign fisheries increase import prices enough to affect the price differential between domestic products and imported products remains to be seen. If the import prices rise enough to cause switching in the U.S. market from imports to domestically harvested fish, U.S. commercial fishermen may benefit. However, the high rate of exporting for U.S. harvested seafood is indicative that foreign markets already offer greater price incentives. Thus, it is more likely that seafood dealers will locate alternative foreign sources for any product subject to an embargo. Therefore, based on these analyses, NMFS does not anticipate that national net benefits and costs would change significantly in the long term as a result of the implementation of the proposed action.

6.0 REGULATORY FLEXIBILITY ACT

The Regulatory Flexibility Act (RFA) established a principle that, in issuing regulations, federal agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of businesses, organizations, and governmental jurisdictions that would be subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure that such proposals are given serious consideration. The RFA does not prescribe decision criteria; instead, the RFA requires an analysis of alternatives to inform the agency, as well as the public, of the expected economic impacts of regulatory actions. Additionally, the requirement for an analysis ensures that the agency considers alternatives that minimize the expected impacts while meeting the goals and objectives of the action and applicable statutes.

In this rulemaking, NMFS is implementing the import provision under the MMPA. The rule establishes standards and procedures for nations wishing to export fish and fish products into the United States to receive a comparability finding for regulatory programs to reduce marine mammal bycatch. Under the regulations, any harvesting nation's fishery that wishes to export fish and fish products to the United States must provide reasonable proof that it has adopted a regulatory program governing the bycatch of marine mammals in that fishery that is comparable in effectiveness to the United States regulatory program. The rule provides nations with the opportunity to develop alternative measures to those described in the EA, provided they can demonstrate such measures are comparable in effectiveness to the U.S. regulatory program. The products of fisheries which do not receive a comparability finding from the Assistant Administrator for Fisheries will be prohibited from entry into the United States.

The rule also generally requires that any intermediary nation that exports fish and fish products to the United States must ban the re-exportation of fish and fish products from any fishery that is prohibited from exporting such fish and fish products directly to the United States.

6.1 STATEMENT OF NEED FOR AND OBJECTIVE OF THE RULE

On March 5, 2008, the U.S. Department of Commerce and other relevant Executive Departments were petitioned by two nongovernmental organizations, the Center for Biological Diversity and Turtle Island Restoration Network, to ban the imports of swordfish and swordfish products from nations that have failed to provide reasonable proof of the effects on ocean mammals of the commercial fishing technology in use to catch swordfish exported to the United States. The petitioners noted that, to the extent rulemaking would be required, their request for action to ban swordfish imports be considered as a petition for rulemaking under the Administrative Procedure Act. The complete text of the petition is available at the following web address: http://www.nmfs.noaa.gov/ia/docs/swordfish_petition_l-4.pdf.

On December 15, 2008, NMFS published a notice of receipt of the petition in the Federal Register and a request for public comments through January 29, 2009 (73 FR 75988). NMFS subsequently reopened the comment period for an additional 45 days from February 4 to March 23, 2009 (74 FR 6010, February 4, 2009).

On April 30, 2010, NMFS published an advance notice of proposed rulemaking (ANPRM, Appendix K) describing options to develop procedures to implement these provisions (75 FR 22731). On July 1, 2010, NMFS extended the comment period for an additional 60 days (75 FR 38070).

Although the petition only requested action regarding imports of swordfish and swordfish products, the import provisions of MMPA section 101(a)(2) apply more broadly to imports from other foreign fisheries that use "commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of U.S. standards." Therefore, this rulemaking is broader in scope than the petition, and is not limited in application to swordfish fisheries; rather, it includes imports of fish and fish products into the United States where harvest technology in the foreign fishery may interact with marine mammals.

This action is being taken under the authority of the MMPA, which contains provisions to address the incidental mortality and serious injury of marine mammals in both domestic and foreign commercial fisheries. With respect to foreign fisheries, section 101(a)(2) of the MMPA (16 U.S.C. 1371(a)(2)) states that "The Secretary of the Treasury shall ban the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of United States standards. For purposes of applying the preceding sentence, the Secretary [of Commerce]— (A) shall insist on reasonable proof from the government of any nation from which fish or fish products will be exported to the United States of the effects on ocean mammals of the commercial fishing technology in use for such fish or fish products exported from such nation to the United States."

Section 102 (c)(3)states that "It is unlawful to import into the United States…any fish, whether fresh, frozen, or otherwise prepared, if such fish was caught in a manner which the Secretary has proscribed for persons subject to the jurisdiction of the United States, whether or not any marine mammals were in fact taken incident to the catching of the fish." 16 U.S.C. 1372(c)(3).

The objective of the rule is to implement these provisions of the MMPA and to enhance the conservation and recovery of marine mammals, by encouraging nations to implement a regulatory program to reduce the bycatch of marine mammals to sustainable levels comparable in effectiveness to the U.S. regulatory program.

The MMPA also envisions a multilateral process to implement effective measures to reduce the bycatch of marine mammals on the high seas. In Section 108 of the MMPA, Congress also directed the Secretary of Commerce, through the Secretary of State, to initiate negotiations as soon as possible for the development of bilateral or multinational agreements with other nations for the protection and conservation of all marine mammals

covered by this Act and to initiate negotiations as soon as possible with all foreign governments which are engaged in, or which have persons or companies engaged in, commercial fishing operations which are found by the Secretary to be unduly harmful to any species or population stock of marine mammal, for the purpose of entering into bilateral and multilateral treaties with such countries to protect marine mammals. This mandate informs the rule and encourages constructive engagement through regional fishery management organizations, intergovernmental agreements or bi lateral arrangements between the United States and other fishing nations. The comparability finding procedure in the rule works in combination with established U.S. standards and consultation procedures described in the statute and the advanced notice of proposed rulemaking.

6.2 DESCRIPTION AND ESTIMATE OF THE NUMBER OF SMALL ENTITIES TO WHICH THE RULE WILL APPLY

A description of U.S. seafood markets, including production and trade, is provided in Section 3.4 above. The procedures in this rulemaking do not apply directly to any U.S. business entity, small or large, as the rulemaking is aimed at foreign countries that harvest seafood that is exported to the U.S. market. However, U.S. businesses involved in the supply chain for seafood products, and U.S. consumers of seafood, could be indirectly affected by trade measures applied against foreign fisheries that do not received comparability findings.

The universe of indirectly affected industries includes U.S. seafood processors, importers wholesalers, and retailers. The exact volume and value of product, and the number of jobs supported primarily by imports within the processing, wholesale and retail sectors cannot be ascertained based on available information. In general, however, the dominant position of imported seafood in the U.S. supply chain is indicative of the number U.S. businesses that rely on seafood harvested by foreign entities. Nevertheless, unless fish and fish products from a relatively large number of export fisheries from several countries were denied entry, a highly unlikely outcome, businesses could simply substitute for the relatively small amounts of product by obtaining domestic supplies or alternative foreign sources. NMFS does not anticipate that significant numbers of fisheries or nations will fail to receive a comparability finding, because this proposed rule offers harvesting nations time to develop and significant flexibility in developing their regulatory programs. Additionally, the consultative process and potential for financial and technological assistance, will further aid harvesting nations in meeting the requirements of these regulations. Therefore given the number of nations exporting fish and fish products to the U.S. market and the volume of products supplied, domestic importers, retailers, wholesalers, and processors should be able to locate substitute sources of fish and fish products for those fisheries that fail to receive a comparability finding. This will help reduce any adverse indirect impacts to the U.S. economy.

For consumers, such small changes in product flow are unlikely to change prices or availability. Therefore, no adverse impacts are anticipated by the proposed action. There would not likely be differential effects on small entities given the current predominance

of imported fish products in the marketplace. Larger processing and wholesaling firms may be more directly engaged with importation activities, and may be faced with sourcing decisions. Smaller importers and small retailers will not have any particular compliance costs other than sourcing, and may be able to work with larger importers in the short term to avoid disruptions.

6.3 DESCRIPTION OF THE PROJECTED REPORTING, RECORD-KEEPING, AND OTHER COMPLIANCE REQUIREMENTS OF THE RULE

This final action contains new collection-of-information, involving limited reporting and record keeping, or other compliance requirements. To facilitate enforcement of the import prohibitions for prohibited fish products, harvesting nations with fisheries that do receive a comparability finding, that offer similar fish and fish products to those that have been prohibited from entry, may be required to submit certification of admissibility along with the fish or fish products offered for entry into the United States that are not subject to the specific import restrictions. NMFS has developed and submitted a Paperwork Reduction Act approval request to OMB and is awaiting OMB approval for Certification of Admissibility. U.S. importers would be required to obtain the certificate from the package of shipping documents, attest that the product actually received is accurately described on the certificate, and forward a copy to NMFS.

6.4 DESCRIPTION OF ANY SIGNIFICANT ALTERNATIVES TO THE PROPOSED RULE THAT ACCOMPLISH THE STATED OBJECTIVES OF APPLICABLE STATUTES AND THAT MINIMIZE ANY SIGNIFICANT ECONOMIC IMPACT OF THE RULE ON SMALL ENTITIES

One of the requirements of an Initial Regulatory Flexibility Analysis (IRFA) is to describe any alternatives to the proposed rule which accomplish the stated objectives and which minimize any significant economic impacts. As described above and in Section 2.1, NMFS analyzed several alternatives that achieve the objective of reducing mortality of marine mammals in fishing operations. The final rule is based on the preferred alternative and is the one that offers the most flexibility while also complying with the relevant provisions of the MMPA and U.S. obligations under the WTO Agreement. The flexibility offered under the rule allows harvesting nations to adopt a variety of alternatives to assess and reduce marine mammal incidental mortality and serious injury, provided the alternatives are comparable in effectiveness to the U.S. regulatory program. Because this flexibility facilitates the ability of the harvesting nations to comply, the potential for indirect adverse impacts on small entities is minimized.

Under the no action alternative, NMFS would not promulgate regulations to implement the international provisions of the MMPA. This alternative to the rule may have reduced the potential indirect burden or economic impact to small entities. However, because the international provisions of the MMPA are statutory requirements, NMFS does not have discretion to implement the no action alternative.

Promulgating the regulations in the rule is the preferred alternative because this action will demonstrate the U.S. commitment to achieving the conservation and sustainable management of marine mammals internationally. By promoting the adoption of regulatory programs for the conservation of marine mammals that are comparable to those in the United States in other nations, the proposed regulations could help level the playing field for U.S. fishermen. In the absence of comparable regulatory programs, fishermen of other nations may be harvesting fishery resources in waters beyond any national jurisdiction without bearing the same regulatory costs that are imposed on U.S. fishermen.

Additionally, the increased data collection that may result from the regulations could assist in global stock assessments of marine mammals and improve our scientific understanding of these species.

Finally, the regulations should help ensure that the United States is not importing fisheries products harvested by nations that engage in the unsustainable bycatch of marine mammals in waters within and beyond any national jurisdiction.

NMFS does not anticipate that U.S. entities would be significantly affected by the as U.S. industry is not directly affected by the rulemaking. Although over 90 percent of the edible seafood consumed annually in the United States is imported, the United States imports from over 120 nations. Given the number of nations exporting fish and fish products to the U.S. market and the volume of products supplied, domestic importers, retailers, wholesalers, and processors should be able to locate substitute or alternative sources of fish and fish products for those fisheries that fail to receive a comparability finding. This will help reduce any adverse indirect impacts to the U.S. economy. Although U.S. entities are not directly impacted by this rule, they may experience some indirect effects from this rule. The indirect effects of import prohibitions may cause short term disruptions in the flow of seafood imports potentially impacting U.S. businesses. NMFS does not anticipate that national net benefits and costs would change significantly in the long-term as a result of the implementation of the proposed alternatives. Therefore, NMFS anticipates that the impacts on U.S. businesses engaged in trading, processing, or retailing seafood will likely be minimal.

6.5 CONCLUSIONS

As noted above, NMFS does not anticipate significant economic impacts from any of the alternatives analyzed. Due to the consultative and procedural nature of this rulemaking, it is highly likely that the costs of temporary disruptions in supply for specific products could be ameliorated in the short term by substituting different products or by locating alternative sources. Given the time frame for the consultative process, and the evaluation period for comparability findings, the affected public will have sufficient advance notice to mitigate impacts. In order to meet the objectives of the MMPA, NMFS cannot exempt small entities, change the reporting requirements only for small entities, or use performance or design standards in lieu of the regulatory requirements in the rule.

7.0 LIST OF PREPARERS

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8.0 PERSONS/AGENCIES CONSULTED

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Office of General Council

9.0 APPENDICES

A. Petition
B. Final Rule and EA for High Seas Driftnet Fishing Moratorium Protection Act
C. NOAA Tech Memorandum Threats to Cetaceans
D. Status of International LMRs
E. Regulatory History
F. Side-by-Side Comparison of Domestic and Import Requirements
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I. Marine Mammal Conservation & Management Summary by RFMO
J. Bycatch Measures in Regional Fishery Management Bodies
K. International Bycatch Report
L. Advance Notice of Proposed Rule Making (April 30, 2010)

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APPENDIX A

PETITION TO BAN IMPORTS OF SWORDFISH FROM COUNTRIES FAILING TO SUBMIT PROOF OF THE EFFECTS OF FISHING TECHNOLOGY ON MARINE MAMMALS PURSUANT TO MARINE MAMMAL PROTECTION ACT SECTION 101

March 4, 2008

PETITION TO BAN IMPORTS OF SWORDFISH FROM COUNTRIES FAILING TO SUBMIT PROOF OF THE EFFECTS OF FISHING TECHNOLOGY ON MARINE MAMMALS PURSUANT TO MARINE MAMMAL PROTECTION ACT SECTION 101

BEFORE THE DEPARTMENT OF HOMELAND SECURITY, THE DEPARTMENT OF TREASURY, AND DEPARTMENT OF COMMERCE

Center for Biological Diversity
Turtle Island Restoration Network

NOTICE OF PETITION

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The Center for Biological Diversity is a non-profit, public interest environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has over 40,000 members throughout the United States. The Center and its members are concerned with the conservation of marine mammals and the effective implementation of the Marine Mammal Protection Act.

Turtle Island Restoration Network is a nonprofit, public interest environmental organization with approximately 10,000 members throughout the United States and the world, each of whom shares a commitment to the study, protection, enhancement, conservation, and preservation of the world's marine and terrestrial ecosystems, including protection of marine mammals.

Action Requested

The Center for Biological Diversity and Turtle Island Restoration Network are writing to request that the Secretaries of Homeland Security, the Treasury, and Commerce carry out the non-discretionary duties imposed by section 101(a)(2) of the Marine Mammal Protection Act ("MMPA"), 16 U.S.C. § 1371(a)(2), to "ban the importation of commercial fish or fish products that have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of marine mammals in excess of United States standards." Contrary to the MMPA requirement, the Secretaries have failed to obtain reasonable proof from countries exporting swordfish and swordfish products to the U.S. regarding the effects of their commercial swordfish fishing technology on marine mammals. Therefore, petitioners request that the Secretaries ban imports of swordfish from any and all countries that have not satisfied the MMPA section 101(a)(2) requirement.

To the extent any of the violations of law described in herein require affirmative action by agencies and officials within the Department of Treasury, Department of Homeland Security, or Department of Commerce, please consider this letter a formal petition for such action pursuant to 5 U.S.C. § 553(e).

Dated: 3/4/08

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INTRODUCTION

The Center for Biological Diversity and Turtle Island Restoration Network request that the Department of Treasury, Department of Homeland Security, and/or Department of Commerce carry out their non-discretionary duties under section 101(a)(2) of the Marine Mammal Protection Act ("MMPA"), 16 U.S.C. § 1371(a)(2), to "ban the importation of commercial fish or fish products that have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of marine mammals in excess of United States standards." Specifically, we request that the import of swordfish and swordfish products be banned from all countries that have failed to provide proof of the effects on marine mammals of the commercial fishing technology they use to catch swordfish.

Commercial fishing poses a significant threat to marine mammal species around the globe. Swordfish fisheries are especially dangerous to non-target species due to the massive level of fishing effort directed at swordfish, largely to feed U.S. demand, and to the harmful fishing methods employed to catch swordfish, particularly gillnetting and longlining. Thousands of dolphins, whales, sea lions, and other marine mammals are injured and killed each year in gillnets and longlines strewn throughout their feeding, breeding, and migratory habitat. Often these animals become entangled after unwittingly swimming into vast gillnets or a wall of longlines dozens of miles in length. Others are hooked after trying to grab a ready meal off the line. Still others are purposefully killed by fishers trying to protect their catch from depredation. In essence, gillnet and longline fishing place massive, deadly obstacles to basic life functions in the only habitat these air-breathing, ocean-dependent mammals have to sustain themselves.

Congress recognized that fishing posed a grave threat to marine mammal species when it passed the MMPA. The law imposes restrictions on fisheries-related mortalities of marine mammals and, together with regulations pursuant to the Endangered Species Act, has led to the establishment of significant protective measures aimed at restricting harmful fishing practices and protecting marine mammal populations from unsustainable fisheries bycatch. Congress also recognized that, if the United States' efforts to protect marine mammals from fisheries bycatch were to be successful, it would have to exert pressure on fisheries of other nations to adopt similarly protective measures.

MMPA section 101 provides that vital mechanism for ensuring the safety of marine mammals outside U.S. waters. By requiring foreign nations to prove that their fishing methods do not result in harm to marine mammals in excess of U.S. standards before allowing those nations to export fish and fish products to the U.S., MMPA section 101 ensures that the U.S.'s considerable economic power provides an incentive to conserve, rather than obliterate, marine mammal populations. It also serves to protect U.S. fishers from unfair competition by foreign fishers operating without appropriate restraints on fishing practices.

However, the vital purposes of MMPA section 101 can only be achieved if the U.S. government carries out its non-discretionary duty to obtain the required proof from countries wishing to export swordfish to the United States. To date, the government has not done so, and

marine mammal populations around the globe suffer for it. The U.S. government must protect the public's interest in healthy global marine mammal populations and sustainable fisheries by enforcing this longstanding MMPA provision.

I. LEGAL FRAMEWORK.

A. The MMPA's Restrictions on the Import of Commercial Fish or Fish Products.

Section 101(a)(2) of the MMPA reads as follows:

> The Secretary of the Treasury shall ban the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of United States standards. For purposes of applying the preceding sentence, the Secretary—
> (A) shall insist on reasonable proof from the government of any nation from which fish or fish products will be exported to the United States of the effects on ocean mammals of the commercial fishing technology in use for such fish or fish products exported from such nation to the United States…[1]

Some of the duties the MMPA assigned to the Department of the Treasury were transferred to the newly created Department of Homeland Security ("DHS") in 2002 by the Homeland Security Act.[2] The Homeland Security Act transferred many border-related entities and functions formerly borne by other agencies to the DHS, including the U.S. Customs Service within the Department of Treasury and the related functions of the Secretary of Treasury.[3] Under the reorganization, U.S. Customs and Border Protection ("CBP") is vested with the authority to enforce the MMPA section 101, 16 U.S.C. § 1371.[4]

If, however, the Department of Homeland Security is not the agency currently charged with enforcing this provision of the MMPA, Petitioners request that the Secretary of Treasury or Secretary of Commerce take the action requested in this petition.

B. The MMPA Places the Burden on Exporting Countries to Provide Reasonable Proof of Compliance with U.S. Standards.

The MMPA § 101(a)(2)(A) places the burden of proof on exporting countries to demonstrate the impact of their commercial fisheries on marine mammals, and requires that the Secretary of the Treasury (and now the Secretary of Homeland Security) "*shall insist on reasonable proof* from the government of any nation from which fish or fish products *will be* exported to the United States of the effects on ocean mammals of the commercial fishing

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[1] 16 U.S.C. § 1371(a)(2). *See also* 50 C.F.R. § 216.24(f)(1) (implementing regulations).
[2] 6 U.S.C. § 111.
[3] 6 U.S.C. § 203.
[4] Summary of Laws and Regulations Enforced by CBP, *available at* http://www.cbp.gov/xp/cgov/toolbox/legal/summary_laws_enforced/ (last visited Aug. 27, 2007).

technology in use for such fish or fish products exported from such nation to the United States."[5] In other words, the Secretary must demand, obtain, and deem adequate a country's demonstration of the effects of its fishing techniques on marine mammals *before* allowing that country's fish products to enter the U.S. In drafting the MMPA, Congress explained this as an affirmative duty on the Secretary "to obtain reasonable proof from foreign governments in order to make a finding that foreign commercial fishing techniques were not resulting in kills or injuries in excess of U.S. standards."[6]

The Center for Biodiversity has formally requested information from the Departments of the Treasury, Homeland Security, and Commerce detailing what evidence the Departments have of the fishing practices of countries that export swordfish to the United States. To our knowledge, none of these countries have provided this information and therefore have failed in to meet their burden of proof. As we show below, many of these countries' swordfish fisheries fall far short of U.S. standards.

C. The Secretaries Have a Duty to Ban Imports of Fish and Fish Products in Absence of Information Demonstrating the Fish Was Caught in Accordance with U.S. Standards.

Under MMPA section 101, the Secretary of the Treasury (and/or the Secretary of Homeland Security) "shall ban" the import of fish or fish products caught in a manner that exceeds U.S. standards for incidental injury or death to marine mammals. Furthermore, the MMPA § 102(c)(3) makes the import of such products a criminal violation: "It is unlawful to import into the United States . . . any fish, whether fresh, frozen, or otherwise prepared, if such fish was caught in a manner which the Secretary has proscribed for persons subject to the jurisdiction of the United States, whether or not any marine mammals were in fact taken incident to the catching of the fish."[7]

The legislative history of the MMPA underscores Congress' conviction that the purposes of the MMPA could not be met solely by regulating domestic fisheries. Congress recognized that the U.S. would have to use its market power to effectively protect marine mammals in international waters, as well as to prevent U.S. fishers from suffering a competitive disadvantage to unregulated foreign fishers. Therefore, Congress set out to "restrict or to prohibit the importation of marine mammals or animals taken by methods or in circumstances which would not be permitted to persons subject to U.S. jurisdiction."[8] As described below, the situation that Congress sought to avoid – i.e., a situation in which U.S. dollars support the decimation of marine mammals by poorly regulated, destructive fisheries while U.S. fishers struggle to compete – is exactly the situation we are in today.

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[5] 16 U.S.C. § 1371(a)(2)(A) (emphasis added).
[6] Marine Mammal Protection Act Amendments of 1988, S. Rep. No. 592 (1988).
[7] 16 U.S.C. § 1372(c)(3).
[8] H.R. Rep. 92-707 (1972), *as reprinted in* 1972 U.S.C.C.A.N. 4144, at 4151. *See also id.* at 4156 (Act "prohibits the importing of fish caught outside of the United States where the fish were caught by techniques which the Secretary concludes are injurious to marine mammals").

II. GEAR AND TECHNIQUES USED BY SWORDFISH FISHERIES.

Commercial fisheries targeting swordfish generally use either longline gear or gillnets. Both longline and gillnet fishing result in substantial catch of non-target species, such as sea turtles, marine mammals, and sea birds. Pelagic longline fishing involves the use of a monofilament line that stretches from 20 to upwards of 60 miles from a vessel and is set to a given depth depending on the target species. Boats targeting swordfish set their lines at a relatively shallow depth, which tends to attract a larger number of non-target species. Attached to the longline are additional lines to which are attached weights and baited hooks. A single longline fishing vessel may deploy several thousand hooks at one time, yet only catch one to three targeted fish per hundred hooks.[9] Marine mammals get caught on the baited hooks of longlines or are entangled in the lines. Unable to surface for air, these animals subsequently drown. Those that do not immediately drown often suffer serious injury, such as hook ingestion, condemning them to a slower death by starvation, internal bleeding, or infection.

Gillnets, which are often a mile or more in length and entangle virtually everything that comes into contact with them, are especially dangerous to cetaceans and pinnipeds.[10] As with longlines, animals that become entangled in gillnets are unable to surface for air and therefore drown. It has been estimated that over 300,000 marine mammals die every year in global fisheries, most of them in gillnets.[11]

III. U.S. LONGLINE AND DRIFT-GILLNET FISHERIES ARE REGULATED TO REDUCE MARINE MAMMAL TAKE.

U.S. swordfish vessels operate under a relatively stringent set of federal and state laws that limit the gear they use and when and where they may fish, and require that special procedures be followed to reduce bycatch of protected species such as marine mammals. While provisions of the Magnuson-Stevens Fishery Conservation and Management Act, Endangered Species Act, and Marine Mammal Protection Act establish restrictions on all U.S. fisheries, regional fisheries are subject to additional restrictions from area-specific fishery management plans and state laws. U.S. swordfish fisheries, located off the Atlantic coast from Florida to New England, the Pacific Coast from Washington to California, and in the western Pacific waters surrounding Hawaii, are each governed by a separate fishery management plan and, to some extent, marine mammal take reduction plan. As described below, these measures provide substantial protection to marine mammals and other species.

[9] National Coalition for Marine Conservation. 1998. Ocean Roulette: Conserving Swordfish, Sharks and Other Threatened Pelagic Fish In Longline-Infested Waters, at 19.
[10] Read, Andrew J., Phebe Drinker, Simon Northridge. 2006. Bycatch of Marine Mammals in U.S. and Global Fisheries. *Conservation Biology*. 20: 163-169, at 166.
[11] *Id.*

A. Laws Applicable to All U.S. Fisheries.

1. Magnuson-Stevens Fishery Conservation & Management Act.

The Magnuson-Stevens Fishery Conservation & Management Act ("MSA") provides a national program for the conservation and management of marine and anadromous fishery resources both within and beyond the U.S. exclusive economic zone ("EEZ").[12] The MSA establishes eight regional fishery management councils, which are tasked with developing a fishery management plan "for each fishery under its authority that requires conservation and management."[13] Fishery management plans ("FMPs") must specify, among other things, the type and quantity of gear that may be used for a given fishery, and information on time and location of fishing, effort, and catch levels that fishing vessels must report.[14] In an effort to track and reduce bycatch, the MSA requires each FMP to "establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priority . . . minimize bycatch [and] minimize the mortality of bycatch which cannot be avoided."[15]

2. Endangered Species Act.

A number of marine mammals that interact with swordfish gear are protected under the Endangered Species Act ("ESA"), including sperm, humpback, fin, and North Atlantic right whales.[16] This law, one of the strongest of its kind, provides multi-layered protection for listed species. Section 2(c) of the ESA establishes that it is "…the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act."[17] The ESA defines "conservation" to mean "…the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary."[18] Similarly, section 7(a)(1) of the ESA directs that the Secretary review "…other programs administered by him and utilize such programs in furtherance of the purposes of the Act."[19]

Section 4 of the ESA calls for the preparation of a recovery plan for every species listed under the Act. Recovery plans establish recovery goals and objectives, describe site-specific management actions recommended to achieve those goals, and estimate the time and cost required for recovery.[20] Section 4(f) specifically requires that NMFS both "…develop and *implement* plans (hereinafter…referred to as 'recovery plans') for the conservation and survival

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[12] 16 U.S.C. § 1801(b).
[13] 16 U.S.C. §§ 1852(a), (h)(1).
[14] 16 U.S.C. §§ 1853(a)(2), (5).
[15] 16 U.S.C. § 1853(a)(11).
[16] NMFS, List of Marine Mammal Species under the Endangered Species Act, *available at* http://www.nmfs.noaa.gov/pr/species/esa/mammals.htm (last visited September 10, 2007).
[17] 16 U.S.C. § 1531(c)(1).
[18] 16 U.S.C. § 1532(3).
[19] 16 U.S.C. § 1536(a)(1).
[20] 16 U.S.C. §1533(f).

of endangered species and threatened species…."[21] Consistent with the intent that recovery plans actually be implemented, Congress required that recovery plans "…incorporate…(i) a description of such site-specific management actions as may be necessary to achieve the plan's goal for the conservation and survival of the species."[22]

Section 7(a)(2) of the ESA requires federal agencies to "insure that any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the adverse modification of habitat of such species . . .determined . . . to be critical . . . ."[23] To accomplish this goal, agencies must consult with the delegated agency of the Secretary of Commerce or Interior whenever their actions "may affect" a listed species.[24] Where NMFS is both the acting agency and the delegated wildlife agency for purposes of the listed species in question, different branches of NMFS must undertake internal consultation with each other. For species under the jurisdiction of the U.S. Fish and Wildlife Service ("FWS"), NMFS must also consult with that agency as well.

At the completion of consultation, NMFS or FWS issues a Biological Opinion that determines if the agency action is likely to jeopardize the species. If so, the opinion must specify a Reasonable and Prudent Alternative ("RPA") that will avoid jeopardy and allow the agency to proceed with the action.[25]

The ESA also prohibits any "person" from "taking" threatened and endangered species without a valid permit.[26] In the case of ESA-listed marine mammals, any person wishing to engage in an activity that might result in the take of such a marine mammal must first obtain a permit under both the ESA and the MMPA.[27] The definition of "take," found at 16 U.S.C. § 1532(19), states,

> The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

In a case dealing with fisheries, a court found that "the statute not only prohibits the acts of those parties that directly exact the taking, but also bans those acts of a third party that bring about the acts exacting a taking. We believe that…a governmental third party pursuant to whose authority an actor directly exacts a taking of an endangered species may be deemed to have violated the provisions of the ESA."[28] As such, the take prohibition applies to NMFS as the authorizing agency for fisheries actions, and the applicant as the person directly engaged in the activity likely to result in prohibited take. Violations of section 9 of the ESA are subject to civil penalties, forfeiture of fishing vessels, and criminal penalties of fines and imprisonment.[29]

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[21] *Id.* (emphasis added).
[22] 16 U.S.C. § 1533(f)(1)(B)(i).
[23] 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.14(a).
[24] 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.14(a).
[25] 16 U.S.C. § 1536(b).
[26] 16 U.S.C. § 1538.
[27] *See* 16 U.S.C. §§ 1371(a)(5)(E) and 1536(b)(4)(C).
[28] *Strahan v. Coxe,*, 127 F.3d 155, 163 (1st Cir. 1997).
[29] 16 U.S.C.§ 1540(a), (b) and (e).

3. Marine Mammal Protection Act.

The MMPA demands that all fisheries "shall reduce incidental mortality and serious injury of marine mammals to insignificant levels approaching a zero mortality and serious injury rate" by April 30, 2001.[30] This goal, known as the Zero Mortality Rate Goal ("ZMRG"), is defined by regulation as ten percent of Potential Biological Removal ("PBR").

Under the MMPA, NMFS must develop and implement take reduction plans ("TRPs") for marine mammal stocks that interact with specified commercial fisheries known to cause frequent or occasional incidental mortality and serious injury to marine mammals.[31] The TRP must aim to reduce incidental mortality and serious injury of marine mammals in both the short- and long-term. The plan must contain measures to reduce incidental mortality and serious injury within six months of its implementation to levels less than the potential biological removal level established for the particular stock under MMPA section 117. The plan must also aim to reduce, within five years of implementation, incidental mortality and serious injury of the marine mammal stock to insignificant levels approaching zero.[32]

As with the ESA, engaging in a knowing violation of the MMPA caries substantial civil and criminal penalties.[33]

B. Regulation of Drift-Gillnet Fisheries in the U.S.

In addition to species-specific take limitations, U.S. standards for the protection of marine mammals require fishery-specific restrictions. Gillnet fisheries are carefully regulated in the United States because of their known impact on marine mammals and other species. According to many of the world's leading marine mammal experts, the "single biggest threat facing cetaceans worldwide is death as bycatch in fishing gear."[34] Researchers at Duke University and the University of St. Andrews in Scotland estimate that approximately 308,000 cetaceans are killed each year in fishing gear, and point to gillnet use as the most consistent offender:

> Experts agree that wherever there are gillnets, there is cetacean bycatch. When caught in fishing gear, small whales, dolphins and porpoises often die because they aren't strong enough to break free and come to the surface to breathe.[35]

Recognizing this threat, the U.S. has banned the use of drift gillnets in two of the three U.S. swordfish fisheries. The Atlantic Highly Migratory Species ("HMS") fishery management

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[30] 16 U.S.C. § 1387(b)(1).
[31] 16 U.S.C. § 1387(f)(1).
[32] 16 U.S.C. § 1387(f)(2).
[33] *See* 16 U.S.C. §§ 1375 (fines and imprisonment) and 1376 (forfeiture of vessels).
[34] Scientists included Dr. Andrew Read of Duke University Marine Laboratory, U.S., and Dr. Simon Northridge of the Sea Mammal Research Unit (SMRU), St Andrew's University, U.K. For list of task force participants and January 2002 Workshop participants, see http://www.cetaceanbycatch.org/network.cfm, http://www.cetaceanbycatch.org/workshoplist.cfm. *See also* Read et al. 2006, *supra* note 10.
[35] *Id.*

plan, which governs U.S. fishing for swordfish, tuna, and sharks off the U.S. East Coast, prohibits the use of gillnets to fish for swordfish and prohibits a vessel that has a gillnet on board from possessing swordfish.[36] Fishing with drift gillnets is similarly prohibited in the western Pacific fishery management area surrounding Hawaii, except when authorized under an experimental fishery permit.[37]

Drift gillnet fishing is not yet banned off the West Coast of the U.S. mainland, but is significantly limited by complex set of federal and state regulations. At the federal level, the Pacific Offshore Cetacean Take Reduction Team ("POCTRT") requires that drift gillnet fishers follow several measures designed to protect marine mammals. The POCTRT requires that drift gillnet operators:

(1) use acoustic deterrent devices (i.e. pingers) on drift gillnets to prevent entanglement of marine mammals;

(2) deploy drift gillnets at a minimum depth of 6 fathoms (10.9 meters) in order to allow marine mammals to swim over the tops of the nets without entanglement;

(3) accommodate observers onboard drift gillnet vessels when an observer is assigned to the vessel; and

(4) attend any mandatory skipper workshops regarding marine mammal bycatch reduction.[38]

In addition, federal regulations prohibit drift gillnet fishing in certain areas of the U.S. EEZ off the West Coast. See Figure 1. While these closures are primarily intended to protect sea turtles, they also protect marine mammals from incidental encounters with drift gillnet gear. Under these regulations, drift gillnet fishing may not be conducted from August 15 to November 15 in the portion of the EEZ bounded by the coordinates 36°18.5' N latitude (Point Sur), to 34°27' latitude, 123° 35' W longitude to 129°W longitude (off California coast), north to 45°N latitude (off Oregon coast), and east to the point at which the 45°N latitude meets the Oregon coast.[39] Drift gillnet fishing is also prohibited in the portion of the EEZ south of Point Conception, California, located at 34°27' N latitude, and west to 120°W longitude from August 15 to August 31 and January 1 through January 31 when NMFS has forecasted or announced the occurrence of an El Niño event.[40]

State laws further restrict both the types of gear permissible for drift gillnet fishing and the areas in which it may be conducted. State laws prohibit the use of drift gillnet gear in the following areas:

[36] 50 C.F.R. §§ 635.21(e)(4), 635.71(a)(17).
[37] 50 C.F.R. §665.30.
[38] Pacific Fishery Management Council, West Coast Highly Migratory Species Fishery Management Plan (June 2007) ("West Coast HMS FMP") at 67.
[39] *Id.*
[40] *Id.* at 68.

(1) In the EEZ off California from February 1 to April 30;

(2) In the portion of the EEZ off California within 75 nautical miles ("nm") of the coastline from May 1 to August 14;

(3) In the portion of the EEZ off California within 25 nm of the coastline from Dec. 15 through Jan. 31;

(4) In the portion of the EEZ bounded by a direct line connecting Dana Point; Church Rock on Catalina Island; and Point La Jolla, San Diego County; and the inner boundary of the EEZ from August 15 through September 30 each year;

(5) In the portion of the EEZ within 12 nm from the nearest point on the mainland shore north to the Oregon border from a line extending due west from Point Arguello;

(6) East of a line running from Point Reyes to Noonday Rock to the westernmost point of southeast Farallon Island to Pillar Point;

(7) In the following areas around the Channel Islands, California:

(a) In the portion of the EEZ within six nm westerly, northerly, and easterly of the shoreline of San Miguel Island between a line extending six nm west magnetically from Point Bennett and a line extending six nm east magnetically from Cardwell Point and within six nm westerly, northerly, and easterly of the shoreline of Santa Rosa Island between a line extending six nm west magnetically from Sandy Point and a line extending six nm east magnetically from Skunk Point, from May 1 through July 31 each year;

(b) In the portion of the EEZ within 10 nm westerly, southerly, and easterly of the shoreline of San Miguel Island between a line extending 10 nm west magnetically from Point Bennett and a line extending 10 nm east magnetically from Cardwell Point and within 10 nm westerly, southerly, and easterly of the shoreline of Santa Rosa Island between a line extending 10 nm west magnetically from Sandy Point and a line extending 10 nm east magnetically from Skunk Point from May 1 through July 31 each year;

(c) In the portion of the EEZ within a radius of 10 nm of the west end of San Nicolas Island from May 1 through July 31 each year;

(d) In the portion of the EEZ within six nm of the coastline on the northerly and easterly side of San Clemente Island, lying between a line extending six nm west magnetically from the extreme northerly end of San Clemente Island to a line extending six nm east magnetically from Pyramid Head from August 15 through September 30 each year;

(8) In the portion of the EEZ within 75 nm of the Oregon shoreline from May 1 through August 14, and within the 1,000 fathom ("fm") curve during the remainder of the year; and

(9) In all EEZ waters off the Washington coast (Washington does not authorize use of any drift gillnet gear).[41]

Notably, the West Coast HMS FMP adopts Washington State's prohibition on drift gillnet fishing in the EEZ off the Washington coast and modifies current Oregon state regulations to delete the May-August prohibition on drift gillnetting within 75 nm and prohibit drift gillnet fishing year round in EEZ waters off the Oregon coast east of a line approximating the 1,000 fm curve.[42]

California also restricts the type of gear that drift gillnet operations may use. State law requires that drift gillnets have a minimum stretch mesh size of 14 inches and that the unattached portion of a net be marked by a pole equipped with a radar reflector.[43] A vessel may not have more than 6,250 ft. of gillnet on board. Of this total, no more than 6,000 ft. in cumulative float line length may be on the vessel's net reel, dock, and/or in the water at any time.[44] Finally, drift gillnet vessels may not use quick disconnect devices to attach net panels.[45]

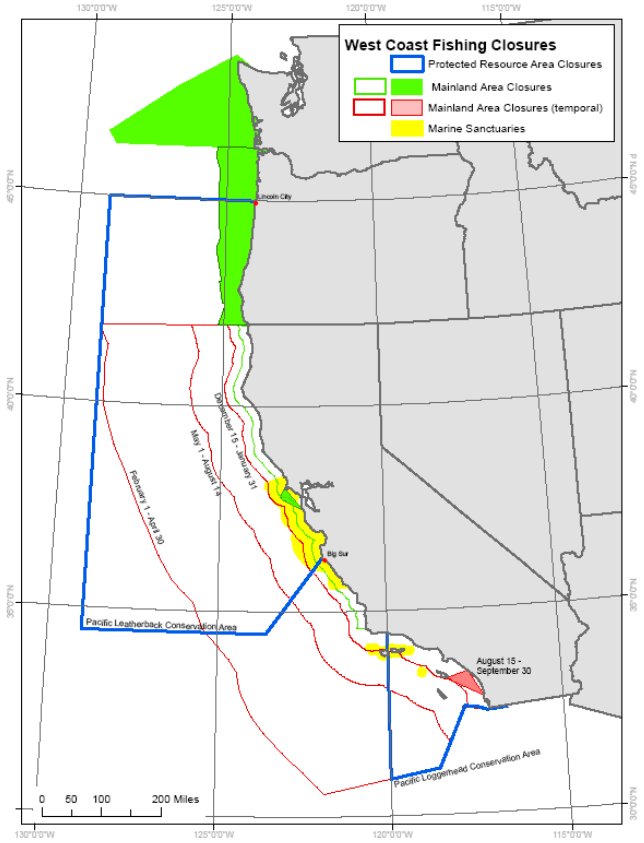

Figure 1. Areas closed to gillnet fishing off the U.S. West Coast.

[41] *Id.* at 68-69.
[42] *Id.* at 70.
[43] *Id.* at 68.
[44] *Id.*
[45] *Id.*

C. Regulation of Longline Fisheries in the U.S.

As with drift gillnet fishing, longline fishing kills thousands of marine mammals, sea turtles, and sea birds each year. These animals are often attracted to the baited hooks and either become hooked themselves or entangled in the line. Unable to surface for breath, they drown. A single longline set can trail for up to 60 miles, dangling thousands of lines and hooks in its wake and forming a nearly invisible, deadly obstacle for animals in the open water.

Responding to concern over the incidental capture and mortality of marine mammals, sea turtles, and sea birds, the U.S. has banned pelagic longline fishing in large areas of the Pacific Ocean. The West Coast HMS fishery management plan, which governs the swordfish fishery off the U.S. West Coast, prohibits the use of pelagic longline gear in the West Coast EEZ.[46] The use of longline gear to target swordfish (i.e. shallow-set longlining) is also prohibited outside the EEZ north of the equator.[47, 48] These prohibitions were largely driven by the need to protect the imperiled leatherback and loggerhead sea turtles. However, they also protect marine mammals that reside in or migrate through the no-longlining areas from becoming entangled in longline gear.

Where longline fishing for swordfish is permitted, U.S. regulations place strict limitations on the gear that may be used, fishing effort, and the time of year when fishing is permissible.

Western Pacific pelagic fisheries, including the Hawaii-based shallow-set longline fishery that targets swordfish as well as the deep-set longline fishery that targets tuna species, operate pursuant to a number of gear and other restrictions under the FMP for Pelagic Fisheries of the Western Pacific Region ("Pelagics FMP"). The Pelagics FMP Amendment 3 restricts the collective shallow-set longline fishing effort north of the equator to 2,120 sets per year and limits the number of shallow-sets any vessel may make north of the equator during a given trip.[49] When making shallow-sets north of the equator, Western Pacific fishery longline vessels must only use circle hooks sized 18/0 or larger with a 10-degree offset and mackerel-type bait.[50] When making shallow-sets north of 23°N latitude, vessels must start and complete deployment of longline gear during the time period from one hour after local sunset to local sunrise.[51] Within

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[46] *Id.* at 70.
[47] *Id.*
[48] Longline fishing targeting tuna species (i.e. deep-set longlining) is allowed under the West Coast HMS FMP between the western boundary of the U.S. West Coast EEZ and150°W longitude. Even this fishery is severely restricted, however. West Coast deep-set longline vessels fishing on the high seas are subject to the same requirements as Hawaii-based longline vessels holding longline permits in 2003. These requirements include carrying line clippers, dip nets, and bolt cutters to aid in the release of sea turtles, deploying the main longline in a manner that allows the deepest point of the line between any two floats to be greater than 100m below the sea's surface, and specifications for thawing, dying, and discharging bait and offal so as to minimize its attraction to sea birds and turtles. *Id.* at 70-71. The FMP also prohibits the use of light sticks and restricts the number of branch lines that may be set between any two floats to no more than 15. *Id.* In addition, these vessels must implement measures for the proper release and handling of sea turtles and sea birds, specified in 50 C.F.R. Part 660, and have a vessel monitoring system ("VMS"). Vessel operators must attend annual protected species workshops to learn how to avoid interactions with these species and safely release any individuals that are incidentally caught. *Id.* at 71.
[49] 69 Fed. Reg. 17329, 17330 (April 2, 2004); 50 C.F.R. §660.33(a).
[50] 69 Fed. Reg. at 17330-31; 50 C.F.R. §§660.33(f), (g).
[51] 69 Fed. Reg. at 17331; 50 C.F.R. §660.35(a).

72 hours of landing a pelagic species under the Pelagics FMP, longline vessels are required to submit to NMFS logbooks and a valid shallow-set certificate for every shallow-set made north of the equator during the trip.[52] Furthermore, each vessel must carry and use NMFS-approved dehooking devices to safely release incidentally hooked protected species.[53] Both the owner and operator of a vessel registered for use under a Hawaii longline limited access permit must attend a NMFS workshop each year on how to safely handle and release protected species and must have a valid workshop certificate on board the vessel whenever it is engaged in longline fishing.[54] Finally, NMFS requires 100% observer coverage for longline vessels targeting swordfish in this fishery.[55]

Like the closures under the West Coast HMS fishery management plan, these measures are largely designed to protect sea turtles. However, restrictions on fishing effort, requirements to carry equipment to safely unhook or disentangle incidentally animals, and full observer coverage for these vessels undoubtedly help to reduce the frequency and lethality of marine mammal interactions with this fishery.[56]

The U.S. Atlantic longline fishery similarly operates under a combination of time area closures, gear restrictions, and effort limits. See Figure 2. The Atlantic HMS fishery management plan establishes several seasonal closures. Vessels with longline gear on board may not deploy any fishing gear within:

(1) the Northeastern U.S. closed area from June 1 through June 30 each calendar year;

(2) the Charleston Bump closed area from February 1 through April 30 each calendar year;

(3) the East Florida Coast closed area at any time;

(4) the DeSoto Canyon closed area at any time.[57]

[52] 69 Fed. Reg.at 17330; 50 C.F.R. §660.33(c).
[53] 69 Fed. Reg.at 17331; 50 C.F.R. §660.32.
[54] 69 Fed. Reg. at 17354; 50 CFR §§660.34(a), (d).
[55] 69 Fed. Reg. at 17333.
[56] The MMPA requires that NMFS further reduce mortality and serious injury of marine mammals that are incidentally caught by this fishery by convening a marine mammal take reduction team to formulate a take reduction plan for the Western Pacific. NMFS has not yet taken this critical, required step.
[57] 50 C.F.R. §§ 665.21(c)(2)(i)-(iv).

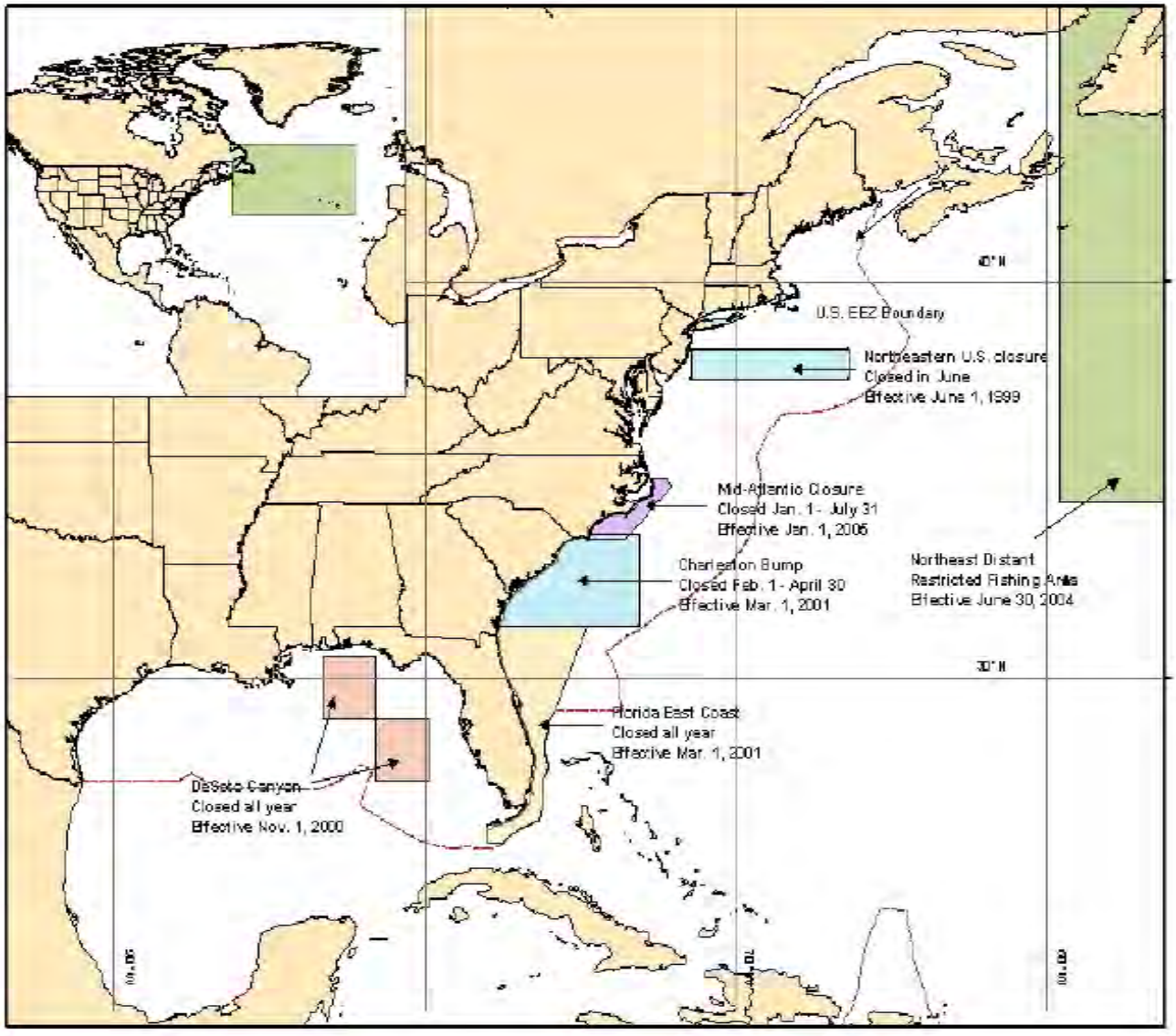

Figure 2. **Existing time/area closures in HMS fisheries.** Inset shows extent of the Northeast Distant restricted fishing area. All closures except the Mid-Atlantic are applicable to pelagic longline gear only. The Mid-Atlantic Closure is applicable to bottom longline gear only. Note: the Northeast Distant (NED) was a closed area to all vessels as of 2001. It became the NED Restricted Fishing Area on June 30, 2004 when it was opened to those participating in the NED experiment. (Source: Atlantic HMS FMP at 2-19 (July 2006))

The Atlantic HMS FMP also prohibits fishing within the Northeast Distant closed area unless vessels use only 18/0 or larger circle hooks and comply with a number of measures designed to reduce bycatch and mortality of sea turtles.[58]

In order to facilitate enforcement of these time-area closures, the owner or operator of a commercial pelagic longlining vessel permitted to fish for HMS species must install a NMFS-

[58] 50 C.F.R. § 665.21(c)(2)(v).

approved vessel monitoring system ("VMS") unit on board the vessel and operate the VMS whenever the vessel is away from port with pelagic longline gear on board.[59] The VMS requirement serves as an important supplement to onboard observer coverage. Approximately 2.5 to 5 percent of vessels in this fishery have an onboard observer.[60]

In the event that a marine mammal or sea turtle is hooked or entangled by pelagic longline gear, the operator of the vessel must immediately release the animal, retrieve the pelagic longline gear, and move at least 1 nm (2 km) from the location of the incident before resuming fishing. Vessels must report all marine mammal entanglements to NMFS consistent with regulations in 50 C.F.R. § 229.6.[61] In addition, pelagic longline vessels must carry approved equipment for safely removing gear from hooked or entangled animals.[62]

In addition to the restrictions imposed by the Atlantic HMS FMP, the Atlantic Pelagic Longline Take Reduction Team ("TRT") has recommended a number of additional requirements, which await implementation by NMFS. As described above, the MMPA requires NMFS to develop and implement take reduction plans for marine mammal stocks that interact with specified commercial fisheries known to cause frequent or occasional incidental mortality and serious injury to marine mammals.[63]

The Center for Biological Diversity and Turtle Island Restoration Network filed suit against NMFS in 2002 for its failure to convene a TRT for the Atlantic pelagic longline fishery, which resulted in a 2003 settlement agreement requiring the agency to convene a TRT by June 30, 2005, to address bycatch of long-finned pilot whales, short-finned pilot whales, and common dolphins in the Atlantic pelagic longline fishery.[64] On June 22, 2005, NMFS announced the establishment of the TRT, directing it to address incidental mortality and serious injury of short and long-finned pilot whales in the mid-Atlantic region of the Atlantic pelagic longline fishery, and to prepare a draft TRP for these non-strategic stocks within 11 months of the Team's establishment.[65, 66]

On June 6, 2006, the TRT recommended a number of protective measures to reduce mortality and serious injury of marine mammals in the Atlantic pelagic longline fishery. These include:

(1) The designation of a special research area offshore of Cape Hatteras with specific observer and other requirements for fishers operating in that area;

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[59] 50 C.F.R. § 635.69(a)(1).
[60] Dietrich, Kimberly et al. 2007. Best Practices for the Collection of Longline Data to Facilitate Research and Analysis to Reduce Bycatch of Protected Species: Report of a workshop held at the International Fisheries Observer Conference Sydney, Australia, November 8, 2004. NOAA Technical Memorandum NMFS-OPR-35, at 5.
[61] 50 C.F.R. § 635.21(c)(3).
[62] 50 C.F.R. § 635.21(c)(5).
[63] 16 U.S.C. § 1387(f)(1).
[64] Atlantic Pelagic Longline Take Reduction Team, Draft Atlantic Pelagic Longline Take Reduction Plan (June 8, 2006) ("Draft TRP") at 3.
[65] 70 Fed. Reg. 36120 (June 22, 2005).
[66] The TRT was not directed to address incidental mortality or serious injury to common dolphins because no recent serious injuries or mortalities of common dolphins had been recently observed in the pelagic longline fishery by the time the TRT was convened. Draft TRP, *supra* note 64, at 2.

(2) A limitation on mainline length for all pelagic longline sets in the Mid-Atlantic Bight region;

(3) An increase in observer coverage in all highly migratory species fisheries that interact with pilot whales and Risso's dolphins;

(4) The development and use of equipment and methods for careful handling and release of entangled or hooked marine mammals;

(5) The promotion of voluntary daily communications among captains regarding interactions with protected species and other bycatch throughout the Atlantic pelagic longline fishery;

(6) The distribution of an updated informational placard that must be displayed in the wheelhouse and on the working deck of all active pelagic longline vessels;

(7) The development of mandatory certification workshops for owners and operators of pelagic longline vessels on marine mammal bycatch; and

(8) The distribution of quarterly reports of pilot whale and Risso's dolphin bycatch rates to the TRT for its review.[67]

Measures 1, 2, 6, and 7 are expected to be enacted in regulation in the near future.

D. Take of Marine Mammals in U.S. Longline and Gillnet Fisheries.

While the only certain way to eliminate bycatch in longline and drift gillnet fisheries is to prohibit the use of these types of gear, U.S. regulations have undoubtedly reduced the impact of fisheries bycatch on marine mammals. Between 2000 and 2002, observers in the Western Pacific longline fishery reported 24 instances of marine mammal bycatch, including two mortalities.[68] An estimate of total bycatch was not reported. The most common identified species in longline bycatch were false killer whale, short-finned pilot whale, Risso's dolphin, and humpback whale.[69]

Pilot whales and Risso's dolphins also figure prominently in the Atlantic HMS fishery's marine mammal bycatch. In 2005, this fishery recorded 24 marine mammal interactions, including 10 serious injuries.[70] Scientists estimate from the observed number of interactions that 208 pilot whales and 13 Risso's dolphins suffered serious injury in pelagic longline gear during 2005.[71] These numbers will likely decrease once the measures set forth in the Atlantic TRP are implemented.

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[67] *Id.* at 50.
[68] NOAA Fisheries, Western Pacific Fisheries Bycatch Overview, *available at* http://www.nmfs.noaa.gov/bycatch-chart.html (last visited September 13, 2007).
[69] *Id.*
[70] Walsh, C. Fairfield and L. Garrison. 2006. Estimated Bycatch of Marine Mammals and Turtles in the U.S. Atlantic Pelagic Longline Fleet During 2005. NOAA Technical Memorandum NOAA NMFS-SEFSC-539, at 9.
[71] *Id.* at 12.

The California-Oregon drift gillnet fishery seriously injures or kills a number of cetacean and pinniped species. Between 2003 and 2005, the fishery documented the kill of 23 short-beaked common dolphins, 10 California sea lions, 4 Risso's dolphins, as well as a gray whale, a northern right whale dolphin, and a northern elephant seal.[72] Several other individuals, including a humpback whale, California sea lion, and an unidentified whale, were captured but released alive.[73] Estimated total bycatch numbers for this time period were not reported.

Overall, conservation measures have significantly decreased marine mammal bycatch in U.S. fisheries.[74] Between 1990 and 1999, bycatch of marine mammals in U.S. fisheries declined by 40 percent.[75] While some of this decline may be attributable to shifts in fishing effort, it nevertheless demonstrates the importance of strong bycatch reduction efforts and the necessity of requiring countries wishing to export fish to the U.S. to meet the same standards.

IV. SWORDFISH IMPORTS INTO THE U.S.

The U.S. imports over ten thousand metric tons of swordfish and swordfish products each year, making it one of the top swordfish consumers in the world.[76] In the past three years, most swordfish imports into the U.S. have come from Singapore, Panama, Canada, Mexico, and Chile.[77] See Figure 3, below. Singapore alone has exported over 2,500 metric tons of swordfish annually to the U.S. over the past three years.[78] Canada and Panama each export an average of over 1,000 metric tons of swordfish to the U.S. every year. Ecuador, Brazil, Uruguay, Indonesia, and Vietnam have also become significant swordfish exporters.[79] Overall, the U.S. has received swordfish imports from nearly four dozen countries in recent years (Figure 4), yet the U.S. government reports that it has no information from any of these countries regarding their fishing practices, take of marine mammals, or any other information to satisfy the requirements of MMPA section 101.[80]

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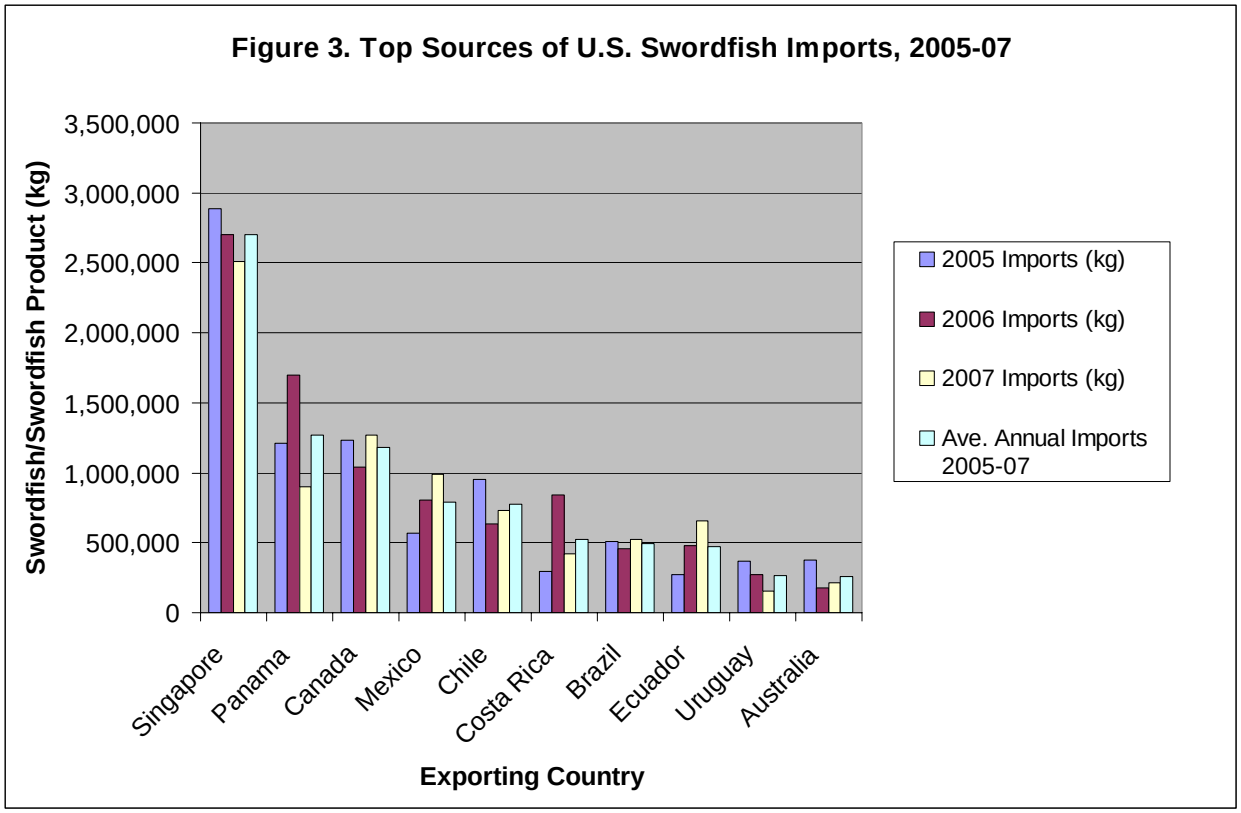
[72] NMFS Southwest Regional Office, NMFS California/Oregon Drift Gillnet Observer Program: Observed Catch by Fishing Season (2003-2004) and (2004-2005), *available at* http://swr.nmfs.noaa.gov/fmd/observer/catch0304.htm and http://swr.nmfs.noaa.gov/fmd/observer/catch0405.htm (last visited September 13, 2007).
[73] *Id.*
[74] Read et al. 2006, *supra* note 10, at 167.
[75] *Id.*
[76] U.S. Dept. of Commerce, Imports and Exports of Fishery Products Annual Summary 2006 at 3, 5, *available at* http://www.st.nmfs.gov/st1/trade/index.
[77] NMFS Fisheries Statistics and Economics Division, Trade Query – Swordfish (2005-07), *available at* http://www.st.nmfs.gov/st1/trade/cumulative_data/TradeDataProduct.html.
[78] *Id.*
[79] *Id.*
[80] Letter from L. Brown, Director of Field Programs, U.S. Customs & Border Protection, to M. Sakashita, Staff Attorney, Center for Biological Diversity (August 14, 2007); *see also* Letter from S.E. Sloca, FOIA Officer, Office of the Secretary of the Interior, to M. Dorgan, FOIA Officer/Public Liaison, Dept. of Homeland Security (July 16, 2007); Letter from M. Dorgan, FOIA Officer/Public Liaison, Dept. of Homeland Security, to M. Sakashita, Staff Attorney, Center for Biological Diversity (July 26, 2007); and Letter from W. Hogarth, Asst. Administrator for Fisheries, NMFS, to M. Sakashita, Center for Biological Diversity (December 12, 2007).



(Source: NMFS Fisheries Statistics and Economics Division, Trade Query – Swordfish (2005, 2006, and 2007), *available at* http://www.st.nmfs.gov/st1/trade/cumulative_data/TradeDataProduct.html.)

Country of Origin	2005 Imports (kg)	2006 Imports (kg)	2007 Imports (kg)
Singapore	2,883,962	2,700,320	2,513,219
Panama	1,211,721	1,699,168	900,196
Canada	1,231,425	1,037,911	1,272,173
Mexico	567,083	806,659	989,372
Chile	950,019	633,190	732,470
Costa Rica	297,860	842,844	423,143
Brazil	509,075	457,375	523,917
Ecuador	273,779	481,012	655,072
Uruguay	367,545	271,331	152,803
Australia	375,485	174,735	216,855
Indonesia	255,141	196,847	194,007
New Zealand	150,027	265,662	205,858
Vietnam	254,244	128,746	199,472
South Africa	2,182	16,659	298,903
China-Taipei	100,202	86,631	83,862
China	14,994	19,367	186,804
Trinidad & Tobago	128,754	14,347	52,909
Malaysia	32,424	46,401	101,710
Venezuela	86,457	57,340	15,698
India	98,111	36,236	19,949
Sri Lanka	661	24,516	87,488
Japan	25,945	11,404	21,137

Country of Origin	2005 Imports (kg)	2006 Imports (kg)	2007 Imports (kg)
Cook Is.	51,678	3,736	2,874
Philippines	2,555	30,042	10,660
Mauritius	0	10,579	25,947
Pakistan	23,128	4,171	0
Thailand	11,623	0	11,739
Russia	0	0	20,000
Guadeloupe	0	18,462	0
Peru	2,978	965	12,667
Colombia	8,640	1,722	2,241
South Korea	0	1,007	9,420
Honduras	10,374	0	0
El Salvador	7,193	1,081	0
Portugal	0	6,574	225
Nicaragua	729	1,425	2,793
Lithuania	0	0	4,408
Guyana	0	0	2,823
Spain	0	2,603	0
Bermuda	0	0	2,030
Fiji	1,030	0	0
Tonga	732	0	0
Grenada	296	0	0

Figure 4. Imports of Swordfish and Swordfish Products into the U.S., 2005-07.

(Source: NMFS Fisheries Statistics and Economics Division, Trade Query – Swordfish (2005, 2006, and 2007), *available at* http://www.st.nmfs.gov/st1/trade/cumulative_data/TradeDataProduct.html.)

V. FOREIGN SWORDFISH FISHERIES' TAKE LIKELY EXCEEDS U. S. STANDARDS.

Customs and Border Protection, located within DHS, has a duty to ban imports of swordfish from countries that have failed to provide reasonable proof that the swordfish they are exporting to the U.S. were caught in compliance with U.S. standards. The MMPA places the burden of proof on the exporting country to demonstrate such compliance, and the U.S. may not accept their exports without such proof.[81] Petitioners requested from DHS, the Secretary of the Treasury, and NMFS all documents related to the implementation of the import restriction provisions of MMPA section 101 through a Freedom of Information Act Request. In response, each of these agencies asserted that they possessed no responsive documents, indicating that none of the exporting countries have provided the required proof.

It is possible that some of the countries exporting swordfish to the U.S. operate according to standards that are comparable or even superior to U.S. standards. However, the responsible U.S. agencies cannot confirm whether and for which countries this is the case without demanding, receiving, and assessing the proof required under MMPA section 101(a)(2). Their failure to do so constitutes more than an academic violation of the MMPA. It directly undermines U.S. efforts to protect marine mammals, including imperiled populations, and places U.S. fishers at a severe disadvantage compared to unregulated foreign fishers.

In fact, available information indicates that many of the countries exporting swordfish to the U.S. fail to regulate their fisheries in a manner that protects marine mammals, use destructive fishing practices, and transship fish from other poorly regulated and destructive fisheries. These countries generally do not make their landing and bycatch data available to the general public. Some may not track bycatch data at all. The resulting dearth of critical data on marine mammal interactions highlights the need to enforce MMPA section 101(a)(2) in order to force these countries to account for their catches and fishing practices.

Singapore, the largest exporter of swordfish to the U.S. and likely one of the most egregious offenders when it comes to poorly regulated fishing and trade practices, presents a useful case study for the necessity of enforcing MMPA section 101. Below, we present a brief overview of Singapore's trade in swordfish. Singapore is far from alone in its use of dubious fishing and trade practices, as we demonstrate with the brief sampling of information regarding other swordfish exporting nation's practices that follows.

A. Problems Associated with Imported Fish from Singapore Demonstrate the Importance of Enforcing the MMPA Import Ban.

Singapore is by far the largest exporter of swordfish to the U.S., superseding former top importers like Chile, Canada, and Brazil.[82] In recent years, Singapore's exports have accounted for approximately 28 percent of the U.S. total swordfish imports.

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[81] 16 U.S.C. § 1371(a)(2)(A).

[82] National Marine Fisheries Service, Fisheries Statistics and Economics Division, Swordfish Imports Data 1990-2006, *available at* http://www.st.nmfs.gov/st1/trade/cumulative_data/TradeDataProduct.html.

Although records show sizeable exports of swordfish from Singapore, Singapore reports negative exports to its Southeast Asian counterparts.[83] Additionally, Singapore reports zero swordfish catches with the fisheries statistics program of the U.N. Food and Agriculture Organization ("FAO").[84]

It appears that Singapore acts primarily as an intermediary, re-exporting fish between large-scale exporting countries and similarly large-scale-importing countries. Expansion of Singapore's import-export facilities, for example, demonstrates its intention to become a transshipper to the global import-export market. In early 2000, the Port of Singapore Authority ("PSA") modernized facilities to accommodate growth of the import-export sector. For instance, the PSA opened terminals at Pasir Panjang with new berths, capable of hosting a new generation of mega vessels for seafood imports. As an added incentive, the PSA offered sizable discounts to seafood importers.[85] These trends, combined with port logs and sharp growth in export volumes from Singapore, support the conclusion that the swordfish Singapore exports to the U.S. comes from transshipments from other nations through Singapore's ports.

Coinciding with Singapore's sharp growth in swordfish imports to the U.S. was Taiwan's industrial fisheries' boom of the early 1990s. The simultaneous growth of these geographically-proximate and fast-growth fishing sectors indicates that Singapore's principal source of swordfish transshipments is Taiwanese fishing vessels.[86]

The practice of transshipping fish products is problematic in that it obscures the true sources of the goods being traded and thus prevents the fishers who provided the fish products from being held to applicable standards. Although Singapore requires all transhippers to go through a permitting process, it does not make its bilateral agreements public nor does it ensure that marine mammal protection standards are implemented by transshippers. Thus, importers of Singapori transshipments cannot independently investigate the standards of originating fisheries, nor can they rely on the Singapori permitting process. This lack of transparency and accountability in the Singapori-Taiwanese fishing partnership likely leads to significant and unaccounted for take of marine mammals.

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[83] Menasveta, D. 2003. The Sustainable Contribution of Fisheries to Food Security in Southeast Asia, *available at* www.fao.org/docrep/003/x6956e/x6956e07.htm (last visited 1/07).

[84] The FAO's Fisheries and Aquaculture department collects the world's most comprehensive fisheries statistics, including the amount of commercially caught fish recorded for each country between 1950 and 2005. *See generally* FAO FishStat Plus, *available at* http://www.onefish.org/servlet/CDSServlet?status=ND0xMDc3OS4xMDA1NzAmNj1lbiYzMz13ZWItc2l0ZXMmMzc9aW5mbw~~ (last visited 11/30/2007).

[85] Guzzetta, A. August 2003. Singapore: Surviving on Ships and Chips? *Claremont Policy Briefs*, *available at* http://lowe.claremontmckenna.edu/pdf/Redirect/cpb0301.asp (last visited 6/12/07).

[86] The conclusion that Singapore has become a major transhipper is supported by the sharp growth rate evidenced in NMFS import data. Prior to 1997, Singapore's imports to the U.S. averaged ~50,000 kilograms of swordfish, compared to its peak exports of 6 million kilograms in 1997 and steady average around ~4.3 million since then. NMFS, Fisheries Statistics and Economics Divisions, Swordfish Imports Data 1990-1997; *see also* Wildman, M.R. 1997. World Swordfish Fisheries: An analysis of swordfish fisheries, market trends and trade patterns, past-present-future, Volume III – Asia. U.S. Department of Commerce, NOAA Technical Memorandum NMFS–F/SPO–25 (hereinafter "Wildman 1997").

1. Singapore's Fishery Management Regime Allows the Take of Marine Mammals in Excess of U.S. Standards.

Singapore appears to lack adequate fishery conservation management strategies and policies to meet U.S. MMPA requirements for importing swordfish. The Agri-Food and Veterinary Authority of Singapore ("AVA") regulates Singapore fishing. The AVA administers four fishery-related statues and their supplementary legislation.[87] These acts regulate general aspects of the fishing industry such as fishing vessels, gear, licensing, aquaculture, and offenses for non-compliance. The Fisheries Act and seven subsidiary rules most directly manage Singapore's fishing. There is little reference in any of these legislative documents to fishery conservation and no reference to mitigating marine mammal bycatch in any fishery.

The Fisheries Act is Singapore's primary fishery legislation and was enacted "for the protection and conservation of fisheries."[88] Despite the stated purpose of Singapore's Fisheries Act, it only implements three specific conservation management strategies and does not address marine mammal bycatch at all. The only mandated conservation regulations in the Act are bans on trawling, landing or selling illegally caught fish, and using poisons or explosives.[89]

As explained above, Singapore imports most of the swordfish it exports to the United States from Taiwan. There is no evidence to indicate Singapore's importation regulations consider marine mammal bycatch. The Fisheries Act states the Minister may "regulate or prohibit the import, export, or transshipment of any species of fish if the Minister is of the opinion that such species of fish may pose a threat to the ecological balance or integrity of fisheries, or to public safety."[90] However, there is no subsequent legislation regarding importation. The 2006 Endangered Species (Import and Export) Act regulates the direct import and export of listed species, but does not protect listed species incidentally caught in fisheries.[91]

Recent reports show that Singapori swordfish imports from Southeast Asian and Taiwanese fisheries are caught with passive fishing gear – such as myriad driftnets and longlines – that catch inordinate numbers of marine mammals as bycatch in excess of U.S. standards. For example, Singapori business representatives from Far Ocean seafood products confirmed that driftnet gear is still legal in Southeast Asian fisheries. [92]

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[87] Fishery-related legislation implemented by the AVA includes the Fisheries Act, the Wholesome Meat and Fish Act, the Agri-Food and Veterinary Authority Act, and the Endangered Species (Import and Export) Act.

[88] Singapore Fisheries Act (Chapt. 111) (2002), *available at* http://www.ava.gov.sg/Legislation/ListOfLegislation/ (last visited July 31, 2007).

[89] Singapore Fisheries Act, Chapt. 111.10 (prohibition on use of poisons or explosives); 111.11 (landing or selling fish illegally caught); 111.12 (use of trawl-nets).

[90] *Id.* at Chapt. 111.27(2)(s).

[91] Singapore Endangered Species (Import and Export) Act (2006), *available at* http://www.ava.gov.sg/Legislation/ListOfLegislation/ (last visited July 31, 2007).

[92] Palmer, M. 2007. International Marine Mammal Project: Shutting Down Gill Nets. *Earth Island Journal*, at 21, *available at* http://www.earthisland.org/eijournal/new_articles.cfm?articleID=1156&journalID=93 (last visited November 30, 2007).

2. Taiwan's Longline and Drift Gillnet Fishery Is Poorly Regulated and Known to Result in Significant Take of Marine Mammals.

All available data shows that Singapore's primary source of swordfish transshipments, Taiwan, uses substandard fishing practices that fall far below U.S. standards to protect marine mammals. Few studies of Taiwanese fisheries impacts have been published in peer-reviewed journals or made accessible to the public.[93] This petition draws on what scientific analysis that has been made public. In addition, some conclusions can be reached regarding the extent of marine mammal bycatch from indicators such as the size of the fleet, the volume of landings, the regions fished, and the gear used.

Taiwan has become one of the major deep-sea fishing nations in the world.[94] Taiwanese fisheries employ deep sea and conventional longlining operations targeted at tuna but incidentally catch swordfish and other billfish in these operations. Taiwanese tuna fishers also report common interactions between distant-water longline fleet and cetaceans.[95] Notably, these fishers mentioned that interactions with marine mammals occur more frequently in the swordfish fishery because the gear is deployed closer to water's surface. A 1995 survey undertaken in the Taiwanese fishing ports of Tungkang and Nanfang Ao found 34 cetaceans dead as a result of being hooked or entangled in longline gear. Another 66 cetaceans had died for unknown reasons or by harpoons that fishers used to try to prevent the depredation of their catch.[96]

Closer to their motherports in the Western Taiwan Strait and Eastern Taiwan, fishing vessels use longline, drift gillnets, sink gillnets and trammel nets, all associated with significant cetacean bycatch.[97] Combining estimates of incidental bycatch from vessels in the East Coast harbors (Nanfang Ao, Hualien, Shihti and Chengkung) alone, marine biologists report an annual bycatch of 27,000 to 41,000 cetaceans.[98] Though not yet reported, the fleet size and use of gear similar to that used by fishers closer to Taiwan, imply a proportionately sizable bycatch rate of marine mammals in more distant waters.

Taiwanese legislation does not appear to provide safeguards against marine mammal bycatch in the swordfish fishery. The Taiwan Fishery Agency oversees two national legislative acts to regulate the Taiwan fishery: the Fisheries Act[99] and the Fishing Port Act.[100] These Acts

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[93] Wang, J.Y. and Yang, Shih-Chu. 2002. Interactions Between Taiwan's Distant-water Longline Fleet and Cetaceans, *presented in* Report of the Workshop Interaction Between Cetaceans and Longline Fisheries, New England Aquarium Aquatic Forum Series Report 03-1, Apia, Samoa (hereinafter "Wang and Yang 2002"), at 3.
[94] Vice-Chairman of OFDC, Address titled "The Establishment of the 'Overseas Fisheries Development Council International' Puts Taiwan on the Global Map!" (Nov. 2001), *available at* http://www.Fa.gov.tw/eng/news/m901123e.php (last visited June 25, 2007).
[95] Wang and Yang 2002, *supra* note 93; Dalla Rosa, L. and E. Secchi. 2002. Comparative Analysis of the Interactions between Killer Whales/Sharks and the Tuna/Swordfish Fishery in Southern and Southeastern Brazil, *presented in* Report of the Workshop Interaction Between Cetaceans and Longline Fisheries, New England Aquarium Aquatic Forum Series Report 03-1, Apia, Samoa, at 4-5.
[96] *Id.*
[97] Wang, J.Y. and L.S. Chou. 2002. Report of the Second Workshop on the Biology and Conservation of Small Cetaceans and Dugongs of Southeast Asia. W.F. Perrin et al., Eds. at 33.
[98] *Id.*
[99] Taiwan Fisheries Act, as amended and promulgated by Presidential Order on December 18, 2002, *available at* http://www.fa.gov.tw/eng/laws/fshacte.php (last visited July 24, 2007).

lay out general guidelines for the fishery, including licensing, fishing rights, port management, possible restrictions, and penalties for violating the terms of the Acts. The Fisheries Act specifically regulates, among other things, conservation management. However, the Act does not make any specific reference to regulating bycatch or a national policy to protect marine mammals.

Taiwan enacted the Fisheries Act "to conserve and rationally utilize aquatic resources."[101] The Act gives local Taiwanese municipalities' authority to control fishing with vague directives and unclear oversight. Local governments are responsible for establishing methods of catching, harvesting, and "any other matters as deemed necessary."[102] Taiwan lacks uniform guidelines for local municipalities and does not maintain a system to monitor local regulation.

The Taiwan Fisheries Act states that matters not covered in the Act shall be governed by other legislation, but it is difficult to determine what other legislation exists. According to the Taiwan Fisheries Agency website, there are sixteen regulations and nine directives which apply to the two acts.[103] Only one document, specifically regarding the squid jig fishery, concerns marine mammal protection.[104] The other documents pertaining to various aspects of Taiwan fishing do not address marine mammal bycatch. For example, this list includes a driftnet fishery regulation regulating fishing areas to prevent territorial disputes, but does not include any provisions to prevent bycatch such as gear restrictions, observers, or closed areas.[105]

In sum, Taiwan's fisheries management falls far short of U.S. MMPA requirements.

B. Many Other Countries Use Fishing Practices That Likely Result in Harm to Marine Mammals in Excess of U.S. Standards.

Like Singapore, many of the countries that export swordfish to the U.S. fail to regulate fisheries interactions with marine mammals, fail to monitor their fisheries, and engage in trade practices that obscure the true source of the swordfish being exported. It is quite likely that many, if not most, of these countries fish in a manner that results in serious injury and mortality of marine mammals in excess of U.S. standards. Allowing these countries to sell their fish and fish products in the U.S. market without ensuring that they meet standards comparable to those imposed on U.S. fishers threatens marine mammals and places U.S. fishers at a significant disadvantage. As demonstrated by the following brief examples, widespread use of gillnets – a method particularly deadly to marine mammals – and lack of regulation or enforcement in international swordfish fisheries pose a grave threat to marine mammal populations. By failing to enforce the MMPA, the U.S. encourages these destructive practices to its own detriment.

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[100] Taiwan Fishing Port Act, as enacted and promulgated by President Order (81) Hua-Tsung-(1)-Yi-Tzu No.0592 on January 31, 1992, *available at* http://www.fa.gov.tw/eng/laws/fishingportact.php (last visited July 24, 2007).
[101] See Taiwan Fisheries Act, *supra* note 99.
[102] *Id*.
[103] *See* Taiwan Fisheries Laws: Acts, Regulations, and Directives, *available at* http://www.fa.gov.tw/eng/laws/fisheries_laws.php (last visited July 24, 2007).
[104] *See* Regulations for Squid Jigging Vessels Operating in the Southwest Atlantic Ocean, *available at* http://www.fa.gov.tw/eng/laws/soweatoc.php (last visited July 24, 2007).
[105] *See* Regulations on the Management of Driftnet Fisheries, *available at* http://fa.gov.tw/eng/laws/rmdriftnet.php (last visited July 24, 2007).

The U.S. currently accepts swordfish exports from a number of known flag of convenience nations. Flag of convenience nations are infamous for their lack of regulation; indeed, the very reason that vessel owners register their vessels with these nations is to avoid the sort of requirements, such as onboard observers, specialized gear, and fishing licenses, that apply to U.S.-registered vessels. Panama, for example, has built a booming business from lending its flag to substandard shipping operations. Panama has also become a major source of U.S.-imported swordfish, pumping nearly 1,700 metric tons of swordfish products into the U.S. market in 2006 alone. Honduras and Portugal, also flag of convenience nations, export swordfish to the U.S. as well.[106] There can be little doubt that these countries fall far short of U.S. standards for avoiding take of marine mammals by swordfish fisheries.[107]

Furthermore, vessel owners from countries with stronger fisheries regulations are increasingly re-flagging their vessels to avoid those regulations. For example, North Korea has a mandatory fisheries observer program and has reported relatively high bycatch rates of cetaceans in its fisheries.[108] Recently, a large number of North Korean vessels have started to operate under flags of convenience such as Cambodia.[109] Brazil has reportedly expanded its longline fleet, which is documented to take Risso's dolphins, by leasing vessels from flag of convenience countries such as Barbados, Honduras, Panama, and Portugal.[110]

The U.S. also currently accepts imports from countries whose vessels have been reported using large-scale driftnets in violation of the international ban on use of the gear. Numerous Chinese vessels and one Indonesian vessel were reported using driftnets in the North Pacific Ocean in 2006.[111] Other sources of swordfish imports, such as Spain, have especially poor track records with regard to operating sustainable fisheries. Spain's (and the European Union's in general) destructive fishing methods have sparked numerous controversies with countries trying to conserve fishery resources.[112]

Two other major sources of imported swordfish, Chile and Mexico, use drift gillnets, which are known to kill and injure scores of marine mammals every year.[113] While these nations have made efforts to conserve swordfish stocks, it is not clear whether they have made similar efforts to reduce bycatch of marine mammals in their swordfish fisheries.

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[106] NMFS Fisheries Statistics and Economics Division, 2003-2006 data, *available at* http://www.st.nmfs.gov/st1/trade/cumulative_data/TradeDataProduct.html.

[107] Moreover, the U.S. is party to several treaties, such as the International Commission for the Conservation of Atlantic Tunas Convention, that ban the import of fish caught by vessels operating under flags of convenience.

[108] International Whaling Commission. 2002. Annex M: Report of the Sub-Committee on Bycatch and Other Human-Induced Mortality, at 2.

[109] Neff, Richard, Flags That Hide the Dirty Truth, *Asia Times* (April 19, 2007).

[110] Rosa, L. Dalla and E.R. Secchi. 2007. Killer whale and shark depredation on longline catches. *J. of the Mar. Biol. Ass'n of the U.K.* 87:135-140, at 139.

[111] 2006 Report of the Secretary of Commerce to the Congress of the U.S. Concerning U.S. Actions Taken on Foreign Large-Scale High Seas Driftnet Fishing Pursuant to Section 206(e) of the MSA as Amended by P.L. 104-297, Sustainable Fisheries Act of 1996, at Table 1.

[112] *See, e.g.*, Cruz, M.O., The Swordfish in Peril: The EU Challenges Chilean Port Access Restrictions at the WTO, *Bridges* (August 2000).

[113] *La Pesqueria de Pez Espada del Pacifico*, Instituto Nacional de la Pesca, at 417; Wildman 1997, *supra* note 86, Vol. IV 2A, at 430.

Finally, fishers in some nations purposefully target marine mammals during the course of their fishing operations. For example, reports show that some fisheries in the Philippines, a growing source of U.S. swordfish imports, have begun to target cetaceans by setting drift nets in areas where cetaceans are known to occur.[114]

In summary, these examples demonstrate that many, if not most, swordfish imports do not meet U.S. standards. The continued import of these ill-gotten products serves to undermine U.S. conservation and economic interests by supporting the very behavior that Congress intended to end.

VI. SWORDFISH IMPORTS MUST BE BANNED UNTIL THE EXPORTING COUNTRIES HAVE DEMONSTRATED THEIR FISH PRODUCTS WERE CAUGHT IN ACCORDANCE WITH U.S. STANDARDS.

When Congress passed the MMPA, it realized that marine mammal conservation could not be accomplished through regulation of U.S. fishers alone. MMPA section 101(a)(2) therefore mandates the use of the United States' considerable trade power to achieve conservation of marine mammals outside U.S. waters. This provision is meant to provide a strong incentive for foreign fishers to protect marine mammals by using sustainable fishing practices, while leveling the playing field for domestic fishers subject to U.S. regulations. By importing huge quantities of swordfish and swordfish products from countries that engage in suspicious trading practices and use commercial fishing technologies that result in high rates of serious injury and death of marine mammals, the U.S. government is promoting the exact opposite result of what the MMPA is meant to achieve. In effect, the U.S. is promoting the destruction of marine mammal stocks.

In short, the Secretaries' failure to enforce MMPA section 101(a)(2) harms U.S. interests in trade and conservation. Petitioners therefore urge the Secretary of Homeland Security, the Secretary of the Treasury, and the Secretary of Commerce to immediately ban the import of all swordfish and swordfish products unless and until: (1) the Secretaries demand reasonable proof from any nation seeking to export swordfish or swordfish products to the U.S. of the effects on marine mammals of the commercial fishing technology used to obtain the swordfish or swordfish products; and (2) the Secretaries receive such proof and determine that it demonstrates that the swordfish or swordfish products to be imported were not caught with commercial fishing technology that results in the incidental kill or incidental serious injury of marine mammals in excess of U.S. standards.

We look forward to receiving your responses within 60 days of receiving this petition.

[114] Dumaguete Action Plan: Cetacean Bycatch Section. 2002. In: Perrin, W.F. et al., Eds. Report of the Second Workshop on the Biology and Conservation of Small Cetaceans and Dugongs of Southeast Asia. July 24-26, 2002. Silliman University, Dumaguete City, Philippines, at 3.

APPENDIX B

FINAL
ENVIRONMENTAL ASSESSMENT,
REGULATORY IMPACT REVIEW,
AND REGULATORY FLEXIBILITY ACT ANALYSIS
FOR A FINAL RULE
TO ESTABLISH IDENTIFICATION AND CERTIFICATION PROCEDURES FOR NATIONS UNDER THE HIGH SEAS DRIFTNET FISHINGMORATORIUMPROTECTION ACT

FINAL

ENVIRONMENTAL ASSESSMENT,

REGULATORY IMPACT REVIEW,

AND REGULATORY FLEXIBILITY ACT ANALYSIS

FOR A FINAL RULE

TO ESTABLISH IDENTIFICATION AND CERTIFICATION

PROCEDURES FOR NATIONS UNDER THE HIGH SEAS

DRIFTNET FISHING MORATORIUM PROTECTION ACT

United States Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Office of International Affairs

September 2010

Final Rule to Identification and Certification Procedures for Nations under the High Seas Driftnet Fishing Moratorium Protection Act

Actions: Establish identification and certification procedures for nations whose vessels are engaged in illegal, unreported, or unregulated (IUU) fishing or bycatch of protected living marine resources.

Type of Statement: Final Environmental Assessment, Regulatory Impact Review, and Final Regulatory Flexibility Analysis

Lead Agency: National Marine Fisheries Service

For Further Information:

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Abstract:

The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006, which was signed into law in January 2007, amends the High Seas Driftnet Fishing Moratorium Protection Act (Moratorium Protection Act) to require actions be taken by the United States to address illegal, unreported, or unregulated (IUU) fishing and the bycatch of protected living marine resources (PLMRs). Specifically, the Moratorium Protection Act requires the Secretary of Commerce to identify in a biennial report to Congress those foreign nations whose vessels are engaged in IUU fishing or fishing activities that result in bycatch of PLMRs. The Moratorium Protection Act also requires the establishment of procedures to certify whether nations identified in the biennial report are taking appropriate corrective actions to address IUU fishing or bycatch of PLMRs by fishing vessels of that nation. Identified nations that do not receive a positive certification from the Secretary of Commerce could be subject to measures under the High Seas Driftnet Fisheries Enforcement Act (16 U.S.C. 1826a), such as the denial of port privileges, prohibition on the importation of certain fish or fish products into the United States, or other measures.

This action would establish procedures for the Secretary of Commerce to certify nations whose vessels are engaged in IUU fishing activity or PLMR bycatch. Background information on the issues and a description of the alternatives being considered for this rulemaking are described in this environmental assessment.

ENVIRONMENTAL ASSESSMENT

1.0 INTRODUCTION

The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSRA), which was signed into law in January 2007, amends the High Seas Driftnet Fishing Moratorium Protection Act (Moratorium Protection Act) to require actions be taken by the United States to strengthen international fishery management organizations and address illegal, unreported, or unregulated (IUU) fishing and bycatch of protected living marine resources. Specifically, the Moratorium Protection Act requires the Secretary of Commerce to identify in a biennial report to Congress those foreign nations whose vessels are engaged in IUU fishing or fishing that results in bycatch of protected living marine resources (PLMRs). The Moratorium Protection Act also requires the establishment of procedures to certify whether nations identified in the biennial report are taking appropriate corrective actions to address IUU fishing or bycatch of protected living marine resources by fishing vessels of that nation. Based upon the outcome of the certification procedures developed in this rulemaking, nations could be subject to import prohibitions and other measures under the authority provided in the High Seas Driftnet Fisheries Enforcement Act (Enforcement Act) if they are not positively certified by the Secretary of Commerce. Pursuant to the Moratorium Protection Act, NOAA's National Marine Fisheries Service (NMFS) is proposing to establish identification and certification procedures to address illegal, unreported, or unregulated (IUU) fishing activities and bycatch of PLMRs.

1.1 PURPOSE AND NEED

The proposed action is the establishment of procedures for the certification of nations whose vessels are identified as engaging in IUU fishing or bycatch of PLMRs. The purpose of the proposed action is to enhance existing U.S. authority related to compliance with international fisheries management and conservation agreements. The need for the proposed action is to comply with the Moratorium Protection Act, as amended by the MSRA. Congress, recognizing that the U.S. regulatory regime for fisheries management is regarded as one of the most stringent, amended the Moratorium Protection Act to strengthen the ability of international fishery management organizations and the United States to address IUU fishing and reduce the bycatch of PLMRs. These threats to sustainable fisheries worldwide have continued under existing law.

To address IUU fishing, Congress authorized measures under the Moratorium Protection Act to promote international cooperation to address IUU fishing and strengthen the ability of international fishery management organizations to combat harmful fishing practices. To protect certain vulnerable species of concern to the United States, the Moratorium Protection Act was amended to encourage the use of bycatch reduction methods in international fisheries that are comparable to methods used by U.S. fishermen. In addition, the Act called for the establishment of certification procedures as described above, and NMFS is proposing the promulgation of regulations to implement these provisions of the Moratorium Protection Act.

1.2 NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.) was enacted in 1969 and requires consideration of environmental issues in federal agency planning and decision making. NEPA requires federal agencies to evaluate the impacts of major federal actions on the human environment. The procedural provisions of NEPA, which outline the responsibilities of federal agencies, are provided in the Council on Environmental Quality NEPA regulations, 40 CFR Parts 1500-1508. NOAA has published procedures for implementing NEPA in NOAA Administrative Order 216-6 (NAO 216-6). NAO 216-6 also reiterates Department of Commerce provisions of Executive Order 12114, Environmental Effects Abroad of major Federal Actions. This Environmental Assessment (EA) is prepared in accordance with NEPA, its implementing regulations, and NAO 216-6.

Under NAO 216-6, the promulgation of regulations that are procedural and administrative in nature is subject to a categorical exclusion from the requirement to prepare an Environmental Assessment. However, NMFS decided to do an EA for this action in order to facilitate public involvement in the development of the proposed certification procedures. This EA provides the public with a context for reviewing the proposed certification action by exploring the impacts associated with IUU fishing and bycatch. NMFS published a proposed rule (74 Fed. Reg. 2019 (January 14, 2009)) for this action and solicited public comment on the rule and draft EA, regulatory impact review and initial regulatory flexibility analysis (IRFA) for 120 days. NMFS did not receive any public comment on the draft EA or IRFA.

1.3 BACKGROUND

To provide context for the proposed action, background information on IUU fishing, bycatch, and authorities provided in current domestic laws is summarized in this section. Note that environmental assessments and environmental impact statements on some aspects of bycatch have been prepared for other rule makings and are listed in Appendices to this EA. Additional information can be found in Appendices A - F in documents prepared as background for this proposal.

1.3.1 IUU Fishing

In general, IUU fishing is fishing that does not comply with national, regional or global fisheries conservation and management obligations. The term covers a wide variety of illicit fishing conduct within national jurisdictions, areas under the governance of international agreements, and regional or subregional areas subject to conservation and management measures promulgated by regional fisheries management organizations (RFMOs). Unregulated fishing may occur in international waters where no management authority or conservation measures are in place.

In 2001, the United Nations Food and Agriculture Organization (FAO) adopted the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU).[1] The aim of this voluntary instrument is to prevent, deter and eliminate IUU

[1] United Nations Food and Agriculture Organization. International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing. Rome 2001 (hereinafter FAO IPOA-IUU). Other fishing-related IPOAs include those for Management of Fishing Capacity; Conservation and Management of Sharks; and Reduction

fishing by providing States with comprehensive, effective and transparent measures to address IUU fishing, including through appropriate RFMOs established in accordance with international law. To help implement the IPOA-IUU, the United States published its own National Plan of Action (see Appendix A).

The United States has taken a view in defining IUU fishing that is aimed both at improving compliance with international fishery management regimes and at enhancing fairness for the U.S. fleet. According to a Senate Report, the U.S. industry is disadvantaged when "other countries do not impose the same stringent regime on their fishing fleets, either within their EEZs [Exclusive Economic Zones] or on the high seas. . . .Even when agreements exist, implementation is slow, and management requirements are weak or ineffective in the face of economic pressures."[2]

In the Moratorium Protection Act, Congress directed NMFS to publish a definition of IUU by April 12, 2007. The agency published a final rule articulating its decision to "publish the definition exactly as set forth in section 403 of MSRA" (new section 609(e)(3) of the Driftnet Moratorium Protection Act), although the agency reserves the possibility of revising the definition in the future.[3] This definition of IUU fishing was published in the Federal Register on April 12, 2007 (72 Fed. Reg. 18404) and is codified at 50 CFR Part 300.

For purposes of the Moratorium Protection Act, ''IUU fishing'' is defined as fishing activities that violate conservation and management measures required under an international fishery management agreement to which the United States is a party, including catch limits or quotas, capacity restrictions and bycatch reduction requirements; overfishing of fish stocks shared by the United States, for which there are no applicable international conservation or management measures or in areas with no applicable international fishery management organization or agreement that has adverse impacts on such stocks; and fishing activity that has an adverse impact on seamounts, hydrothermal vents, and cold water corals located beyond national jurisdiction, for which there are no applicable conservation or management measures or in areas with no applicable international fishery management organization or agreement.

1.3.2 Bycatch of Protected Living Marine Resources

The incidental catch, or bycatch, in fisheries is one of the greatest threats to marine mammals, sea turtles, and sharks. Thousands of these animals are killed each year through entanglement in

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of Incidental Catch of Seabirds in Longline Fisheries. These IPOA's were developed as the COFI Members in 1997 found it necessary to have some form of international agreement in order to manage the issues concerned in compliance with the Code of Conduct for Responsible Fisheries. The most suitable instrument for each of the three texts were developed in the course of two intergovernmental meetings, open to all FAO Members, held in 1998. The IPOAs were adopted by the twenty-third Session of the FAO Committee on Fisheries in February 1999 and endorsed by the FAO Council at the session it held in November 2000.There is also an FAO Strategy on Improving Information on the Status and Trends of Capture Fisheries, endorsed in 2003. http://www.fao.org/fi/website/FIRetrieveAction.do?dom=org&xml=CCRF_prog.xml&xp_nav=2,3 (last visited April. 2, 2008).

[2] Senate Report 109-229, Report of the Committee on Commerce, Science and Transportation on S. 2012, Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2005. April 4, 2006.

[3] Illegal, Unreported, or Unregulated Fishing. NMFS/NOAA. Final Rule. 72 Fed. Reg. 18404 at 18405 (April 12, 2007).

fishing gear, including gillnets, trawl nets, purse seines, and longlines. Progress on quantifying the scale of this mortality, identifying the magnitude of this threat, and mitigating or reducing the mortality has been slow, sporadic, and limited to a few specific fisheries or circumstances. Minimizing bycatch has become increasingly important for NMFS over the past several years. NMFS is also concerned with bycatch mortality, which is the mortality of the discarded catch of any living marine resource plus unobserved mortality due to a direct encounter with fishing gear. Assessing the amount and type of bycatch that occurs in marine fisheries is an essential component of NMFS' efforts to better quantify total fisheries-associated mortality in marine fisheries. The reduction of bycatch in marine fisheries is also a major component of several of NMFS' governing statutes, including the Magnuson-Stevens Fishery Conservation and Management Act, the Endangered Species Act (ESA), and the Marine Mammal Protection Act (MMPA).

NMFS implemented several bycatch reduction regulations in 2006, undertook bycatch reduction technology research and has continued to monitor and document bycatch in fisheries of the United States. During 2006, the United States continued its efforts to secure international measures to reduce bycatch that are comparable to the standards and measures applicable to United States fishermen. Given the negative impacts of bycatch globally, the United States will continue efforts to secure international measures designed both to minimize bycatch and minimize the mortality resulting from unavoidable bycatch. Reports on NMFS activities to address bycatch are provided (see Appendix C).

Internationally, however, few RFMOs have bycatch reduction measures in place.[4] In 2006, Congress recognized that high bycatch levels are a threat to sustainable fisheries worldwide. Noting that the absence of effective bycatch reduction strategies has both economic and conservation implications for U.S. industry and management, the Congress found "…a clear need to ensure other nations, particularly those that fish on shared or high seas stocks, adhere to conservation and management standards comparable to those adhered to by U.S. fishermen both in U.S. waters and on the high seas. As bycatch of endangered or protected species increases in international fisheries, additional restrictions placed on U.S. vessels under the Magnuson-Stevens Fishery Conservation and Management Act or other U.S. law both disadvantage U.S. fleets and fail to address the problem."[5] To help reduce bycatch in international fisheries, the Moratorium Protection Act was amended by the MSRA to include provisions that encourage the use of new bycatch reduction methods comparable to methods used by U.S. fishermen in high seas fisheries, for protection of certain vulnerable species of concern to the United States, such as endangered sea turtles and marine mammals. The Secretary of Commerce and the Secretary of State are encouraged to provide assistance to nations or organizations in development and adoption of such gear and appropriate conservation and monitoring plans for PLMRs.

''Protected living marine resources'' is defined in the Moratorium Protection Act as non-target fish, sea turtles, or marine mammals that are protected under United States law or international agreement, including the MMPA, ESA, the Shark Finning Prohibition Act, and the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES); but they do not

[4] See Appendices D and E for descriptions of bycatch measures for cetaceans and sharks, and discussion of sea turtle measures in text.
[5] Senate Report, supra note 2 at 43.

include species, except sharks, that are managed under the MSA, the Atlantic Tunas Convention Act, or any international fishery management organization. See 16 U.S.C. 1826k.

1.3.3. Magnuson-Stevens Fishery Conservation and Management Reauthorization Act

In 2006, the Congress reauthorized the Magnuson-Stevens Fishery Conservation and Management Act, which governs how the United States manages fisheries within its Exclusive Economic Zone (EEZ). The reauthorization bill, titled the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (MSRA),[6] directed substantial attention to fishing issues outside U.S. waters, particularly IUU fishing and bycatch in high seas fisheries. The international provisions of the MSRA are designed to "strengthen the ability of international fishery management organizations and the United States to ensure appropriate enforcement and compliance with conservation and management measures in high seas fisheries," particularly with regard to IUU fishing, expanding fleets, and high bycatch levels.[7]

Section 207 of the MSRA authorizes the Secretary of Commerce to promote improved monitoring and compliance for high seas fisheries or fisheries governed by international or regional fishery management agreements.[8] Among other provisions, the section calls for improved communication and information exchange among law enforcement organizations, an international monitoring network, an international vessel registry, expansion of remote sensing technology, technical assistance to developing countries and support of a global vessel monitoring system for large vessels by the end of 2008.[9]

Section 403 of the MSRA's international provisions amends the Moratorium Protection Act[10] by adding several new sections, including a requirement for a biennial report on international compliance; action to strengthen regional fishery management organizations; and identification of nations whose vessels are engaged, or have been engaged at any point during the preceding 2 years, in IUU fishing. [11] The Act also requires the identification of nations whose fishing vessels are engaged, or have been engaged during the preceding calendar year, in fishing activities or practices resulting in bycatch of PLMRs beyond any national jurisdiction, or fishing activities or practices beyond the EEZ of the United States that result in bycatch of a PLMR that is shared by the United States, if the relevant organization has failed to implement measures to reduce such bycatch; the nation engaged in PLMR bycatch is not a party to a relevant organization; and the nation has not adopted a bycatch reduction program comparable to that of the United States, taking into account different conditions.[12] In cases where international fishery management organizations or the nation in question are unable to address IUU fishing or reduce the bycatch of PLMRs, amendments to the Moratorium Protection Act and the High Seas Driftnet Fisheries Enforcement Act (Enforcement Act) allow for denial of port privileges, import prohibitions, and other measures to enforce compliance.[13] These provisions add to existing authority related to

[6] 16 U.S.C. 1801-1882 (1976), P. L. 94-265, as amended by P.L. 109-479 (hereinafter MSRA).
[7] Senate Report, supra note 2 at 12. For more on IUU fishing see Appendix A.
[8] MSRA, supra note 6, at Sec. 401.
[9] Id.
[10] 16 U.S.C. 1826d-k (P.L. 104-43).
[11] MSRA, supra note 6, at Sec. 403.
[12] MSRA, supra note 6, at Sec. 403.
[13] Id; supra note 11; 16 U.S.C. 1826a-c (P.L. 102-582).

compliance with international conservation agreements.[14] The Secretary of Commerce determines whether a nation has taken appropriate corrective action in response to IUU fishing, gives the offending party notice and opportunity for comment, and then certifies to Congress whether it has provided documentary evidence of corrective action.[15]

Once nations have been identified as having vessels engaged in IUU fishing, there is a notification and consultation process. Subsequent to these processes, the Secretary of Commerce must certify whether the government of an identified nation has taken appropriate corrective action to address the activities for which it was identified. When making such a determination, the Secretary shall take into account whether a nation provided documentary evidence that it has taken corrective action with respect to the offending activities of its fishing vessels identified in the report; or whether the relevant international fishery management organization has implemented measures that are effective in ending the IUU fishing by vessels of that nation. See 16 U.S.C. 1826(j)(d)(1).

A similar procedure is required for bycatch of PLMRs in international waters or a PLMR beyond the U.S. EEZ that is shared by the United States. After a process that gives the international community time to respond to notification of their identification, amend existing treaties or develop new instruments as appropriate, the Secretary of Commerce must certify whether the nation has provided documentary evidence of the adoption of a regulatory program governing the conservation of the PLMR that is comparable to that of the United States, taking into account different conditions, and which, in the case of pelagic longline fishing, includes mandatory use of circle hooks, careful handling and release equipment, and training and observer programs; and has established a management plan containing requirements that will assist in gathering species-specific data to support international stock assessments and conservation enforcement efforts for protected living marine resources. See 16 U.S.C. 1826(k)(c)(1).

If the Secretary does not positively certify that the government of the identified nation has taken appropriate corrective action, measures of the Enforcement Act may be applied with some exceptions. The Secretary of the Treasury is authorized to withhold or revoke the clearance of vessels of the identified nation and deny them entry into the navigable waters or any port of the United States; prohibit the importation of certain fish or fish products from that nation; and impose other economic sanctions if denial of clearance and import bans are not successful in stopping the violation.[16]

An alternative procedure allows for certification on a shipment-by-shipment or shipper-by-shipper basis of fish or fish products.[17] Congress also called upon the Secretary of Commerce to provide assistance to nations or organizations to help them develop gear and management plans that will reduce their bycatch of PLMRs.[18]

[14] See Appendix C for description of domestic law, especially Pelly and Packwood amendments, 22 U.S.C. 1978(a); 16 U.S.C. 1371(a).
[15] MSRA, supra note 6, at Sec. 403.
[16] Id; supra note 11 at 16 U.S.C. 1826(j)(d)(3) and 16 U.S.C. 1826(k)(c)(5); 16 U.S.C. 1826a(a), (b)(3), and (b)(4).
[17] Id. at Sec. 610(c)(5)
[18] Senate Report, supra note 2 at 12.

1.3.4 Domestic laws related to IUU fishing

A listing of U.S. enforcement authorities that can be used to address IUU fishing is included in the National Plan of Action of the United States of America to Prevent, Deter and Eliminate Illegal, Unregulated and Unreported Fishing (see Appendix A). Notably, the MSRA and amendments to the Moratorium Protection Act are not the first attempts by the Congress to enact laws aimed at stopping fishing activity that compromised the effectiveness of domestic and international management and conservation regimes. The recent provisions differ from prior efforts in their emphasis on using multilateral approaches to address IUU fishing and bycatch. Appendix B describes how the existing statutory framework was employed in earlier actions under the Lacey Act, the Pelly Amendment to the Fisherman's Protective Act of 1967, the Packwood Amendment to the Fishery Conservation and Management Act of 1982, and the Driftnet Impact, Monitoring, Assessment and Control Act of 1987. In contrast to the multilateral approach of the MSRA, in these earlier approaches, the United States sought to use unilateral trade sanctions to push compliance with provisions of international and domestic measures for the protection of whales, sea turtles and dolphins affected by fishing practices (see Appendix B).

1.3.5 Domestic laws related to bycatch

U.S. law and policy provide mechanisms for action to reduce bycatch of marine mammals and sea turtles in fishing operations. The MMPA, ESA, and the Magnuson-Stevens Fishery Conservation and Management Act provide policy statements, action mandates and research direction for U.S. actions related to the bycatch of protected species. The MMPA, and the MSRA also direct U.S. managers to work in the international arena to promote conservation of PLMRs such as marine mammals, sea turtles, and sharks.

The MMPA contains national and international sections that provide tools to address the bycatch of marine mammals. Serious injury and mortality of marine mammals incidental to commercial fishing operations is a primary threat to many marine mammal species. The MMPA states that marine mammal "species and population stocks should not be permitted to diminish beyond the point at which they cease to be a significant functioning element in the ecosystem of which they are a part."[19] In 1994, Congress amended the MMPA to address the incidental mortality and serious injury (bycatch) of marine mammals in U.S. commercial fisheries. MMPA section 118 established a system for classifying commercial fisheries according to their levels of marine mammal bycatch and created the take reduction plan (TRP) process to reduce that bycatch.[20]

Internationally, the MMPA requires the Secretary of Commerce or the Secretary of the Interior, working through the Secretary of State, to negotiate agreements with other nations to protect and conserve marine mammals. The international provisions of the MMPA provide the United States

[19] 16 U.S.C. 1361(2).

[20] NMFS. June 1995a. Environmental Assessment of Proposed Regulations to Govern Interactions between Marine Mammals and Commercial Fishing Operations, under Section 118 of the Marine Mammal Protection Act. See also: NMFS. June 16, 1995b. Taking of Marine Mammals Incidental to Commercial Fishing Operations; Authorization for Commercial Fisheries; Proposed List of Fisheries. Federal Register Vol. 60, No. 116, p. 31666. See also: NMFS. August 30, 1995c. Taking of Marine Mammals Incidental to Commercial Fishing Operations; Authorization for Commercial Fisheries. Federal Register Vol. 60, No. 168, p. 45086.

with the tools to take a leadership role in initiating negotiations with all foreign governments engaged in commercial fishing found to be unduly harmful to any species or population stock of marine mammal. Until recently, the United States has rarely applied these measures nor has it taken actions abroad to reduce marine mammal bycatch or to protect ecosystems. In 2006, NMFS Office of International Affairs developed an international action plan to begin to address marine mammal bycatch in fisheries (see Appendix E).

The ESA was enacted in 1973 to provide for the conservation of species "which are in danger of extinction throughout all or a significant portion of their range."[21] The ESA provides broad protection for species of fish, wildlife, and plants that are listed as threatened or endangered in the United States or elsewhere. The Act operates through listings of species as either threatened or endangered, which then triggers action for protection of critical habitat and development of recovery plans. In addition to its provisions for protecting and recovering these species within U.S. jurisdiction, ESA reaches beyond U.S. borders to protect endangered species both through its own provisions and through U.S. implementation of CITES.

In addition, the Secretary of Commerce, through the Secretary of State, must encourage foreign countries to provide for the conservation of fish, wildlife and plants, including listed species; enter into bilateral or multilateral agreements for this purpose; encourage and assist foreign persons who take fish, wildlife and plants for import to the U.S. for commercial or other purposes to develop and carry out conservation procedures. Further, the Secretary of Commerce may provide personnel and financial assistance for the training of foreign personnel and for research and law enforcement, and may conduct law enforcement investigations and research abroad as necessary to carry out the Act.[22]

Sea turtle conservation, particularly through reduction of bycatch in shrimp trawls, was set forth in an amendment to the ESA.[23] The statute requires the United States to embargo shrimp harvested with commercial fishing technology that may adversely affect sea turtles. The import ban does not apply to nations that have adopted sea turtle protection programs comparable to that of the United States (i.e., require and enforce the use of turtle excluder devices (TEDs)) or to fishing nations where incidental capture does not present a threat to sea turtles (e.g., nations that fish in areas where sea turtles do not occur). The Department of State is the principal implementing agency of this law, while NMFS serves as technical advisor. Nations that seek to import shrimp into the United States must be certified to meet the requirements of P.L. 101-162 on an annual basis. State and NMFS inspect portions of a nation's shrimp trawl fleet for adequate use of TEDs. Approximately 40 countries are currently certified to export shrimp to the United States. Although most certifications are done on a national basis, State Department's certification guidelines allow for import of individual shipments of TED-harvested shrimp from uncertified countries.[24]

[21] 16 U.S.C. 1531-1543 (1976), Pub. L. 93-205, 87 Stat. 884, as amended.
[22] 16 U.S.C. 1537.
[23] Sea Turtle Conservation Amendments to the Endangered Species Act, Pub. L. 101-162, sec. 609, 103 Stat. 988, 1037 (Nov. 21, 1989) (amending 16 U.S.C. § 1537 (1994)).
[24] Description of the State department's procedure and guidelines is available online at http://www.state.gov/g/oes/ocns/.

1.4 SCOPE OF ASSESSMENT

The scope of this assessment analyzes the establishment, via regulation, of certification procedures associated with IUU fishing and PLMR bycatch as required by the MSRA amendments to the Moratorium Protection Act.

NMFS certification procedures, once in place, would result in a list of nations whose fishing vessels would be subject to denial of entry into any place in the United States and its navigable waters if such nations do not receive a positive certification under the Moratorium Protection Act. Further, the Secretary of Commerce could recommend Presidential action to prohibit the importation of certain fish or fish products from such nation into the United States. This EA provides an overview of the port privilege denial process as additional information. It does not address Presidential actions.

This EA does not assess the process for identification of nations; however, information on identification is included here for context.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

As described in Section 1.0, the proposed action is to develop procedures for the certification of nations that have been identified as having vessels engaged in fishing in violation of conservation and management measures, overfishing of shared stocks, and/or fishing that has adverse impacts on bottom features. See discussion above and at 16 U.S.C. 1826j(e)(3). The proposed action is also to develop procedures for the certification of nations that have been identified as having vessels engaged in fishing activities on the high seas that result in bycatch of a PLMR, or fishing activity beyond the U.S. EEZ that result in bycatch of PLMRs shared by the United States.

The CEQ regulations implementing NEPA call for consideration of the proposed action and a range of alternatives to the proposed action. A range of alternatives includes analysis of reasonable alternatives and the rationale for alternatives that are eliminated from detailed study. To be considered reasonable, an alternative must meet the stated purpose of and need for the proposed action. Therefore, procedures for both IUU fishing and bycatch are required to meet the purpose and need.

The alternatives described in section 2.2. and 2.3 provide options for certification procedures for IUU fishing and bycatch separately. To meet the purpose and need, the NMFS decision will consist of the selection of one alternative for IUU fishing and one alternative for bycatch. The preferred alternatives for each are identified in section 2.2. and 2.3.

2.1 OTHER ACTIONS

The Moratorium Protection Act envisions a multilateral process to implement effective measures to end IUU fishing and eliminate or reduce the bycatch of PLMRs. It requires the identification of nations, notification of such identifications, and further consultation with nations that have been identified as engaging in IUU fishing or bycatch of PLMRs. In addition, the Act requires

establishment of certification procedures through rulemaking, and the alternatives considered here relate specifically to the certification procedures. The identification and other processes are means by which the United States will open discussion with other fishing nations regarding IUU fishing activity and the bycatch of PLMRs. Subsequent to these actions, the Act requires development of certification procedures by rulemaking, and NMFS included these processes in the rule for purposes of transparency, but these processes are not conducive to an alternatives analysis.

2.2 IUU ALTERNATIVES

2.2.1 Alternative I-1

No Action Alternative: NMFS would not develop any new procedures to address the certification of nations identified in the biennial report to Congress (called for in section 609(a) of the Moratorium Protection Act) as having vessels that are engaged, or have been engaged during the preceding two calendar years, in IUU fishing activities. The no action alternative would leave in place existing procedures for certification of nations fishing illegally or in a manner that undermines international agreements to which the United States is a party. Hence, the no action alternative would retain NOAA's authority to take action under the Lacey Act, the Pelly Amendment to the Fisherman's Protective Act and other statutes discussed above. Failure to develop new procedures would not comply with 16 U.S.C. 1826j(d)(1), which states the Secretary shall establish a certification procedure.

2.2.2 Alternative I-2

Under Alternative I-2, which is the preferred alternative, the Secretary would provide a positive certification to a nation identified in the biennial report to Congress (called for in section 609(a) of the Moratorium Protection Act) as having vessels that are engaged, or have been engaged during the preceding two calendar years, in IUU fishing activities, if the Secretary determines the nation has taken appropriate corrective action to address the activities for which it was identified. When making such a determination, the Secretary shall take into account whether a nation such nation has taken corrective action against the offending vessels, **or** the relevant RFMO has implemented measures that are effective in ending the IUU fishing activities by vessels of the identified nation.

2.2.3 Alternative I-3

Under this alternative, the Secretary would provide a positive certification to a nation identified the biennial report to Congress (called for in section 609(a) of the Moratorium Protection Act) as having vessels that are engaged, or have been engaged during the preceding two calendar years, in IUU fishing activities, if such nation has taken corrective action against the offending vessels, **and** the relevant RFMO has implemented measures that are effective in ending the IUU fishing activities by vessels of the identified nation.

2.3 BYCATCH ALTERNATIVES

2.3.1 Alternative B-1

No action alternative: NMFS would not develop any new procedures to address certification of nations identified in the biennial report to Congress (called for in section 610(a) of the Moratorium Protection Act) as having vessels that are engaged, or have been engaged during the preceding calendar year in bycatch of PLMRs. Under this alternative, the status quo, existing regulations would remain in place and activities under existing certification programs such as the International Dolphin Conservation Program Act (IDCPA) and Public Law 101-162 would continue.

2.3.2 Alternative B-2

Under Alternative B-2, which is the preferred alternative, to receive a positive certification from the Secretary of Commerce, nations identified in the biennial report to Congress (called for in section 610(a) of the Moratorium Protection Act) as having vessels that are engaged, or have been engaged during the preceding calendar year in bycatch of PLMRs must provide documentary evidence of their adoption of a regulatory program governing the conservation of the PLMR that is comparable in effectiveness with that of the United States, taking into account different conditions, and establish a management plan that will assist in species-specific data collection to support international stock assessments and conservation enforcement efforts for the PLMR.

The certification is a two-step process. First, NMFS would establish a procedure whereby it would examine the bycatch reduction methods currently in use to determine if they are comparable to methods used by U.S. fishermen in high seas fisheries to protect PLMRs. In its certification decision, NOAA would evaluate whether the nation has measures in place that are comparable in effectiveness to those required in the United States to reduce PLMR bycatch. In the case of a U.S. fishery for which bycatch reduction measures are required (e.g. TEDs for trawls, pingers for gillnets, or time/area restrictions), the program would be judged as comparable if for example, a nation requires bycatch reduction measures such as gear modifications, time/area closures, and outreach and research program that are similar to the United States or achieve similar reduction in bycatch.

Among the different conditions the United States may take into account in determining whether measures are comparable are considerations such as oceanographic or environmental conditions, resource or capacity constraints, available technology, or socio-economic considerations. These are meant to be exemplary, not exhaustive, and do not constitute a set of standards. The most important consideration in evaluating comparability would be whether the nation is making progress in reducing bycatch of PLMRs in its fisheries and that its bycatch reduction measures are achieving similar outcomes to those of the United States.

The second step is for a nation to establish a management plan that will assist in species-specific data collection to support international stock assessments and conservation enforcement efforts.

2.3.3 Alternative B- 3

Under this alternative, identified nations must provide documentary evidence of the adoption of a regulatory program, by the identified nation **and** the relevant international organization for the

conservation and protection of the PLMRs or the international/regional fishery organization (and proof of the identified nation's participation with such organization) governing the conservation of the PLMRs, if such organization exists, that is comparable with that of the United States, taking into account different conditions, and establish a management plan that will assist in species-specific data collection to support international stock assessments and conservation efforts, including but not limited to enforcement efforts for PLMRs.

This alternative is similar to alternative 2 with the exception of the addition of documentary evidence of a nation's regulatory program from and proof of its participation in the relevant international organization. Nations would be required to substantiate that they have implemented domestically the conservation and management and bycatch reduction measures adopted by an RFMO for the conservation and protection of the PLMR; and demonstrate establishment of a management plan that will assist in the collection of species-specific information.

2.4 ALTERNATIVES ELIMINATED FROM FURTHER ANALYSIS

2.4.1 Alternative Procedures Alternatives

The Moratorium Protection Act authorizes the establishment of alternative procedures for certification, on a shipment-by-shipment, shipper-by-shipper, or other basis of fish or fish products from a vessel of a harvesting nation not certified, if the Secretary determines that the vessel has not engaged in IUU fishing. In addition, the Moratorium Protection Act requires the establishment of alternative procedures for certification, on a shipment-by-shipment, shipper-by-shipper, or other basis of fish or fish products from a vessel of a nation not positively certified, if the Secretary determines the relevant fishing practices did not result in bycatch of PLMRs or were harvested using practices that are comparable to those of the United States, taking into account different conditions and which, in the case of pelagic longline fisheries, includes mandatory use of circle hooks, careful handling and release equipment, and training and observer programs; and includes the gathering of species-specific information.

Any certification on a shipment-by-shipment basis, shipper-by-shipper basis, or vessel-by-vessel basis would require real-time monitoring and verification procedures to document whether that vessel or shipment is complying with the conservation and management measures of a particular RFMO and has not engaged in IUU fishing and/or PLMR bycatch. For the most part, the procedure for identification and certification is a retrospective analysis of data to determine whether a nation's vessels have engaged in IUU fishing and/or PLMR bycatch. The current fishing practices of a vessel or a nation are not monitored and verified in real-time so as to confirm that the vessel has not violated any conservation and management measures adopted by that nation or the RFMO. The statute anticipates an iterative process whereby the United States is working with RFMOs and fishing nations to improve compliance, and requires notice to nations before action is taken. It would require at least two years of this consultative process before specific nations are identified. Until such time as RFMOs adopt monitoring and verification procedures that allow for real-time documentation of products caught in compliance with the conservation and management provisions of an RFMO, the implementation of these alternative procedures are unlikely, except on a case-by-case basis (e.g tuna tracking and

verification in the Eastern Tropical Pacific tuna purse seine fishery). Information provided during the comment period of the Advance Notice of Proposed Rulemaking for this action suggests that where individual vessels or shippers have been identified by an RFMO as engaging in fishing activity in violation of conservation and management measures of such organization, private sector importers, exporters, suppliers and other entities in the seafood business sector may take their own actions to avoid using identified IUU vessels or shipments from IUU shippers.

An analysis of the potential impacts associated with these Alternative Procedures is not presented in this document since there are no alternatives that would lend themselves to meaningful analysis. Additionally, an analysis of the impacts of these procedures was not conducted due to the agency's limited discretion in the requirements to develop such procedures for nations identified as having vessels engaged in PLMR bycatch.

2.4.2. Other Mechanisms for Positive Certification

Additional alternatives were considered that varied from the direction provided in the Moratorium Protection Act, but not analyzed further given the specificity of the statute regarding procedures that the agency must develop.

NMFS considered, but did not analyze further, a procedure that would result in positive certification for an identified nation whose vessels have been engaged in, or are engaging in, IUU fishing activities, in cases where only the relevant RFMO had taken action against the offending vessels.

NMFS considered, but did not analyze further, a bycatch certification procedure that would have required identified nations to provide documentary evidence of their adoption of a regulatory program governing the conservation of the PLMR that is comparable with that of the United States, taking into account different conditions, or establish a management plan that will assist in species-specific data collection to support international stock assessments and conservation enforcement efforts for PLMRs.

The establishment of procedures via non-regulatory means, such as guidelines, was considered but eliminated from analysis because non-regulatory actions are not considered to provide sufficient authority for the Secretary of Commerce to fulfill the certification requirement of the Moratorium Protection Act.

3.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

For purposes of the proposed action, the effect is to provide a procedure for the positive or negative certification of nations related to IUU fishing and PLMR bycatch. The proposed regulation also will implement responsibilities to strengthen existing U.S. authority related to international conservation agreements. As such, the proposed action in itself does not have a direct effect on the environment, as those effects are ascribed to the underlying international agreements and their associated governing authorities. However, to provide the public with context for assessing the proposed alternative IUU and bycatch certification procedures, it is

useful to provide a broad overview of the environment and resources addressed by the Moratorium Protection Act.

CEQ regulations on NEPA call for an assessment of the affected environment commensurate with the impacts of a proposed action on that environment so that analyses are succinct and focused on the resources that are most likely to be affected. In this case, certification itself does not have an environmental impact. Further, the outcome of subsequent decisions are outside of NOAA's authority and conjectural in the case of Presidential actions to be taken against nations that receive a negative certification. In addition, the imposition of trade-related measures could cause a nation's vessels to shift from importation into the U.S. market into another market. For these reasons, the affected environment is speculative. However, in this instance, the agency believes a broad description of the affected environment is helpful to provide a context for public participation in the review and comment on the proposed regulatory actions.

The Moratorium Protection Act directs the Secretary of Commerce to certify nations that have been identified as having vessels engaged in IUU fishing. For purposes of IUU fishing, the affected environment includes the U.S. EEZ, transboundary areas where the United States shares stocks with other nations, ocean areas governed by agreements to which the United States is party, and areas of high seas where the United States and other fishing nations harvest highly migratory stocks.

The Moratorium Protection Act also directs the Secretary of Commerce to certify nations that have been identified as having vessels engaged in fishing activities or practices on the high seas that result in bycatch of a PLMR or fishing activities beyond the U.E. EEZ that result in bycatch of PLMRs that are shared by the United States. PLMRs are defined in Section 610(e). For purposes of bycatch of PLMRs, the affected environment includes transboundary areas where the United States shares PLMRs with other nations, and high seas areas where PLMRs occur.

In a 2002 report on high seas and deep-water fisheries, FAO describes the oceanic environment as "the marine water portion that extends over the continental slope and the abyssal plain."[25] This area is likely to lie beyond the EEZs of nations and may range in depth from 200 to 10,000 meters. Five depth zones comprise the oceanic environment: epipelagic, mesopelagic, bathypelagic, abyssopelagic, and hadalpelagic. The deep waters below the epipelagic zone do not receive sufficient light to contribute to primary production, but do provide nutrients that contribute to upwelling, which in turn creates high productivity.

In an analysis of 50 years of data from the FAO, species living in the oceanic region were classified as either epipelagic or deep-water (inhabiting the meso- and bathypelagic zones). Though the FAO study was used to examine trends in catches of these species, the classification is useful for purposes of this analysis because the species groups that fall within the epipelagic and deep-water regions are most likely to be the species that are fished in high seas areas. The epipelagic species include tunas, bonitos, billfishes, sharks, rays chimaeras, krill, squid, cuttlefish, and octopus. The deep-water species include cod, hakes, haddocks, demersal fish such as grenadiers and lanternfish, sharks, rays, chimaeras, crabs, lobsters, shrimps and prawns.

[25] L. Garibaldi and L. Limongelli. Trends in oceanic captures and clustering of large marine ecosystems. FAO Fisheries Technical Paper. No. 435. Rome, FAO. 2002, at 2.

Figure 1 shows the EEZs of the world. The areas outside the shaded zones are high seas. The fisheries of the world occur in both the shaded and unshaded areas. The lines delineate FAO Statistical Areas. Figure 2 shows the numbered FAO statistical areas.

The requirements of the Moratorium Protection Act are directed at addressing global fishing activity, primarily in international waters. ..[26] NOAA's NEPA policy "has been, and continues to be, that the scope of its analysis will be to consider the impacts of actions on the marine environment both within and beyond the U.S. Exclusive Economic Zone."[27]

The analysis that follows therefore includes in the discussion of affected environment areas of the Atlantic and Pacific adjacent to the U.S. EEZ in those oceans, and areas of international waters where the United States has an identified interest under the provisions of the Moratorium Protection Act. The analysis will not address fishing activity within the EEZs of other nations or fishing activity on international waters where the United States does not have an interest under the provisions of the Moratorium Protection Act.

[26] See, EO 12144, 1979, *Environmental Defense Fund v Massey*, 986 F. 2d 528 (D.C. Cir. 1993).
[27] NOAA NEPA Handbook, NOAA AO 216

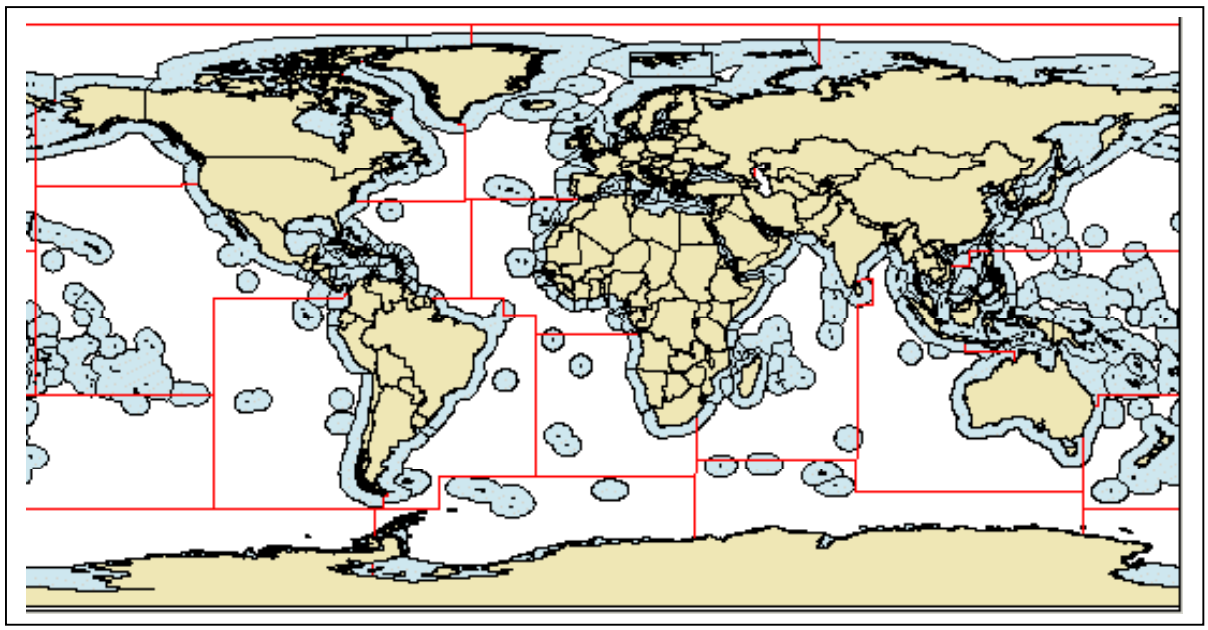


Figure 1. EEZs of the world. Source: The Sea Around Us. {http://www.seaaroundus.org/}

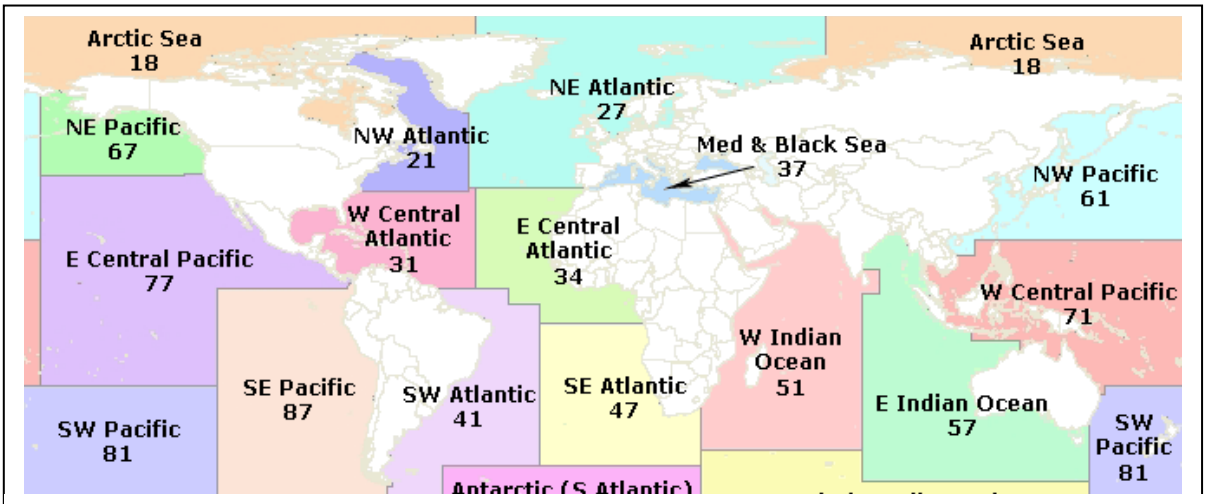


Figure 2. FAO Statistical Areas. Source: The Sea Around Us. {http://www.seaaroundus.org/}

3.1 PHYSICAL ENVIRONMENT

3.1.1. High Seas

The Pacific Ocean is the world's largest body of water and covers about one third of Earth's surface (approximately 69 million square miles). From north to south, it is more than 9,000 miles long; from east to west, the Pacific Ocean is nearly 12,000 miles wide (on the Equator). The Pacific Ocean contains several large seas including: on its western margin, the Celebes Sea, Coral Sea, Japan Sea, Philippine Sea, Sea of Okhotsk, South China Sea, and the Tasman Sea; in the north, the Bearing Sea; and, in the east, the Sea of Cortez.

The Hawaiian Archipelago and the Marianas Archipelago, which include Guam and Commonwealth of the Northern Mariana Islands (CNMI), lie in the North Pacific subtropical gyre while American Samoa lies in the South Pacific subtropical gyre. These subtropical gyres rotate clockwise in the Northern Hemisphere and counter clockwise in the Southern Hemisphere in response to tradewind and westerly wind forcing. Imbedded in this mean flow are an abundance of mesoscale eddies created from wind and current interactions with bathymetry. These eddies, which can rotate either clockwise or counter clockwise, have important biological impacts. Eddies create vertical fluxes, with regions of divergence (upwelling) where the thermocline shoals and deep nutrients are pumped into surface waters enhancing phytoplankton production, and also regions of convergence (downwelling) where the thermocline deepens. North and south of the Hawaiian islands are frontal zones that also provide important habitat for pelagic fish and thus are targeted by fishers. To the north of the Hawaiian and Marianas Archipelagoes, and also to the south of American Samoa, lie the subtropical frontal zones consisting of several convergent fronts located along latitudes 25°-40° N. and S. often referred to as the Transition Zones. To the south of the Hawaiian and Marianas Archipelagoes, and to the north of American Samoa, spanning latitudes 15° N-15° S lies the equatorial current system consisting of alternating east and west zonal flows with adjacent fronts.

Significant sources of interannual physical and biological variation are the *El Niño* and *La Niña* events. During an *El Niño* the normal easterly trade winds weaken, resulting in a weakening of the westward equatorial surface current and a deepening of the thermocline in the central and eastern equatorial Pacific. Water in the central and eastern equatorial Pacific becomes warmer and more vertically stratified with a substantial drop in surface chlorophyll. A *La Niña* event exhibits the opposite conditions. During an *El Niño* the purse seine fishery for skipjack tuna shifts over 1,000 km from the western to the central equatorial Pacific in response to physical and biological impacts. Physical and biological oceanographic changes have also been observed on decadal time scales. These low frequency changes, termed regime shifts, can impact the entire ocean basin. Recent regime shifts in the North Pacific have occurred in 1976 and 1989, with both physical and biological (including fishery) impacts (Polovina, 1996; Polovina et al. 1995).

The oceanic fronts with varying physical parameters such as temperature, salinity, chlorophyll and sea surface height attract swordfish, tunas, seabirds, sharks, and sea turtles. Oceanic pelagic fish such as skipjack and yellowfin tuna, and blue marlin inhabit the warm surface waters; whereas albacore, bigeye tuna, striped marlin and swordfish prefer the cooler more temperate waters. Tunas are commonly most concentrated near islands and seamounts that create

divergences and convergences which concentrated forage fish. Frontal zones are also likely migratory pathways for loggerhead sea turtles.

The Atlantic contains major oceanographic features such as currents, temperature gradients, eddies, and fronts that occur on a large scale and may influence the distribution patterns of many oceanic species. The distribution of marine species along the Atlantic seaboard may be strongly influenced by currents, the warm Gulf Stream in the middle and south portions of the region, and generally by the combination of high summer and low winter temperatures. The Gulf Stream produces meanders, filaments, and warm and cold core rings that significantly affect the physical oceanography of the continental shelf and slope. These features tend to aggregate both predators and prey, and are frequently targeted by commercial fishing vessels. This western boundary current has its origins in the tropical Atlantic Ocean (*i.e.*, the Caribbean Sea). The Gulf Stream system is made up of the Yucatan Current that enters the Gulf of Mexico through the Yucatan Straits; the Loop Current which is the Yucatan Current after it separates from Campeche Bank and penetrates the Gulf of Mexico in a clockwise flowing loop; the Florida Current, as it travels through the Straits of Florida and along the continental slope into the South Atlantic Bight; and the Antilles Current as it follows the continental slope (Bahamian Bank) northeast to Cape Hatteras. From Cape Hatteras it leaves the slope environment and flows into the deeper waters of the Atlantic Ocean.

The Atlantic includes a diverse spectrum of aquatic species of commercial, recreational, and ecological importance. The distribution of marine species along the Atlantic seaboard is strongly affected by the cold Labrador Current in the northern part, the warm Gulf Stream in the middle and southern portions of the region, and generally by the combination of high summer and low winter temperatures. For many species Cape Hatteras forms a strong zoogeographic boundary between the Mid- and South Atlantic areas, while the Cape Cod/Nantucket Island area is a somewhat weaker zoogeographic boundary in the north.

Pelagic *Sargassum* in the Atlantic supports a diverse assemblage of marine organisms including fungi, micro- and macro-epiphytes, sea turtles, numerous marine birds, at least 145 species of invertebrates, and over 100 species of fishes. The fishes associated with pelagic *Sargassum* include juveniles as well as adults, including large pelagic adult fishes. Swordfish and billfish are among the fishes that can be found associated with *Sargassum*. The *Sargassum* community, consisting of the floating *Sargassum* (associated with other algae, sessile and free-moving invertebrates, and finfish) is important to some epipelagic predators such as wahoo and dolphin. The *Sargassum* community provides food and shelter from predation for juvenile and adult fish, and may have other functions such as habitat for fish eggs and larvae.

3.1.2 Areas adjacent to U.S. EEZ with shared PLMRs

Figure 3 shows U.S. EEZ areas. These waters are adjacent to the EEZs of Russia, Canada, Mexico and Cuba, and to those of numerous island nations in the Pacific. The United States shares transboundary PLMRs such as salmon, marine mammals, sea turtles and sharks in all of these areas. The EEZ of the United States and adjacent high seas areas are included in FAO areas 21, 31, 61, 67, and 77.

Figure 3. U.S. EEZ. Source: NOAA Photo Library.

3.1.3 Habitat areas of special concern located beyond national jurisdiction

3.1.3.1 Seamounts

Seamounts are undersea mountains, mostly of volcanic origin, which rise steeply from the sea bottom to below sea level (Rogers 1994). On seamounts and surrounding banks, species composition is closely related to depth. Deep-slope fisheries typically occur in the 100 to 500-meter depth range. A rapid decrease in species richness typically occurs between 200 and 400 meters deep, and most fishes observed there are associated with hard substrates, holes, ledges, or caves (Chave and Mundy 1994). Site fidelity is considered to be less important for deep-water species of serranids, and lutjanids tend to form loose aggregations. Adult deep-water species are believed to not normally migrate between isolated seamounts.

Seamounts have complex effects on ocean circulation. One effect, known as the Taylor column, relates to eddies trapped over seamounts to form quasi-closed circulations. It is hypothesized that this helps retain pelagic larvae around seamounts and maintain the local fish population. Although evidence for retention of larvae over seamounts is sparse (Boehlert and Mundy 1993), endemism has been reported for a number of fish and invertebrate species at seamounts (Rogers 1994). Wilson and Kaufman (1987) concluded that seamount species are dominated by those on nearby shelf areas, and that seamounts act as stepping stones for transoceanic dispersal. Snappers and groupers both produce pelagic eggs and larvae, which tend to be most abundant over deep reef slope waters, while larvae of Etelis snappers are generally found in oceanic waters. It appears that populations of snappers and groupers on seamounts rely on inputs of larvae from external sources.

3.1.3.2 Hydrothermal vents

Although most of the deep seabed is homogenous and low in productivity, there are hot spots teeming with life. In areas of volcanic activity such as the mid-oceanic ridge, thermal vents exist that spew hot water loaded with various metals and dissolved sulfide. Bacteria found in these areas are able to make energy from the sulfide (chemotrophs), and are considered primary producers. A variety of organisms either feed on these bacteria directly. Others contain the bacteria in special organs within their bodies called "trophosomes." Types of organisms found near these thermal vents include crabs, limpets, tubeworms, and bivalves (Levington 1995). Although these deepwater ecosystems are not particularly vulnerable to fisheries, policy makers have noted that the deep sea is one of the last unregulated areas of the oceans.

3.1.3.3 Cold water corals

Although the existence of cold water corals is already known for several hundreds of years, it is only since the 1990s that scientists started to realize study the ocean's large coral reef structures in the cold and dark depths. The individual cold water reefs are usually smaller then tropical reef, but the total surface area of all cold water reefs combined may be equal or even larger then the combined tropical reefs.

Cold water corals have been found in many parts of the world's oceans and they occur in all oceans and at all latitudes, opposed to the warm water corals that only occur around the equator between 30º N and S. Cold water corals can live in waters with a temperature of 4-13°C and are found at depths between several tens of meters up to 3 km. Unlike tropical corals, cold water corals lack photosymbiotic algae in their tissue. However they feed by catching particles out of the surrounding seawater with their tentacles.

Compared to the about 800 species of reef building warm water corals, the number of primary species of cold water corals is limited to six. *Lophelia* is found throughout the world's oceans, except in the polar regions, and it is the dominant deepwater colonial coral in the North Atlantic. It is a true hard coral formed by a colony of individual coral polyps, which produce a calcium carbonate skeleton. It feeds by catching food from the surrounding water. *Lophelia* reefs grow at the rate of about 1 mm in height per year. The highest reefs found so far have been measured at an impressive 35 m, at Sula Ridge off the Norwegian coast. Fragments taken from this reef have been dated as being 8500 years old, which is just after the end of the last Ice Age. Just like warm water reefs, cold water reefs are also inhabited by many species of other animals such as sponges, bivalves, snails, worms, starfish, sea urchins, shrimps, crabs, and fish. A wide variety of animals grow on the coral itself, including sponges, bryozoans, hydroids, and other coral species.

3.2 BIOLOGICAL ENVIRONMENT

3.2.1 Marine Mammals

Marine mammals are incidentally caught in high seas purse-seine, longline, driftnet, and trawl fisheries in the Atlantic and the Pacific. As an example of the potential for interactions over vast areas, Figure 4 shows the location of longline fisheries for tuna and billfish. Marine mammals occur in all those areas. However, accurate abundance and bycatch estimates for marine

mammals are lacking, making any quantitative analysis almost impossible. The qualitative data from RFMOs and national sources provides sufficient information to discuss only those species of marine mammals that have a documented interaction with high seas fisheries. The discussion below uses documentation from RFMOs and national sources.

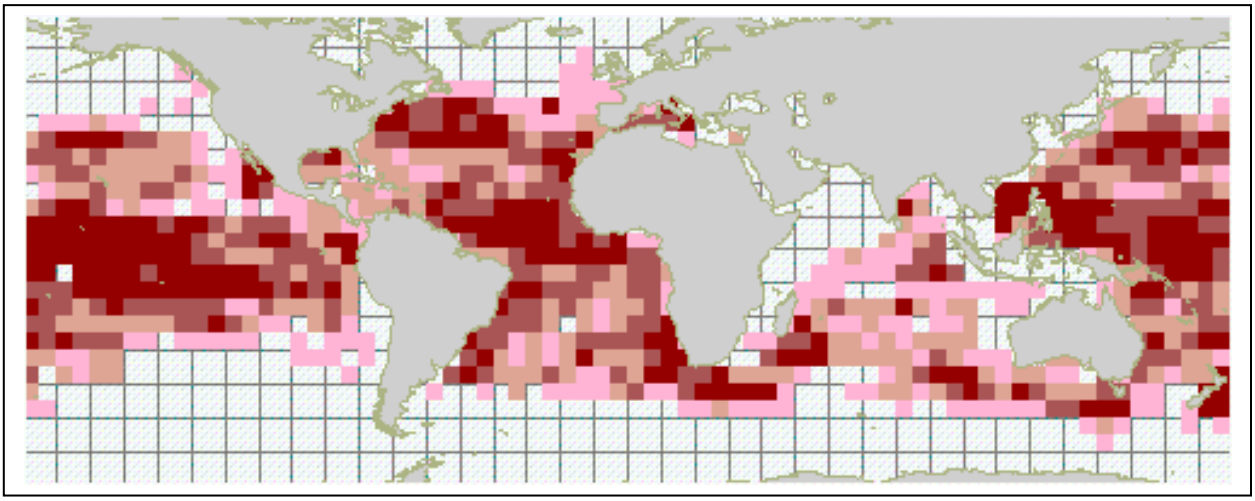


Figure 4. Longline fisheries for tuna and billfish. Source: FAO Atlas of Tuna and Billfish Catches. Mapping application available online at http://www.fao.org/fishery/geoinfo/applications

3.2.1.1 Pacific

In the Eastern Tropical Pacific (ETP), offshore stocks of spotted dolphins (*Stenella attenuata*) are most frequently associated with tunas and have historically been set on by tuna purse seiners. Spinner dolphins (*Stenella longirostris*; eastern and whitebelly stocks) also occur in mixed herds with spotted dolphins and are often set upon by purse seiners. The common dolphin (*Delphinus delphis*) is another species that has been targeted for sets by purse seiners, although sets on this species are less frequent than on spotted and spinner dolphins. Four other dolphin species that are sometimes found in association with tunas include striped (*Stenella coeruleoalba*), rough-toothed (*Steno bredanensis*), bottlenose (*Tursiops truncatus*), and Fraser's (*Lagenodelphis hosei*) dolphins (NRC, 1992).

Endangered species of cetacean that have been observed in the Western Pacific include the humpback whale, sperm whale, blue whale, fin whale and sei whale. In addition, one endangered pinniped, the Hawaiian monk seal, occurs in the region. There is little evidence that dolphin-associated sets are made by purse seiners in the Western and Central Pacific Ocean (WCPO) area. There a few records of Risso's dolphins, pilot whales being encircled during log sets in some areas. Sei whale and whale shark (not a mammal) sets are more common in equatorial areas, but these very large animals are usually released unharmed. Marine mammals may occasionally be entangled in longline gear, but there appear to be few examples of actual hooking by longline gear. False killer whales and pilot whales are frequently associated with depredation of longline bait and catch.

The following is a summary of the status of the cetacean stocks that interact to the greatest degree with the tuna purse seine fishery operating in the ETP.

Pantropical Spotted Dolphin (Stenella attenuata)

There are three recognized stocks of spotted dolphin in the ETP: northeastern offshore, western/southern offshore, and coastal. Spotted dolphins range from 1.6 to 2.6 m in length and weigh up to 100 kg, depending on the stock involved (Dizon et al. 1994). The northeastern and western/southern offshore stocks are relatively smaller, have smaller teeth, and are, on average, less spotted than the coastal stock. Distinctions between the northeastern and the western/southern offshore stocks have been made on the basis of external morphology and skull measurements. Spotted dolphins are extremely gregarious. The offshore stocks are often found in aggregations of more than several hundred animals, frequently in mixed herds with spinner dolphins. The coastal stock of spotted dolphin is usually encountered in herds of less than 100 animals (NMFS, 1991). The northeastern offshore and coastal stocks interact most frequently with the ETP tuna purse seine fishery. These two spotted dolphin stocks are described in greater detail below.

Northeastern offshore stock

The northeastern offshore stock of spotted dolphin is distributed north of the equator above 5°N and west to 120°W (Wade, 1993). On average, individuals in the northeastern offshore stock are larger than those of the western/southern form and smaller than the coastal form (NMFS, 1991). Given a small cetacean's life history characteristics (e.g., sexual maturity at 10 years or more and mature females give birth approximately every 3 years), it is generally expected that maximum population growth rate for this population is 4 percent per year (Reilly and Barlow, 1986); however, few observed data from any cetacean population exist to support this theoretical maximum. The northeastern offshore spotted dolphin population abundance has been estimated at 736, 737 (CV = 0.15) (Gerrodette et al. 2005). Between 2000 and 2006, the total annual fishing mortality for northeastern spotted dolphins for both the United States and the foreign fleets ranged between 147 and 592 animals, with an average of 328 (IATTC 2007). In 1993, NMFS determined that the stock was below its maximum net productivity level and designated it as a depleted stock under the MMPA (58 FR 58285, November 1, 1993). The stock has no special status under the ESA.

Coastal stock

The coastal spotted dolphin ranges from south of the equator to the Gulf of California, approximately 28°N latitude, and is normally found in waters within 50 km of the coast. The stock occurs continuously along the Mexican, Central American, and South American coasts to well south of the equator. Individuals in this stock are larger and more robust than those in other stocks and their light-colored spotting is so extensive that it is sometimes referred to as a "silver-back" (NMFS, 1991). The average abundance estimate is 149,393 (CV = 0.27) (Gerrodette et al. 2005). Estimates of fishery-caused mortality for coastal spotted dolphins are considered less reliable than for other stocks because of the difficulty in separating the offshore and coastal forms, and because of the low level of fishing effort in nearshore waters (NMFS, 1991). The coastal spotted dolphin has been designated as depleted under the MMPA since 1980 (45 FR 72178 (October 31, 1980)). This stock has no special status under the ESA.

Western-southern stock

The western-southern stock is distributed south of the equator. The abundance has been estimated at 627,863 (CV = 0.31) (Gerrodette et al. 2005). In the eastern tropical Pacific, spotted dolphins have been incidentally killed in international tuna purse seine fisheries since the late 1950's. Between 1996 and 2005, annual fishing mortality of western/southern spotted dolphins ranged between 99 and 1,044 animals, with an average of 383(IATTC 2007).

Spinner dolphin (Stenella longirostris)

There are four recognized stocks of spinner dolphins in the ETP: northern whitebelly, southern whitebelly, eastern, and Central American (or Costa Rican). Due to the high degree of overlap in distribution between the northern and southern whitebelly spinner dolphin stocks, it has been suggested that northern and southern whitebelly stocks be combined into a single management unit. Spinner dolphins often occur in very large herds, and are often found mixed with spotted dolphins. The whitebelly and eastern stocks are most affected by the tuna purse seine fishery (NMFS, 1991).

Spinner dolphins reach a length of 1.5-2.2 m, although the size varies among the stocks. The Central American spinner is the longest, reaching a length of 2 m or more, while the eastern spinner dolphin is the smallest. The spinner dolphin name is derived from its habit of leaping clear of the water and spinning on its longitudinal axis, rotating as much as seven times in one leap (NMFS, 1991).

Eastern spinner dolphin

Eastern spinner dolphins are, on average, about 3-4 cm smaller than the whitebelly spinner dolphins (NMFS, 1991). The abundance estimate for the eastern stock of spinner dolphin is approximately 616,662 (CV = 0.22) (Gerrodette et al. 2005). The total fishing mortality of eastern spinner dolphins from 2000-2006 ranged from 155 to 469 per year, averaging approximately 299 animals per year (IATTC, 2007). The eastern stock of spinner dolphin was designated as depleted under the MMPA in 1993 (58 FR 45066, August 26, 1993). This stock has no special status under the ESA.

Whitebelly spinner dolphin

The abundance estimate for the whitebelly stock of spinner dolphin is approximately 441,711 (CV = 0.45) (Gerrodette et al. 2005). The total fishing mortality of whitebelly spinner dolphins from 2000-2006 ranged between 115 and 372 animals, with an average of 211 (IATTC, 2007). This stock has no special status under the MMPA or the ESA.

Other marine mammals

Data reported by Wade and Gerrodette (1993) from cruises conducted between 1986 and 1990, and the most recent ship surveys (1998, 1999, and 2000) provide the most comprehensive information regarding abundance and distribution of marine mammals in the ETP that may

interact with the tuna purse seine fishery. In addition to the cetacean species described previously, the species that were sighted with the greatest frequency during the 1986-1990 cruises were the bottlenose dolphin (*Tursiops truncatus*), long- and short-finned pilot whales (*Globicephala* sp.), Risso's dolphin (*Grampus griseus*), sperm whale (*Physeter macrocephalus*), beaked whale (family Ziphiidae), and Bryde's whale (*Balaenoptera edeni*) (Wade and Gerrodette,1993).

The blue whale (*B. musculus*), sei whale (*B. borealis*), fin whale (*B. physalus*), southern right whale (*Eubalaena australis*), and humpback whale (*Megaptera novaeangliae*) have also been sighted in the ETP. These species are all listed as endangered under the ESA.

Pinnipeds have also been sighted in the ETP, but they have not been known to interact regularly with tuna purse seines. Pinniped species seen, usually one or two at a time, include the California sea lion (*Zalophus californianus*), northern fur seal (*Callorhinus ursinus*) and the northern elephant seal (*Mirounga angustirostris*). The northern fur seal is categorized as depleted under the MMPA. These other pinniped species have no special status under the MMPA or ESA.

3.2.1.2 Atlantic

In the Atlantic marine mammals interact with pelagic longline, purse-seine and trawl fisheries. Again the stock status of pelagic marine mammals is poorly documented, as is the bycatch. Of the marine mammals that are hooked by pelagic longline fishermen, many are released alive, although some animals suffer serious injuries and may die after being released.
Table 1 lists bycatch species recorded as caught by any major tuna fishery in the Atlantic and Mediterranean. Note that the lists are qualitative and are not indicative of quantity or mortality. Thus, the presence of a species in the lists neither implies that it is caught in significant quantities nor that individuals that are caught necessarily die.

Table 1. Marine Mammal Bycatch in Atlantic and Mediterranean tuna fisheries.

Scientific names	Common name	LL	GILL	PS	HARP	TRAP	OTHER
Key: LL, longline; GILL, gillnet; PS, purse seine; HARP, harpoon; TRAP, traps and pots.							
Balaenoptera acutorostrata	Minke whale		X	X		**X**	
Balaenoptera borealis	Sei whale			X			
Balaenoptera edeni	Bryde's whale			X			
Balaenoptera physalus	Fin whale	X	X	X	X		
Delphinus delphis	Common dolphin		X	X			
Eubalaena glacialis	Northern right whale		X				
Globicephala macrorhynchus	Shortfin pilot whale			X			
Globicephala melas	Pilot whale	X	X		X	X	
Grampus griseus	Risso's dolphin	X	X		X		
Kogia breviceps	Pygmy sperm whale		X				
Lagenorhynchus acutus	Atlantic whiteside dolphin		X				
Megaptera novaeangliae	Humpback whale		X				
Mesoplodon spp	Beaked whale		X				
Orcinus orca	Killer whale		X			X	
Phocoena phocoena	Harber porpoise		X				
Physeter macrocephalus	Sperm whale		X	X	X		
Pseudorca crassidens	False killer whale			X			
Stenella attenuata	Pantropical spotted dolphin			X			
Stenella clymene	Shortsnouted spinner dolphin			X			
Stenella coeruleoalba	Striped dolphin	X	X	X	X	X	
Stenella frontalis	Atlantic spotted dolphin		X				
Stenella longirostris	Spinner dolphin			X			
Stenella plagiodon	Atlantic spotted dolphin		X				
Steno bredanensis	Rough-toothed dolphin			X			
Tursiops truncatus	Bottlenose dolphin	X	X	X	X		
Ziphius cavirostris	Goosebeaked whale	X	X		X		

The following is a summary of the status of the marine mammal stocks that interact to the greatest degree with the longline fisheries in the Atlantic.

Pilot Whales

Long-finned pilot whales are distributed world wide in cold temperate waters in both the Northern (North Atlantic) and Southern Hemispheres. In the North Atlantic, the species is broadly distributed and thought to occur from 40° to 75°N in the eastern North Atlantic and from 35° to 65°N in the western North Atlantic (Abend and Smith 1999). Short-finned pilot whales are also distributed world wide in warm temperate and tropical waters. The two species are difficult to differentiate therefore, in many cases, reference is made to the combined species, *Globicephala* spp. Due to this difficulty, the exact species' boundaries for short-finned and long-finned pilot whales in the western Atlantic have not been clearly defined (Payne and Heinemann 1993, Bernard and Reilly 1999).

Long-finned pilot whales were found on the continental shelf and especially along the shelf break while short-finned pilot whales were present on the shelf, along the shelf edge and in deeper water east of the shelf break. The greatest area of overlap in distribution of the two

species seems to be confined to an area along the shelf edge between 38°N and 40°N in the Mid-Atlantic Bight, where long-finned pilot whales are present in winter and summer and short-finned pilot whales are present at least in summer.

Population structure for neither long-finned nor short-finned pilot whales in the North Atlantic is well known. For short-finned pilot whales, there is no available information on whether the North Atlantic stock is subdivided into smaller populations. Several studies on long-finned pilot whales suggest the existence of two or more demographically independent populations in the North Atlantic (Bloch and Lastein 1993; Fullard et al. 2000) as well as population differentiation across the Atlantic as well.

The total number of pilot whales off the eastern United States and Canadian Atlantic coast is unknown, (Waring *et al*. 2006) but the best available estimate for *Globicephala* spp. in the U.S. EEZ is 31,139 (Coefficient of Variation, or CV=0.27) (Waring et al. 2006; Wade and Angliss 1997).

Risso's Dolphin

Risso's dolphins occur world wide in warm temperate and tropical waters roughly between 60°N and 60°S, and records of the species in the western North Atlantic range from Greenland south, including the Gulf of Mexico (Kruse et al. 1999). In the U.S. Atlantic EEZ, the species is most commonly seen in the mid-Atlantic Bight shelf edge year round and is rarely seen in the Gulf of Maine (Waring et al. 2004). Risso's dolphins are pelagic, preferring waters along the continental shelf edge and deeper, as well as areas of submerged relief such as seamounts and canyons (Kruse et al. 1999). There is no information available on population structure for this species. Total numbers of Risso's dolphins off the U.S. or Canadian Atlantic coast are unknown, although eight estimates from selected regions of the habitat do exist for select time periods (Waring et al. 2006). Sightings of Risso's dolphins are almost exclusively in the continental shelf edge and continental slope areas. The best available estimate for Risso's dolphins in the U.S. EEZ is the sum of the estimates from the summer 2004 U.S. Atlantic surveys, 20,479 (CV =0.59), where the estimate from the northern U.S. Atlantic is 15,053 (CV =0.78), and from the southern U.S. Atlantic is 5,426 (CV =0.540) (Waring et al. 2006). This joint estimate is the most recent available, and the surveys have the most complete coverage of the species' habitat. The minimum population estimate for the western North Atlantic Risso's dolphin is 12,920.

A previous survey of Risso's dolphins in the western Atlantic Ocean was conducted during the summer of 1998. The best estimate for Risso's dolphins that came out of the 1998 survey was 29,110 (CV = 0.29, Waring et al. 2004). The estimate for the northern U.S. Atlantic was 18,631(CV = 0.35), while the estimate from the southern U.S. Atlantic was 10,479 (CV = 0.51). The abundance estimate from the 1998 surveys for Risso's dolphins was higher than that for the 2004 surveys, in particular for the southern U.S. component of those surveys. There were fewer Risso's dolphin sightings, particularly off the coast of Georgia and northern Florida, in the 2004 surveys despite a similar amount of survey effort in this region. It is possible that environmental variability or other factors are responsible for the apparent differences in the spatial distribution and abundance of Risso's dolphins.

3.2.2 Sea Turtles

Numerous gear types have been implicated in takes of sea turtles along the Atlantic, Gulf of Mexico, and Pacific coasts. Data available on the extent of sea turtle interactions by gear type, area, and season are poor for the high seas fisheries. Nonetheless, certain types of gear are more prone to incidentally capturing sea turtles than others, depending on the way the gear is fished and the time and area within which it is fished. Fisheries that use trawls, gillnets, seines, pound nets, traps, pots, dredges, longlines, and hook and line, for example, are potential sources of sea turtle incidental entanglement. However, bycatch rates for these fisheries are lacking and more information is needed on potential sea turtle interactions in these gear types/fisheries to better evaluate them.

All sea turtles that occur in U.S. waters are listed as either endangered or threatened under the ESA. The Kemp's ridley (*Lepidochelys kempii*), leatherback (*Dermochelys coriacea*), and hawksbill (*Eretmochelys imbricata*) are listed as endangered. Loggerhead (*Caretta caretta*), green (*Chelonia mydas*), and olive ridley (*Lepidochelys olivacea*) sea turtles are listed as threatened, except for breeding colony populations of green turtles in Florida and on the Pacific coast of Mexico and breeding colony populations of olive ridleys on the Pacific coast of Mexico, which are listed as endangered. These five species of sea turtles are highly migratory or have a highly migratory phase in their life history (NMFS 2001).

3.2.2.1 Pacific

In the ETP tuna purse seine fishery, sea turtles are killed or injured incidental to fishing operations. The tendency for turtles to associate with flotsam in the open ocean make them more likely to be involved with sets on logs, floating objects, and fish aggregating devices. Furthermore, turtles may also be captured in other types of sets if the area being fished has a high turtle density, such as the nearshore waters of southern Mexico, Costa Rica, and Panama (Fox 1990) and oceanographic fronts. Absolute abundance estimates are not available for sea turtles, but observer information provide some data on the at-sea distribution and abundance of turtles in the ETP. Observers from the Inter-American-Tropical-Tuna-Commission (IATTC) record sea turtle encounters, entanglements and mortalities in the ETP tuna purse seine fishery. IATTC data from 1993 to 2002 indicate that sea turtle mortality in the U.S. tuna purse seine fishery was highest in floating object sets, with the olive ridley being the species most often taken (IATTC 2004). The data indicate that for the period 1993 to 2002, the mean annual mortality of sea turtles was more than twice as high in floating object sets (83) than either dolphin sets (17) or school sets (36); sets on floating objects resulted in the highest per set rate of annual turtle mortality over the same period (0.02) as compared with dolphin (0.002) and school (0.007) sets (IATTC 2004). Between 1993 and 2002 the mean annual turtle mortality in the ETP tuna purse seine fishery was approximately 136 individuals, ranging from a high of 172 turtles in 1999 to a low of 46 turtles in 2002 (IATTC, 2004). More recent data indicate that the average turtle mortality between 2003 and 2006 was approximately 5 (IATTC 2007b). Between 1993 and 2002, olive ridleys comprised the majority of turtle mortalities in all sets (60.6 percent), with greens (8 percent), loggerheads (1.4 percent) and unidentified species (29 percent) rounding out the total (IATTC 2004). Approximately one hawksbill mortality occurs each year in the fishery. One fishery-related leatherback mortality occurred between 1993 and 2002 (in 1994). Between

1997 and 2002, over 88 percent of all turtles incidentally taken during fishing operations observed by IATTC observers were released unharmed (IATTC 2004).

In the WCPO, sea turtles are caught in longline and purse seine fisheries. Brogan (2002) estimates that there are 2,182 marine turtle encounters per year in the WCPO longline, of which an estimated 500–600 are expected to result in mortality. This estimate, however, is expected to have wide confidence intervals since observer coverage has been very low (<1%). Brogan (2002) estimates that sea turtle encounters in the purse seine fishery are more prevalent in the western areas of the WCPO, with the main factor affecting marine turtle encounters in the WCPO purse seine fishery being set type. Animal associated, drifting log, and anchored fish aggregating device (FAD) sets have the highest incidence of sea turtle encounters, compared to drifting FAD and sets on free-swimming schools (unassociated sets). Brogan (2002) estimates that there are 105 sea turtle encounters per year in the WCPO purse seine fishery with less than 20 of these encounters resulting in mortality. As with the WCPO longline fishery, this estimate has wide confidence intervals since observer coverage is less than 5%. Please refer to the Biological Opinion on the Operation of the Western Pacific Region's Pelagic Fisheries as Managed under the Pelagics FMP (NMFS 2004a) and the 2001 FEIS (NMFS 2001b) and 2004 Supplemental EIS prepared as part of the ongoing implementation of the Pelagics FMP for additional details on the life history, status, threats, and impacts to Pacific sea turtles.

3.2.2.2 Atlantic

In the Atlantic, leatherback and loggerhead sea turtles are the sea turtle species predominantly caught in the pelagic longline fishery. Turtles are caught throughout the range of the fishery (Gulf of Mexico, Caribbean, Atlantic Ocean from Florida to Maine, and outside the U.S. EEZ). In the U.S. pelagic longline fishery jeopardized estimated take levels for 2000 were 1256 loggerhead and 769 leatherback sea turtles (Yeung 2001). In 2001 and 2002, NMFS closed a portion of the fishery and implemented stronger bycatch reduction measures. The estimated take levels outside of the closed area are 312 loggerhead and 1208 leatherback sea turtles for 2001 and 575 loggerhead and 962 leatherback sea turtles for 2002 (Garrison 2003).

The following is a list of bycatch species recorded as being ever caught by any major tuna fishery in the Atlantic/Mediterranean. Note that the lists are qualitative and are not indicative of quantity or mortality. Thus, the presence of a species in the lists does not imply that it is caught in significant quantities or that individuals that are caught necessarily die.

Table 2. Sea turtle bycatch in tuna fisheries.

Scientific names	Common name	Code	LL	GILL	PS	HARP	TRAP	OTHER	
Key: LL, longline; GILL, gillnet; PS, purse seine; HARP, harpoon; TRAP, traps and pots.									
Caretta caretta	Loggerhead turtle	TTL	X	X	X		X	X	X
Chelonia mydas	Green turtle	TUG	X	X	X				
Dermochelys coriacea	Leatherback turtle	DKK	X	X	X		X		
Eretmochelys imbricata	Hawksbill turtle	TTH		X	X				
Lepidochelys kempii	Kemps Ridley turtle	LKY			X				

3.2.2.3 Sea Turtle Biology and Status

The following is a synopsis of the current state of knowledge on the distribution, abundance and activities that are known or thought to influence the survivorship of turtle species. General information about the biology and status of sea turtles can be found in the Recovery Plans for each species (available through the Office of Protected Resources, NMFS).

Leatherback Sea Turtles

Leatherback turtles (*Dermochelys coriacea*), the largest of the sea turtles with a shell length often exceeding 150 centimeters and front flippers proportionately larger than in other sea turtles. These flippers span 270 centimeters in an adult (NMFS and FWS 1998c). The leatherback is morphologically and physiologically distinct from other sea turtles, and it is thought that its streamlined body, with a smooth dermis-sheathed carapace and dorso-longitudinal ridges, may improve laminar flow. Leatherbacks are widely distributed throughout the oceans of the world, and are found in waters of the Atlantic, Pacific, and Indian Oceans; the Caribbean Sea; and the Gulf of Mexico (Dutton et al. 1999). Leatherbacks commonly range farther north than other sea turtles, because of their ability to maintain warmer body temperatures over longer time periods and the widely dispersed nature of their primary food source, cnidarians (jellyfish and siphonophores) and tunicates (pyrosomas and salps) (NMFS and FWS 1998c, Eckert, 1993). Because of the low nutrient value of jellyfish and tunicates, it has been estimated that an adult leatherback would need to eat about 50 large jellyfish (equivalent to approximately 200 liters) per day to maintain its nutritional needs (Duron 1978); leatherback turtles may consume 20 to 30 percent of their body weight per day (Davenport and Balazs 1991).

Nesting occurs on beaches from 40º North to 35º South latitude (Sternberg, 1981) and no nesting occurs on U.S. beaches in the Pacific. There is no information on status and trends of leatherback sea turtles in nesting areas in the central and south Pacific islands, such as Papua New Guinea, Indonesia, and the Solomon Islands because systematic nesting surveys are lacking. Leatherback nesting also occurs in the Western Pacific in China, Southeast Asia, Indonesia, and Australia (NMFS and FWS 1998c).

The Pacific coast of Mexico is regarded as the most important leatherback breeding ground in the world with about 50 percent of the global population of female leatherbacks nesting there (NMFS and FWS 1998c). Pritchard (1982) estimated that 75,000 females nested annually in Michoacan, Guerrero, and Oaxaca, Mexico. Leatherbacks are in serious decline at all major Pacific basin rookeries (NMFS and FWS 1998c). In all areas where leatherback nesting has been documented, current nesting populations are reported to be well below abundance levels of several decades ago with Mexico documenting an approximate 90 percent decline in the number of leatherback nesters (Sarti et al. 1996). Although the reason for the leatherback decline is unclear, the collection of eggs and incidental catch in the former high seas driftnet fishery in the 1980s are most likely contributing factors (Sarti et al. 1996).

Females are believed to migrate long distances between foraging and breeding grounds, at intervals of typically 2 to 4 years (Spotila et al. 2000). The mean renesting interval of females on Playa Grande, Costa Rica, is believed to be 3.7 years, while in Mexico, 3 years was the typical

reported interval (NMFS 2004). Eastern Pacific migratory corridors exist along the western United States and west coasts of Mexico (Stinson 1984). In addition, recent information on leatherbacks tagged off the west coast of the United States has also revealed an important migratory corridor from central California to south of the Hawaiian Islands, leading to western Pacific nesting beaches. Aerial surveys in California, Oregon, and Washington have shown that most leatherbacks occur in slope waters, while fewer occur over the continental shelf (Eckert 1993). Leatherbacks are sometimes seen in coastal waters, but for the most part leatherback turtles lead a completely pelagic existence, foraging widely in temperate waters except during the nesting season when gravid females return to tropical beaches to lay eggs. Evidence suggests that adults migrate between temperate and tropical waters to optimize foraging and nesting (Eckert 1993). Males are rarely observed near nesting areas, and it has been proposed that mating most likely takes place outside of tropical waters, before females move to their nesting beaches (Eckert and Eckert 1988). Leatherbacks are highly migratory, exploiting convergence zones and upwelling areas in the open ocean, along continental margins, and in archipelagic waters (Eckert 1998). In a single year, a leatherback may swim more than 10,000 kilometers (Eckert 1998).

In the Atlantic Ocean, leatherbacks have been recorded as far north as Newfoundland, Canada, and Norway, and as far south as Uruguay, Argentina, and South Africa (NMFS SEFSC 2001). Female leatherbacks nest from the southeastern United States to southern Brazil in the western Atlantic and from Mauritania to Angola in the eastern Atlantic. The most significant nesting beaches in the Atlantic, and perhaps in the world, are in French Guiana and Suriname (NMFS SEFSC 2001). Genetic analyses of leatherbacks indicate, that within the Atlantic basin, there are three genetically different nesting populations: the St. Croix nesting population (U.S. Virgin Islands), the mainland nesting Caribbean population (Florida, Costa Rica, Suriname/French Guiana), and the Trinidad nesting population (Dutton et al. 1999). When the hatchlings leave the nesting beaches, they move offshore but eventually utilize both coastal and pelagic waters. Very little is known about the pelagic habits of the hatchlings and juveniles, and they have not been documented to be associated with the sargassum areas as are other species. Leatherbacks are deep divers, with recorded dives to depths in excess of 1,000 m (Eckert 1998).

The status of leatherbacks in the Atlantic is relatively unclear; however, increases in the number of nesting females have been noted at some sites in the Atlantic (Dutton et al. 1999). According to Spotila, the Western Atlantic population currently numbers between 15,000-18,800 nesting females, whereas current estimates for the Caribbean (4,000) and the Eastern Atlantic (i.e., off Africa, numbering ~ 4,700) have remained consistent with numbers reported by Spotila et al. in 1996. It is unknown whether the U.S. leatherback populations are stable, increasing, or declining, but it is certain that some nesting populations (e.g., St. John and St. Thomas, U.S. Virgin Islands) have been extirpated. The Turtle Expert Working Group (2007) estimated the population growth trends of six of the Atlantic nesting stocks (due to data constraints, trends for West Africa could not be estimated). Except for the Western Caribbean, these stocks appeared to be increasing. However, they cautioned that the trend estimates were based only on information of nesting females (one segment of the population). They also stated that “it must be stressed that the monitoring effort was improved over the last decade into several management units.” They suggested that more detailed studies are needed to obtain the intrinsic rate of population growth without relying on approximations based on nest counts from beach monitoring.

Loggerhead Sea Turtles

The loggerhead sea turtle (*Caretta caretta*) is characterized by a reddish brown, bony carapace, with a comparatively large head, up to 25 centimeters wide in some adults. Adults typically weigh between 80 and 150 kilograms, with average curved carapace length (CCL) measurements for adult females worldwide between 95 to100 centimeters CCL (Dodd 1988) and adult males in Australia averaging around 97 centimeters CCL (Limpus 1985; Eckert 1993). Loggerheads less than 20 centimeters were estimated to be 3 years old or less, while those greater than 36 centimeters were estimated to be 6 years old or more. Age-specific growth rates for the first 10 years were estimated to be 4.2 cm/year (Zug et al. 1995).

The loggerhead is a circum-global species inhabiting continental shelves, bays, estuaries and lagoons in the subtropical, temperate and occasionally tropical waters (Eckert 1993). For their first years of life, loggerheads forage in open-ocean pelagic habitats. Juvenile and subadult loggerheads are omnivorous, foraging on pelagic crabs, molluscs, jellyfish, and algae captured at or near the surface (Eckert 1993). The large aggregations of juveniles off Baja California have been observed foraging on dense concentrations of the pelagic red crab *Pleuronocodes planipes* (Nichols et al. 1999). Data collected from stomach samples of turtles captured in North Pacific driftnets indicate a diet of gastropods (*Janthina* spp.), heteropods (*Carinaria* spp.), gooseneck barnacles (*Lepas* spp.), pelagic purple snails (*Janthina* spp.), medusae (*Vellela* spp.), andpyrosomas (tunicate zooids). Other common components include fish eggs, amphipods, and plastics (Parker et al. 2002). The maximum recorded diving depth for the loggerhead is 233 meters (see Eckert 1993).

In general, during the last 50 years, North Pacific loggerhead nesting populations have declined 50–90 percent (Kamezaki et al. 2003). In the South Pacific, long-term trend data indicate a 50 percent decline in nesting between the 1970s and 1989 due to incidental mortality of turtles in the coastal trawl fishery. Limpus (1982). In southern Great Barrier Reef waters, nesting loggerheads have declined approximately 8 percent per year since the mid-1980s (Heron Island), while the foraging ground population has declined 3 percent and comprised less than 40 adults by 1992. Researchers attribute the declines to recruitment failure due to fox predation of eggs in the 1960s and mortality of pelagic juveniles from incidental capture in longline fisheries since the 1970s (Chaloupka and Limpus 2001).

In the eastern Pacific, the largest known aggregations of loggerheads are of juveniles (mean shell length=60 cm) (Bartlett 1989) off the west coast of Baja California, Mexico, some 10,000-12,000 km from the nearest significant nesting beaches in Japan and Australia. Estimates of abundance of these foraging populations have been as high as 300,000 loggerheads (Pitman 1990; Bartlett 1989) and sightings are usually confined to the summer months in the eastern Pacific, peaking in July-September off southern California and southwestern Baja California, Mexico.

In the western Atlantic, most loggerhead sea turtles nest from North Carolina to Florida and along the Gulf coast of Florida. Scientists (TEWG 1998; TEWG 2000; NMFS SEFSC 2001) have identified five different nesting assemblages, referred to as nesting subpopulations, in the western North Atlantic. The subpopulations are: (1) a northern nesting subpopulation, occurring

from North Carolina to northeast Florida, about 29º N (approximately 7,500 nests in 1998); (2) a south Florida nesting subpopulation, occurring from 29º N on the east coast to Sarasota on the west coast (approximately 83,400 nests in 1998); (3) a Florida panhandle nesting subpopulation, occurring at Eglin Air Force Base and the beaches near Panama City, Florida (approximately 1,200 nests in 1998); (4) a Yucatán nesting subpopulation, occurring on the eastern Yucatán Peninsula, Mexico (approximately 1,000 nests in 1998); and (5) a Dry Tortugas nesting subpopulation, occurring in the islands of the Dry Tortugas, near Key West, Florida (approximately 200 nests per year). Natal homing to the nesting beach is believed to provide the genetic barrier between these nesting aggregations, preventing recolonization by turtles from other nesting beaches (NMFS and FWS 1998d).

Nesting data collected on index nesting beaches in the United States from 1989-1998 represent the best dataset available to estimate the population size of loggerhead sea turtles. Between 1989 and 1998, the total number of nests laid along the U.S. Atlantic and Gulf coasts ranged from 53,014 to 92,182 annually, with a mean of 73,751. Since a female often lays multiple nests in any one season, the average adult female population is estimated at 44,780 (based on an average of 4.1 nests per nesting female, (Murphy and Hopkins 1984) and of the number of adult females in the entire population based on an average remigration interval of 2.5 years; (Richardson et al. 1978). On average, 90.7 percent of these nests were of the south Florida subpopulation, 8.5 percent were from the northern subpopulation, and 0.8 percent were from the Florida Panhandle nest sites. Based on the above, between 1989 and 1998, there were an estimated 3,800 nesting females in the northern loggerhead subpopulation, and approximately 40,000 nesting females in the south Florida loggerhead subpopulation. The current status of this northern population based on number of loggerhead nests is declining. Recent analyses of nesting data from the Florida Index Nesting Beach Survey program from 1989 to 2005 demonstrate a significant declining trend in nesting (FWC 2006).

Green Sea Turtles

The genus *Chelonia* is generally regarded as comprising two distinct subspecies, the eastern Pacific (so-called “black turtle”, *C. m. agassizii*), which ranges from Baja California south to Peru and west to the Galapagos Islands, and the *C. m. mydas* in the rest of the range (NMFS and FWS 1998a). Green sea turtles (*Chelonia mydas*) have a smooth carapace with four pairs of lateral “scutes,” a single pair of prefrontal scales, and a lower jaw edge that is coarsely serrated. Adult green turtles have a light to dark brown carapace, sometimes shaded with olive, and can exceed 1 meter in carapace length and 100 kilograms in body mass (NMFS and FWS 1998a). Green turtles grow slowly with an estimated age of sexual maturity ranging from 18 to 40 years (Balazs et al. 1992; NMFS and FWS 1998a; Eckert 1993).

Green sea turtles are a highly migratory species, nesting and feeding in tropical/subtropical regions. Their range is defined by a general preference for water temperature above 20° C. Green sea turtles live in pelagic habitats as post-hatchlings/juveniles, feeding at or near the ocean surface. Nonbreeding green sea turtles lead a pelagic existence 500 to 800 miles from shore, while breeding green sea turtles live primarily in bays and estuaries, and are rarely found in the open ocean (Eckert 1993). Most migration from rookeries to feeding grounds is via coastal waters, with females migrating to breed only once every 2 years or more (Bjorndal 1997).

Although most adult green sea turtles appear to have a nearly exclusively herbivorous diet, consisting primarily of seagrass and algae (Wetherall 1993), those along the east Pacific coast seem to have a more carnivorous diet consisting of a large percentage of mollusks and polychaetes, while fish and fish eggs, jellyfish, and amphipods made up a lesser percentage (Bjorndal 1997). Eastern Pacific green turtles (often reported as black turtles) turtles travel more than 1,000 kilometers between foraging and nesting grounds. Green turtles have also been sighted 1,000 to 2,000 statute miles from shore (Eckert 1993) they frequent a north–south band from 15° N to 5° S along 90° W and an area between the Galapagos Islands and the Central American Coast (NMFS and FWS 1998a). Green sea turtles are the most commonly observed sea turtle on the U.S. Pacific coast, with 62 percent reported in a band from southern California and southward (NMFS and FWS 1998a). California stranding reports from 1990 to 1999 indicate that the green turtle is the second most commonly found stranded sea turtle (48 total, averaging 4.8 annually, NMFS 2004).

The underwater resting sites include coral recesses, undersides of ledges, and sand bottom areas that are relatively free of strong currents and disturbance from natural predators and humans. Foraging and resting areas for adults usually occur at depths greater than 10 meters, but probably not normally exceeding 40 meters. Available information indicates that the resting areas are in proximity to the feeding pastures. The maximum dive depth recorded for an adult green turtle was 110 meters (Berkson 1967), while subadult green turtles routinely dive to 20 meters for 9 to 23 minutes, with a maximum recorded dive of 66 minutes (Lutcavage et al. 1997).

In the Pacific, the only major (greater than 2,000 nesting females) populations of green turtles occur in Australia and Malaysia with smaller colonies in the insular Pacific islands of Polynesia, Micronesia, and Melanesia (Wetherall 1993) and six small colonies on islands at French Frigate Shoals, a long atoll situated in the middle of the Hawaiian Archipelago (Balazs et al. 1995). Ninety to 95 percent of the nesting and breeding activity occurs at the French Frigate Shoals, and at least 50 percent of that nesting takes place on East Island, a 12-acre island. Since the mid-1980s data suggest that the Hawaiian green sea turtle (Balazs and Chaloupka 2004; Bjorndal et al. 2000) stock is on the way to recovery following 25 years of protection. This increase is attributed to increased female survivorship since the harvesting of turtles was prohibited in addition to the cessation of habitat damage at the nesting beaches since the early 1950s (Balazs and Chaloupka 2004).

The primary green turtle nesting grounds in the eastern Pacific are located in Michoacán, Mexico, and the Galapagos Islands, Ecuador. Green turtles were widespread and abundant prior to commercial exploitation and uncontrolled subsistence harvest of nesters and eggs. More than 165,000 turtles were harvested from 1965 to 1977 in the Mexican Pacific and in the early 1970s nearly 100,000 eggs per night were collected from these nesting beaches. As a result the nesting population at Michoacán (Colola and Maruata beaches) has decreased significantly since 1981 (Alvarado and Delgado, 2003). In the 1990s, the number of eggs poached dropped to 60-100 per night, or about 800-1,000 turtles per year but recovery is still slow.

In the Atlantic, green sea turtles use mid-Atlantic and northern areas of the western Atlantic Ocean as important summer developmental habitat. Green turtles are found in estuarine and coastal waters as far north as Long Island Sound, Chesapeake Bay, and North Carolina sounds.

Green sea turtles using northern waters during the summer must return to warmer waters when water temperatures drop, or face the risk of cold stunning. In the continental United States, green turtle nesting occurs on the Atlantic and Gulf of Mexico coasts of Florida (Meylan et al. 1995). Since 1989, the pattern of green turtle nesting shows biennial peaks in abundance and a generally positive trend, perhaps due to increased protective legislation throughout the Caribbean (Meylan et al. 1995). Increased nesting has also been observed along the Atlantic Coast of Florida, on beaches where only loggerhead nesting was observed in the past (Pritchard 1997). For the years 1979 through 2004, the number of nests deposited annually ranged from less than 100 to over 9,000 (Florida Fish and Wildlife Research Institute, unpublished data: http://research.myfwc.com/services).

Hawksbill Sea Turtles

Hawksbill sea turtles (*Eretmochelys imbricate*) are circumtropical in distribution, generally occurring from latitudes 30° N to 30° S within the Atlantic, Pacific, and Indian Oceans and associated bodies of water (NMFS and FWS 1998b). The largest remaining concentrations of nesting hawksbills occur on remote oceanic islands of Australia and the Indian Ocean. Within the Pacific United States, hawksbills nest on the main Hawaiian islands, American Samoa, Republic of Palau, and the Federated States of Micronesia. The principal foraging areas in Hawaii occur along the north shores of Hawaii, Maui, and Molokai. Hawksbills have the potential for long-range migrations, and there is some inter-island dispersal between foraging areas and nesting beaches in Hawaii. Along the far western and southeastern Pacific, hawksbill turtles nest on the islands and mainland of Southeast Asia, from China to Japan, and throughout the Philippines, Malaysia, Indonesia, Papua New Guinea, the Solomon Islands (McKeown 1977), and Australia (Limpus 1982).

The hawksbill turtle is relatively uncommon in the waters of the continental United States Hawksbills prefer coral reefs, such as those found in the Caribbean and Central America; however, hawksbills are also found in south Florida and Texas. Nesting areas in the western North Atlantic include Puerto Rico and the Virgin Islands.

Hawksbills have a relatively unique diet of sponges (Meylan 1985, 1988) but also consume bryozoans, coelenterates, and mollusks. In the Caribbean, hawksbill turtles are selective spongivores, preferring particular sponge species to others (Dam and Diez 1997b). The Culebra Archipelago of Puerto Rico contains especially important foraging habitat for hawksbills. Foraging dive durations are often a function of turtle size, with larger turtles diving deeper and longer. In the northern Caribbean, foraging dives were made only during the day and dive durations ranged from 19 to 26 minutes at depths of 8–10 meters. At night, resting dives ranged from 35 to 47 minutes in duration (Dam and Diez 1997a).

As a hawksbill turtle grows from a juvenile to an adult, the turtle switches foraging behaviors from pelagic surface feeding to benthic reef feeding (Limpus 1992). Within the Great Barrier Reef of Australia, hawksbills move from a pelagic existence to a “neritic” life on the reef at a minimum CCL of 35 centimeters. The maturing turtle establishes foraging territory and will remain in this territory until it is displaced (Limpus 1992). As with other sea turtles, hawksbills

will make long reproductive migrations between foraging and nesting areas but otherwise they remain within coastal reef habitats (Meylan 1999).

In the Pacific, the hawksbill turtle is rapidly approaching extinction primarily due to the harvesting of the species for its meat, eggs and shell, as well as the destruction of nesting habitat by human occupation and disruption (NMFS and FWS 1998b). Along the eastern Pacific Rim, hawksbill turtles were common to abundant in the 1930s (Cliffton et al. 1982). By the 1990s, the hawksbill turtle was rare to absent in most localities where it was once abundant (Cliffton et al. 1982). Hawksbill populations have been heavily impacted by direct harvest for the tortoiseshell trade. Today, they are threatened by loss of habitat and other human activities including incidental capture in fisheries. Global populations have declined by 80% over the last century. However, recent assessments of nesting data in the wider Caribbean indicate increases in the number of nests at several key nesting beaches (IUCN 2002).

Olive Ridley Sea Turtles

Olive ridley turtles (*Lepidochelys olivacea*) are olive or grayish green above, with a greenish white underpart, and adults are moderately sexually dimorphic (NMFS and FWS 1998e). Olive ridleys are highly pelagic (Plotkin 1994) and appear to forage throughout the eastern tropical Pacific Ocean, often in large groups, or flotillas. In a 3-year study of communities associated with floating objects in the eastern tropical Pacific, Arenas et al. (1992) found that 75 percent of sea turtles encountered were olive ridleys. Flotsam may provide the turtles with food, shelter, and/or orientation cues in an otherwise featureless landscape. It is possible that young turtles move offshore and occupy areas of surface-current convergences to find food and shelter among aggregated floating objects until they are large enough to recruit to the nearshore benthic feeding grounds of the adults, similar to the juvenile loggerheads mentioned previously.

While it is true that olive ridleys generally have a tropical range, individuals do occasionally venture north, some as far as the Gulf of Alaska (Hodge and Wing 2000). The postnesting migration routes of olive ridleys, traversed thousands of kilometers of deep oceanic waters ranging from Mexico to Peru and more than 3,000 kilometers out into the central Pacific (Plotkin 1994). Stranding records from 1990 to 1999 indicate that olive ridleys are rarely found off the coast of California, averaging 1.3 strandings annually (NMFS 2004).

The olive ridley turtle is omnivorous, feeding on a variety of benthic and pelagic prey items such as shrimp, jellyfish, crabs, snails, and fish, as well as algae and sea grass (Marquez 1990). Olive ridley turtles also forage at great depths, as a turtle was sighted foraging for crabs at a depth of 300 meters (Eckert et al. 1986). The average dive lengths for adult females and males are reported to be 54.3 and 28.5 minutes, respectively (Plotkin 1994, in Lutcavage and Lutz 1997). Declines in olive ridley populations have been documented in Playa Nancite, Costa Rica; however, other nesting populations along the Pacific coast of Mexico and Costa Rica appear to be stable or increasing, after an initial large decline due to harvesting of adults. Historically, an estimated 10-million olive ridleys inhabited the waters in the eastern Pacific off Mexico (Cliffton et al. 1982; NMFS and FWS 1998e). However, human-induced mortality led to declines in this population. Beginning in the 1960s, and lasting over the next 15 years, several million adult olive ridleys were harvested by Mexico for commercial trade with Europe and Japan (NMFS and FWS

1998e). Olive ridley eggs are considered a delicacy, and egg harvest is considered one of the major causes for its decline. Fisheries for olive ridley turtles were also established in Ecuador during the 1960s and 1970s to supply Europe with leather (Green and Ortiz-Crespo 1982). In the Indian Ocean, Gahirmatha Beach in India may have once support the largest nesting population of olive ridleys; however, this population continues to be threatened by nearshore trawl fisheries. Direct harvest of adults and eggs, incidental capture in commercial fisheries, and loss of nesting habits are the main threats to the olive ridley's recovery.

Kemp's Ridley

The Kemp's ridley (*Lepidochelys kempii*) is the most endangered and has declined to the lowest population level of all the world's sea turtle species. Kemp's ridleys nest primarily on Rancho Nuevo in Tamaulipas, Mexico, where nesting females emerge synchronously during the day to nest in aggregations known as arribadas. The majority of the population of adult females nest in this single locality (Pritchard 1969). When nesting aggregations at Rancho Nuevo were discovered in 1947, adult female populations were estimated to be in excess of 40,000 individuals, but the population has been drastically reduced from these historical numbers. Recent data (TEWG 1998, 2000) indicate that the Kemp's ridley population may be in the early stage of recovery. Nesting data, estimated number of adults, and percentage of first time nesters have all increased from lows experienced in the 1970s and 1980s. From 1985 to 1999, the number of nests observed at Rancho Nuevo increased at a mean rate of 11.3 percent per year. Data from nests at Rancho Nuevo, North Camp and South Camp, Mexico, have indicated that the number of adults declined from a population that produced 6,000 nests in 1966 to a population that produced 924 nests in 1978 and 702 nests in 1985, then increased to produce 1,940 nests in 1995, about 3,400 nests in 1999, 4,457 nests in 2003 (TEWG 1998, 2000). Estimates of adult abundance show similar trends from an estimate of 9,600 in 1966 to 1,050 in 1985 and 3,000 in 1995. The proportion of neophyte, or first time nesters, has also increased from 6 to 28 percent from 1981 to 1989 and from 23 to 41 percent from 1990 to 1994 (TEWG 1998, 2000). Scientists project that Kemp's ridleys could reach the intermediate recovery goal identified in the Recovery Plan – of 10,000 nesters by the year 2020.

Subadult Kemp's ridleys stay in shallow, warm, nearshore waters in the northern Gulf of Mexico until cooling waters force them offshore or south along the Florida coast; however, at least some juveniles will travel northward as water temperatures warm to feed in productive coastal waters of Georgia through New England (Pritchard 1969). Juvenile Kemp's ridleys use northeastern and mid-Atlantic coastal waters of the United States Atlantic coastline as primary developmental habitat during summer months, with shallow coastal embayments serving as important foraging grounds. Ridleys found in mid-Atlantic waters are primarily post-pelagic juveniles averaging 16 inches in carapace length, and weighing less than 44 pounds (Pritchard 1969). Next to loggerheads, they are the second most abundant sea turtle in mid-Atlantic waters, arriving in these areas typically during late May and June (Pritchard 1969). In the Chesapeake Bay, where the summer population of Kemp's ridley sea turtles is estimated to be 211 to 1,083 turtles, ridleys frequently forage in shallow embayments, particularly in areas supporting submerged aquatic vegetation (Lutcavage and Musick 1985). Post-pelagic ridleys feed primarily on crabs, consuming a variety of species; mollusks, shrimp, and fish are consumed less frequently.

3.2.4 Sharks

Sharks are cartilaginous fish, belonging to the subclass *Elasmobranchi*. Table 1 of Appendix D lists sharks identified by NMFS as PLMRs for purposes of MSRA.[28] Table 2 of Appendix D shows distribution of sharks and types of fisheries with which they have bycatch interactions. Many oceanic fisheries target sharks, but these species also are taken as bycatch in directed fisheries for tuna, swordfish, and other fish. In general, the bycatch of sharks taken in longline and other fisheries targeting tunas and swordfish is the best understood. By contrast, relatively little is known about the bycatch, status, and biology of sharks from deep-water fisheries. Many species of deep-water sharks are listed as Data Deficient on the IUCN Red List,[29] yet they are known to be highly vulnerable to exploitation because of life history constraints of slow growth and very low productivity. At the same time, there are also fewer management measures in place for species taken in deep-water fisheries, and deep ocean sharks are among the species for which catches have been continuously increasing.[30]

3.2.4.1 Shark Biology and Status

Deepwater sharks are species that tend to be restricted to or spend most of their time below 200 m depth, on the continental slope or beyond. The deepwater sharks under consideration here include species of dogfish sharks (Squalidae), gulper sharks (Centrophridae), lanternsharks (Etmotperidae), sleeper sharks (Somniosidae) and catsharks (Scyliorhinidae). Among these groupings, the life history traits and conservation status of the deepwater chondrichthyans are the most poorly known. For example, age and growth estimates are only available for 31 of the 581 described deepwater cartilaginous fishes.

Deepwater species are among the least productive of the cartilaginous fishes. This is due to slower growth and late maturity, in part as a result of their cold water environment, which also limits available food resources. Most sharks and rays are highly vulnerable to exploitation but the deepwater species are even more so: recovery from depletion may take decades, if not centuries. It has also been noted that the intrinsic rebound potential (i.e., the ability of a population to rebound from fishing pressure) of deepsea sharks, which are among the lowest for all chondrichthyans assessed, decline with depth. Where life history data are lacking, maximum depth could serve as a potential indicator of the ability of a species to withstand fishing pressure. As most deepwater species are taken as bycatch, catch and discard data are incomplete, underreported, and complicated by taxonomic uncertainties, precluding reliable estimates of global catch and mortality. Where data are available, fishing has quickly and severely depleted

[28] Based on the literature review provided in Appendix D, three species have been added to the PLMR list: Pelagic thresher shark (*Alopias pelagicus*), Tope, school or soupfin shark (*Galeorhinusgaleus*), and Salmon shark (*Lamna diptropis*). Not added but recommended for consideration is the Crocodile shark (taken in ICCAT bycatch). Table 2 of Appendix D clarifies nomenclature.

[29] IUCN (2006) *2006 IUCN Red List of Threatened Species*. Available online at www.iucnredlist.org, accessed December 2, 2007.

[30] Garibaldi, L.; Limongelli, L *Trends in oceanic captures and clustering of large marine ecosystems*. FAO Technical Paper. No. 435. Rome, FAO. 2002. p. 21

deepwater shark populations, often in less than 20 years.[31] Silky sharks and other sharks of the family Carcharhinidae are reported in catches in the Indian Ocean.[32]

Nursery areas have not been identified for deepwater sharks, precluding the use of area closures as a tool to protect reproductive females. Movements and migration patterns for most species are poorly known.
Table 3 of Appendix D shows the distribution of sharks by FAO Statistical Area. Table 4 of Appendix D provides a synopsis of the current state of knowledge on the conservation status and trends of sharks. General information about the biology and status of sharks can be found in the FAO World Catalogue of Sharks[33] and in species profiles prepared by the IUCN Shark Specialist Group.[34]

The status of three species of shark—blue shark, shortfin mako, and porbeagle —is of particular concern because of bycatch. The following is a summary of information on stock status for these species. Information on other species is provided in Appendix D.

Blue shark

Blue sharks are caught in longlines, gillnets, handlines, rod and reel, trawls, trolls, and harpoons in the Atlantic Ocean, Gulf of Mexico, and Caribbean but they are mostly caught as bycatch in pelagic longline fisheries targeting tuna and swordfish.[35] Total catch is probably underestimated due to misreporting of bycatches as well as the inadequate reporting of fisheries landing data. ICCAT reported nominal annual catches reach 36,895 metric tons in 1997. Average estimated landings from 1981 to 2004 are 13,347 metric tons. There are uncertainties regarding the stock status of both North and South Atlantic blue sharks due to the lack of data and uncertainties related to life history parameters of the species. For both North and South Atlantic blue shark the current biomass appears to be above the biomass at MSY. In the Mediterranean, there is an absolute dominance of juvenile blue sharks in recent Mediterranean catches.[36]

Shortfin mako

Shortfin mako are caught in longlines, gillnets, handlines, rod and reel, trawls, trolls, and harpoons, in the Atlantic Ocean, Gulf of Mexico, and Caribbean, but they are mostly caught as bycatch in pelagic longline fisheries targeting tuna and swordfish.[37] Total catch is probably underestimated due to misreporting of bycatches as well as inadequate reporting of fisheries landing statistics. ICCAT reported nominal annual catches reach 6,275 metric tons in 2003. Average estimated landings from 1981 to 2004 total 2,336 metric tons. The stock status of both

[31] Kyne, P.M. and C.A. Simpfendorfer (2007) *A Collation and Summarization of Available Data on Deepwater Chondrichthyans: Biodiversity, Life History and Fisheries*. Report of the IUCN Shark Specialist Group. Available online at: www.flmnh.ufl.edu/fish/organizations/ssg/deepchondreport.pdf
[32] FAO, supra note 26 at 21-22.
[33] Compagno, L.J.V. (1984) *Sharks of the World*. FAO Species Catalogue, Vol. 4. FAO, Rome. 655 pp.
[34] Fowler, S. L., Cavanagh, R. D., Camhi, M., Burgess, G. H., Cailliet, G. M., Fordham, S. V., Simpfendorfer, C. A. and Musick, J. A. (2005) *Sharks, Rays and Chimaeras: The Status of the Chondrichthyan Fishes.* IUCN/SSC Shark Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK, 461 pp.
[35] ICCAT, 2005
[36] de la Serna et al., 2002; Megalofonou et al., (2005).
[37] ICCAT, supra note 36.

North and South Atlantic shortfin mako is uncertain since the available data are uninformative and there are uncertainties about the life history parameters of the species. The North Atlantic shortfin mako has historically experienced some level of stock depletion as suggested by the historical trend in catch per unit effort (CPUE). It is possible that the current stock is below biomass at MSY in the North Atlantic as trends in CPUE suggest depletions of fifty percent or more could have occurred. The South Atlantic shortfin mako, may have decreased since 1971, but the magnitude of decline appears less than in the North Atlantic. The current biomass may be above the biomass at MSY, but due to the lack of a clear signal from the catch rates, a wider variety of historical stock trends is possible. The range of possibilities includes no depletion to levels close to biomass at MSY, indicating the stock may currently be fully exploited. In the Mediterranean, there is an absolute dominance of juvenile shortfin makos in the recent Mediterranean catches.[38]

Porbeagle

Porbeagle are caught in a variety of gears in the Atlantic Ocean, including surface longlines, pelagic and bottom trawls, gillnets and handlines but they are mostly caught as bycatch in pelagic longline fisheries targeting tuna and swordfish.[39] Total catch is probably underestimated due to misreporting of bycatch as well as the probably inadequate reporting of several fisheries. ICCAT reported nominal annual catches reached 2,676 metric tons in 1994. Average estimated landings from 1980 to 2004 are 1,290 metric tons.

3.2.4.2 Shark management and bycatch measures

Management measures for shark species are summarized in Appendix D, and include management plans for highly migratory species in the United States, catch prohibitions by several RFMOs, and protection measures under international wildlife agreements. These measures are summarized in Tables 5 and 6 of Appendix D. Very few fishery management plans include requirements to report or avoid bycatch of sharks, though many contain a prohibition on finning and promote live release of sharks taken incidentally. Currently, however, none have implemented catch limits on sharks (except NAFO for thorny skates) to ensure their sustainable exploitation. Also, none have yet drafted a Plan of Action in accordance with FAO's voluntary International Plan of Action — Sharks. The limited information exists on shark bycatch has been compiled from IATTC, ICCAT, NAFO and WCPFC data bases. Information from ICCAT is summarized in Table 7 of Appendix D.

In the eastern Pacific, four species of sharks interact with and are caught incidentally in the ETP tuna purse seine fishery. The most commonly bycaught shark species include blacktip sharks (*Carcharhinus brachyurus*), silky sharks (*C. obscurus*), whitetip sharks (*C. longimanus*), and hammerhead sharks (Sphyrnidae family). The average estimated number of sharks and rays caught by the ETP tuna purse seine fishery annually, 1995 to 2001, was 55,276 fish (IATTC, 2002b). The majority (76.7 percent) of these were taken in sets on floating objects.[40] The silky shark (*Carcharhinus falciformis*), oceanic whitetip shark (*C. longimanus*), and the blue shark

[38] De la Serna et al., supra note 37.
[39] ICCAT, supra note 36.
[40] IATTC, 2002b.

(*Prionace glauca*) are also taken in pelagic longline fisheries in the ETP, and are believed to be taken in artisanal fisheries in many countries around the ETP.

Data for the silky and whitetip shark from purse seine sets on floating objects, schools sets and dolphin sets all show a clear decreasing trend since 1994. The implications of these decreasing trends are unclear, because the stock structure of both shark species in the Pacific Ocean is unknown. Scientists believe that the silky shark is more abundant near land than in the open ocean; however, longline and purse seine CPUE data suggest a widespread distribution across the Pacific. The oceanic whitetip shark is believed to be widely distributed in tropical waters. Observers estimate that 43 percent of sharks caught by tuna purse seine vessels arrive on deck alive. The principal causes of death were adverse conditions in the net resulting from the concentration of the catch, oxygen deprivation, stress, and the pressure to which the species are subjected in the brailer. It appears that certain species are more resistant than others to adverse conditions in the net, and are therefore more likely to survive being sacked up and the pressure in the brailer; an example is the oceanic whitetip shark (*Carcharhinus longimanus*). In 2006, IATTC observers estimated that most of the 22,527 sharks that arrived on deck (91 percent of those involved in sets arrive on deck) were either dead or die soon after being brought aboard. In the western Pacific, pelagic sharks are a common bycatch of the WCPO longline and purse seine fisheries, but very few data have been collected at the species level to enable insights into their distribution and abundance. Observer data indicate that at least 16 elasmobranch species have been observed bycaught in the longline fishery and at least 10 species have been observed bycaught in the purse seine fishery. The blue shark (*Prionace glauca*) is the most commonly caught species during commercial longline operations in the western Pacific. As many as 150,000 blue sharks are captured per year, but the 1.6 blue shark per 1,000 hooks catch rate is significantly less than the catch rate of 10.4 blue shark per 1,000 hooks calculated for the southern bluefin tuna *(Thunnus maccoyii*) fishery off the southeast coast of Australia.[41]

Additionally, in the WCPO longline fisheries, silky shark are caught at about half the rate of blue shark, and oceanic whitetip shark are taken at about one quarter the rate of the blue shark. Blue sharks are the species most associated with finning. From 1992 to 1998 there was a dramatic increase in the numbers of blue sharks finned by the Hawaii-based longline fishery; from 977 sharks in 1992 to 58,444 sharks in 1998.[42] These trends have decreased with domestic and international prohibitions on shark finning. The fate of other shark species may depend on their economic value. For example, the trunk of the silky shark, which is retained in 45.8 percent of observed catches, is apparently more valuable than the trunk of blue shark, which is only retained in only 5.4 percent of observed catches. Williams (1997) reports that vessels retain sharks for consumption by the crew, and as food for live bait.

The predominant shark species caught in the WCPO purse seine fishery are the silky shark and the oceanic whitetip shark.[43] However, observer data often does not identify individual shark species and hence the shark species breakdown in the purse seine fishery is less clear than in the longline fishery. Only a very small percentage of the purse seine catch is made up of shark (around 0.15 percent by weight, according to observer data), which is a much lower rate per

[41] (Stevens 1992; Williams 1997)
[42] (McCoy and Ishihara, 1999).
[43] (Williams 1997).

operation than for longline gear. The breakdown of shark species taken in the WCPO purse seine fishery is somewhat different that the shark species taken in the eastern Pacific Ocean (EPO) purse seine tuna fishery.[44] For example, no blacktip sharks *(Carcharhinus limbatu*s) were caught in the WCPO purse seine fisheries, but this species is one of the four most commonly encountered shark species in the ETP purse seine fishery. The catch rate for sharks, in general, appears to be higher in the ETP than in the WCPO purse seine fishery.

3.2.5. Shared Fish Stocks

Analyses of the FAO catch database of species classified as oceanic (epipelagic and deep water species that occur principally on the high seas) reveal that catches of oceanic species have almost tripled since 1976 from 3 million tons to 8.5 million tons in 2000. The United States manages numerous stocks of highly migratory species and U.S. fishermen share these stocks with fleets of other nations who fish them on the high seas. Capture fisheries directed at high seas and deep water species have been among the fastest growing fisheries worldwide. In 2004, four of the top 10 species by landings were oceanic: skipjack tuna, yellowfin tuna, blue whiting and largehead hairtail— the latter two deep-water species. Table 3 lists fish species that spend all or some part of their life in high seas areas and are managed or shared by the United States. Both epipelagic and deep-water species are listed.

[44] (Hall and Williams 1998).

Table 3. U.S. high seas or shared stocks. Source: Fisheries of the U.S. 2006.

Species or Stock	Shortfin mako shark
Atlantic bigeye tuna	Finetooth shark
North Atlantic albacore	Sharks (nei)
West Atlantic bluefin tuna	Pacific halibut
Atlantic yellowfin tuna	Chinook salmon
Eastern Pacific yellowfin tuna	Coho salmon
Pacific bigeye tuna	Chum salmon
Central Western Pac yellowfin tuna	Sockeye salmon
Skipjack tuna	Pink salmon
Little tunny	Atlantic Salmon
Bonito	Short finned squid
Atlantic blue marlin	Flying squid
Atlantic white marlin	Long-finned squid
West Atlantic sailfish	Pacific loligo
Spearfish	Silver whiting
Atlantic swordfish	Red whiting
Dolphinfish	Cusk
Dusky shark	Atlantic pomfret/Atlantic saury
Porbeagle shark	Lingcod
Sandbar shark	Central Bering Sea Pollock

3.3 GEAR TYPES

3.3.1 Purse seines

Purse seines are large nets that encircle the target species. Depending on the size of vessels, nets generally vary from 1/4 mile to one mile in circumference, and from 300 to 700 ft in depth. The webbing is the main component of the purse seine and is generally made from nylon dipped in tar for added strength and longevity. Mesh size is predominantly 4 1/4 inch (in) (10.77 cm) stretched, but can be as large as 8 in (20.30 cm) at the bottom of the seine. During deployment of gear, the net forms a circular wall of webbing around the school of fish. The net must be deep enough to reduce the likelihood of fish escaping underneath, and the encircling must be done rapidly enough to prevent the fish from escaping before the bottom is secured ("pursed") shut. A set is initiated when a skiff is released from the stern of the purse seiner, anchoring one end of the seine. The targeted fish are contained in a vertical cylinder of webbing after the seine vessel encircles the targeted school and rejoins the skiff. The bottom of the net is then pursed by hauling the cable that is threaded through rings on the bottom of the net. After the net is pursed, it is retrieved until the diameter of the net compass and the volume of water inside the net decreases to a point when, in both space and time, fish are sufficiently concentrated that they can be hydraulically scooped ("brailed") into wells onboard the vessel.

In the ETP, for reasons still not fully understood, yellowfin tuna over 55 pounds are often found in association with schools of dolphin. Tuna fishermen have taken advantage of this association between yellowfin tuna and dolphins by using the more easily detected dolphin schools to help find fish. "Dolphin sets" yield relatively large yellowfin tuna and result in low bycatch relative to other types of sets: log sets and school sets. In the western/central Pacific Ocean, Indian Ocean, and the Atlantic Ocean, the co-occurrence dolphins or other marine mammals and tuna is not as consistent as in the ETP. However there have been documented cases of purse-seiners encircling whales and dolphins in both the Atlantic and the western Pacific (see NOAA Tech Memo, 2008) Log sets (sets on tuna schools associated with floating logs or FADs) tend to yield relatively small, pre-reproductive yellowfin tuna or skipjack tuna (or a mixture of both tuna), together with a wide variety and large quantity of other biota, including sea turtles, sharks, billfish, other sportfish, and a variety of other small non-commercial tunas.

School sets (sets on tuna schools not associated with either floating objects or with dolphins) target free-swimming schools of yellowfin or mixed yellowfin and skipjack tuna that are generally moderately small, and result in relatively less bycatch than log sets.
For more detailed descriptions of purse seine fishing see the Environmental Assessment/ Regulatory Impact Review /Final Regulatory Flexibility Analysis for Regulations to Implement Vessel Assessment Resolutions of the Agreement on the International Dolphin Conservation Program And Capacity Resolutions of the Inter-American Tropical Tuna Commission.

3.3.2 Longlines

A longline system is made up of hook and line gear in which many branch lines, each with a baited hook, hang from a floating longline, or one suspended horizontally below the surface by buoys. Longlines can be set on the seabed, left to drift on the surface, or used at any other depth

in the water column. Depending on the location and the species targeted, longlines range from less than one nautical mile to more than 80 nautical miles. Pelagic longline gear is composed of several parts.

Pelagic longline fisheries in the Atlantic target swordfish, yellowfin tuna, or bigeye tuna in various areas and seasons. Secondary target species include dolphin, albacore tuna, pelagic sharks including mako, thresher, and porbeagle sharks, as well as several species of large coastal sharks. Although this gear can be modified (i.e., depth of set, hook type, etc.) to target swordfish, tunas, or sharks, like other hook and line fisheries, it is a multispecies fishery. These fisheries are opportunistic, switching gear style and making subtle changes to the fishing configuration to target the best available economic opportunity of each individual trip. Longline gear sometimes attracts and hooks non-target finfish with no commercial value, as well as species that cannot be retained by U.S. commercial fishermen, such as billfish.

When targeting swordfish, the lines generally are deployed at sunset and hauled in at sunrise to take advantage of the nocturnal near-surface feeding habits of swordfish. In general, longlines targeting tunas are set in the morning, deeper in the water column, and hauled in the evening. Fishing vessels preferentially target swordfish during periods when the moon is full to take advantage of increased densities of pelagic species near the surface, although vessels of the distant water fleet undertake extended trips include other phases of the lunar cycle. The number of hooks per set varies with line configuration and target catch. Other longlining fisheries include Pacific fisheries for tuna and billfish, bottom longlining for halibut and cod, longlining for reef fish such as snappers and groupers, and deepsea fisheries such as those for Patagonian toothfish. Effects of longlining are described in documents related to essential fish habitat for highly migratory species available online at http://www.nmfs.noaa.gov/habitat/habitatprotection/profile/hms.htm and http://www.pcouncil.org/hms/hmsfmp.html.

3.3.3. Driftnets

Driftnets are a type of gill net allowed to drift freely. They can be from one nautical mile to 40 miles in length. Depth typically ranges from 30 to 40 feet, but can reach 130 feet. The effects of driftnets on the marine environment are described in NOAA's reports to Congress pursuant to section 4004(a) of Driftnet Act, which calls for "reliable information on number and kinds of marine animals killed and retrieved, discarded or lost by foreign vessels involved in driftnet fishing."[45] Driftnet gear is used in fisheries that target squid, shark, swordfish, salmon and tuna, among others.

3.3.4. Trawls

Trawls are funnel-shaped nets towed through water. The net is wide at the mouth and tapers back to a narrow cod end that collects the catch. The average bottom trawl opening is 40 to 60 feet wide and 8 to 10 feet tall. Larger ships, such as those used in Bering Sea pollock or many of the

[45] 16 U.S.C.A. § 1822. See also, NOAA. 2006 Report of the Secretary of Commerce to the Congress concerning U.S. actions taken on foreign large-scale high seas driftnet fishing. August, 2007.

world's whiting fisheries, tow trawls that are larger. Bottom trawlers usually tow their nets at 1 to 2 knots on or above the ocean floor. Fishermen tow mid-water trawls faster to catch faster-swimming schooling fish. Trawls can be designed to catch particular groups of fish through adaptations to the mesh size of the net. Trawl nets have a large metal trawl door that acts like a foil in the water pulling the net open when the net is deployed. Some have a heavy weighted bottom line with wheels to help the net move along the seafloor. The nets are usually hauled aboard on a ramp located at the stern end of the boat with the help of heavy-duty winches. Examples of fish captured in trawl nets in fisheries around the world include hoki, orange roughy, shrimp, rockfish, herring, cod, hake and many others.

3.3.5. Other

Other types of fishing gear include troll lines, gill nets, pots, traps, and dredges. Descriptions of these gears and their effects on the environment are described in numerous agency and scientific publications[46] and on an informational website. See http://www.nmfs.noaa.gov/fishwatch/fishinggears.htm.

3.4. ECONOMIC ENVIRONMENT

3.4.1 U.S. Consumption Trends

This report relies on discussion included in a larger report commissioned by NMFS pertaining to fisheries trade, seafood demand, and the examination of trade measures. This report is available in "Economic Analysis of International Fishery Trade Measures" (Gentner 2008).

The United States ranks third in total consumption of seafood, behind China and Japan, and 72nd in per capita consumption (FUS 2006). Per capita consumption has gone up since 1929 from 11.8 pounds to 16.5 pounds annually. In 2006, Americans consumed 6.5 pounds of fresh and frozen fish and 5.8 pounds of fresh or frozen shellfish. The three most popular products are shrimp, canned tuna, and salmon. Shrimp, in all product forms, is the single most popular species consumed by Americans. In 2006, Americans set a record for shrimp consumption at 4.4lb per person per year, an increase of 0.3lb from 2005 and up over a pound since 2000. Canned tuna is the second most popular product at 2.9 lb per person per year, which is down 0.2lb from 2005 consumption levels. Generally, consumption of canned tuna has been falling since its peak in 1990. Also falling is the consumption of seafood sticks and portions, with American consumers purchasing 0.9lb per person in 2006, which is unchanged since 2005 but down from its peak at 2.0lb per person in 1980. Instead, Americans are eating more fresh seafood with consumption of fillets and steaks up to 5.2lb per person from 5.0lb in 2005, which is a new record. Since 2000, American consumers are buying 1.6lb more per person each year. In particular, tilapia consumption is rapidly rising. It is now the sixth most consumed species and, by far, growing the fastest in terms of market share.

[46] See for example, list of scientific publications related to the effects of fishing gear on habitat, available online at http://www.nmfs.noaa.gov/habitat/habitatprotection/efh/fish_manage_f.htm, or in descriptions of gear effects in marine mammal bycatch documented by take reduction teams, available online at http://www.nmfs.noaa.gov/pr/interactions/trt/teams.htm

With decreasing consumption, nominal prices are falling: canned tuna has dropped from $2.55/lb in 1980 to $1.78/lb in 2004 (Kirkley 2006). Overall, the majority of price reductions are driven by increased imports from China, Thailand, and Vietnam, particularly for aquaculture shrimp and finfish produced at very low cost. Although seafood is still a relatively expensive protein source, due to these decreases in nominal prices, increases in relative income, and increasing importance of non-price factors, U.S. demand for seafood has increased.

Worldwide, the United States is the sixth largest harvester of seafood, when comparing nation's whose primary production is from capture fisheries (Glitnir 2007). U.S. production represents 3.6% of global seafood production with 89% from capture fisheries. By volume, the top five landed species in the United States are Alaskan pollock (35%), menhaden (13%), salmon (9%), hakes (6%), and cod (6%). The most valuable species group is shellfish, however with landings of $2.1 billion in 2005. The top five most valuable species are lobster ($438 million), scallops ($434 million), crab ($413 million), shrimp ($407 million), and salmon ($331 million) in 2005. By state, Alaska dominates with $1.3 billion in landed value followed by Massachusetts ($425 million), Maine ($392 million), Louisiana ($253 million), Washington ($207 million), and Texas ($172 million) in 2005.

With regard to processing, the United States processes $7.5 billion in seafood in 2005. Fresh and frozen product accounts for 79% of total processing value. The top three most valuable processed product classes include processing of fillets and steaks ($1.1 billion), sticks and portions ($397 million), and breaded shrimp ($276). Alaskan pollock accounts for 62% of the fillet and steak value. Fish sticks and portions are growing again in share after declines.

Two-thirds of U.S. seafood consumption occurs away from home, in restaurants or other foodservice outlets, while one-third is consumed at home (Glitnir 2007). These proportions hold whether looking at volume or value. Independent full and limited service restaurants account for approximately 50% of sales away from home. Both independent and chain restaurants are aggressively promoting fresh seafood to drive traffic and overall sales. At home consumption is currently dominated by shrimp, canned tuna, and salmon purchases. Demographic trends are expected to change consumption patterns with increasing consumption in the future, particularly across stronger tasting fish not historically consumed in the United States. New trends in value added packaging, foil pouches, ready-to-eat meals, etc., are expected to increase consumption. Finally, health, safety, and environmental concerns are increasingly important for U.S. consumers. As a result, it is expected that labels will play an increasingly important role in future seafood consumption decisions.

3.4.2 Balance of Trade

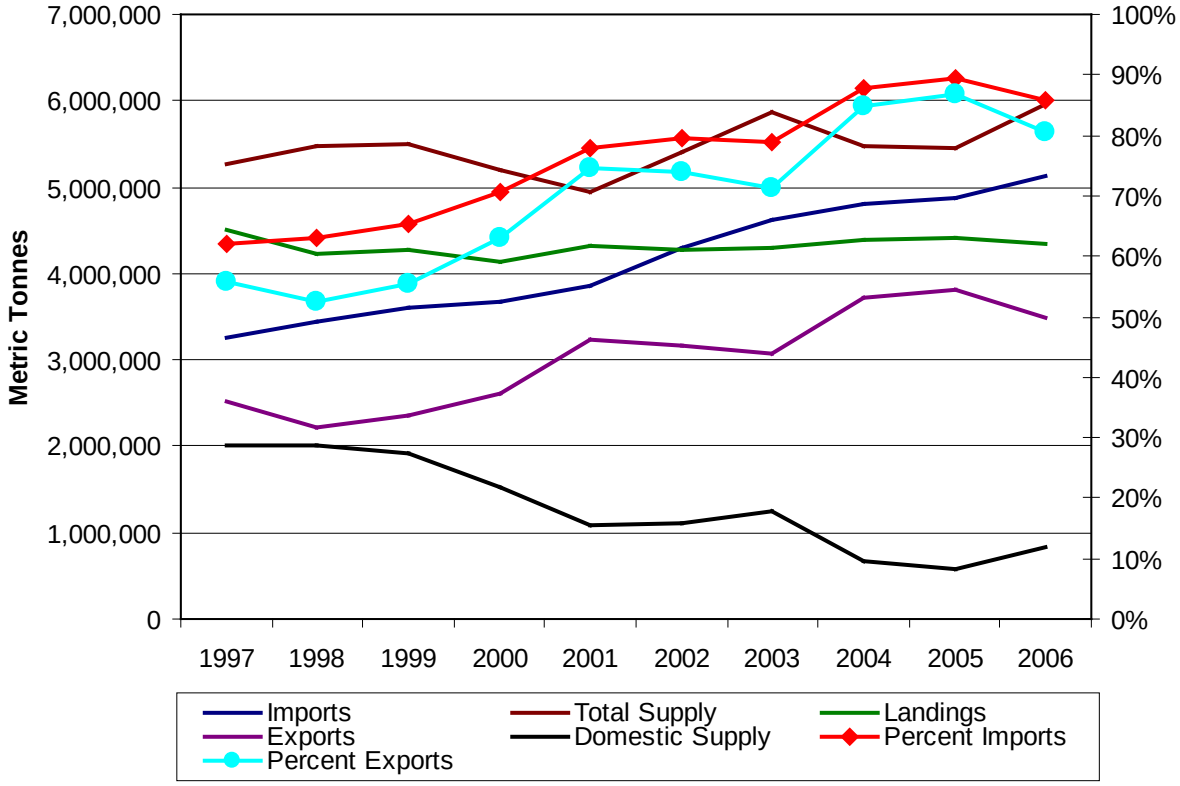
NMFS uses the U.S. Census trade data as the official record of import trade. Census data is largely based on Customs and Border Protection (CBP) form 7501 (referred to as CBP 7501) as modified by additional data sources. Information regarding import volume and value will therefore be based on Census data unless otherwise noted. CBP 7501 data will be utilized when discussing import carriers and importers. With respect to Census import data, there are a number of caveats. First, country of origin is not necessarily the country of harvest, but the country where the product was last substantially altered or processed. Additionally, because country of origin is entered onto CBP 7501 forms as a numeric code there is the potential for misidentification of the country of origin. Unfortunately, there is no consistent data source across all species that allows tracking back to country of harvest. NMFS maintains several

statistical documents that require tracking of chain of custody for toothfish (*Dissostichus eleginoides and Dissostichus mawsoni*), bigeye tuna (*Thunnus obesus*), southern bluefin tuna (*Thunnus maccoyii*), northern bluefin tuna (*Thunnus thynnus*), and swordfish (*Xiphias gladius*). With the exception of the toothfish statistical document, the statistical documents listed above capture only a small portion of the imports identified in the Census and CBP data. As a result, all further results here are based on the Census or CBP data.

American Samoa and Guam, although U.S. territories, do not fall within U.S. Customs jurisdiction and, as such, neither the CBP data nor the Census data contains landings or transshipments occurring in either location. The Nicholson Act generally bars foreign vessels from landing fish in most U.S. ports. Other than some limited landings of albacore tuna (*Thunnus alalunga*) by Canadian vessels on the West Coast, American Samoa and Guam are the only U.S. ports that allow direct landings by foreign fishing vessels. In fact, much of the product entering American Samoa and Guam are landings directly from domestic and foreign fishing vessels, making it different than the mainland importation of foreign fishery products. Because there are only two canneries in American Samoa, data-sharing must be treated differently than Customs data (which can be provided in aggregate form) to protect the confidentiality of this data. To avoid any confidentiality problems, American Samoan landings will be reported with the other U.S. canneries in the Cannery section below. Because mainland canneries are included in the U.S. Census importation data reported here, imports of fresh/frozen tuna product is not additive across the charts presented using the tuna species group and the cannery receipts presented later.

U.S. seafood markets rely heavily on imports. Imports of seafood have risen rapidly increasing from 62% of domestic harvest in 1997 to 86% in 2006, Figure 5. Landings have stayed relatively stable since 1997, falling slightly from 4.5 million metric tons to 4.3 million metric tons. Since 1997 domestic supply, or landings minus exports, has fallen by more than half; from just over 2.0 million metric tons to under 850,000 metric tons in 2006. The increasing wedge between domestic supply and landings has been due to exports increasing 72% since 1997.

Figure 5. Volume of Imports, Exports, Domestic Supply and Total Supply 1997 – 2006.



The United States trades with many nations. Table 4 lists the top 20 U.S. import partners ranked by volume and also by value imported. Table 4 uses actual product weight which is less than the round weight used in Figure 6. When ranked by value, the top three import partners with the United States are Canada, China, and Thailand. When ranked by volume, the top three import partners with the United States are China, Thailand and Canada suggesting that we trade relatively higher valued products with Canada than either China or Thailand. Our imports from Canada are the most diverse. The top three imported Canadian products are salmon (24.1%), snow crab (11.4%), and groundfish (9.3%). The top three imported Chinese products are tilapia (21.7%), groundfish (21%), and shrimp (11.9%). The top three imported products from Thailand are shrimp (53.4%), canned tuna (29.1%), and sauces derived or prepared from fish (3.9%). Imports of groundfish include cod, haddock, hake, whiting, pollock, and generic groundfish, but do not include fish sticks and other breaded fish products likely made with whitefish. As a result, groundfish totals are likely underestimates.

Table 4. Top Twenty U.S. Import Partners Ranked by Volume and Value.

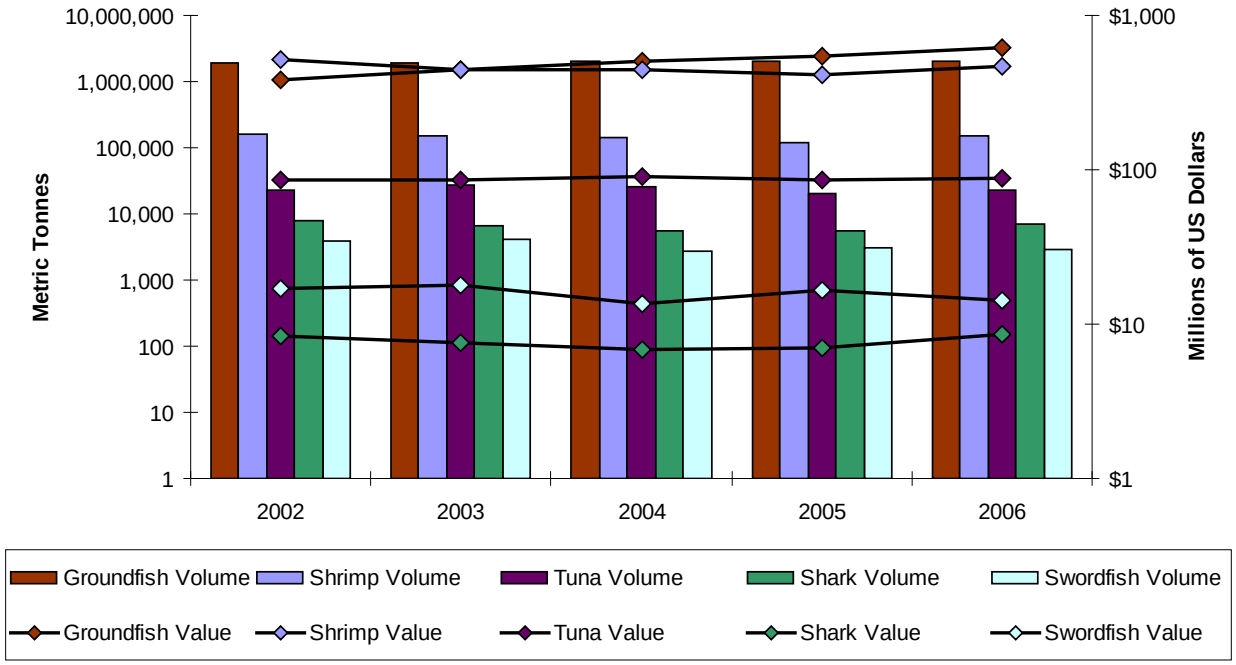
Top Twenty Trading Partners by Value Imported			Top Twenty Trading Partners by Volume Imported		
Origin Country	Metric Tons	Millions of USD	Origin Country	Metric Tons	Millions of USD
CANADA	354,131	$2,224,058,631	CHINA	579,908	$2,097,223,734
CHINA	579,908	$2,097,223,734	THAILAND	362,987	$1,813,569,359
THAILAND	362,987	$1,813,569,359	CANADA	354,131	$2,224,058,631
CHILE	145,561	$975,621,533	CHILE	145,561	$975,621,533
INDONESIA	120,829	$785,275,697	INDONESIA	120,829	$785,275,697
VIET NAM	94,199	$653,845,687	ECUADOR	111,822	$571,411,412
ECUADOR	111,822	$571,411,412	MEXICO	95,541	$476,964,022
MEXICO	95,541	$476,964,022	VIET NAM	94,199	$653,845,687
RUSSIAN FEDERATION	36,227	$375,284,915	PHILIPPINES	77,679	$273,220,142
INDIA	48,583	$323,810,098	INDIA	48,583	$323,810,098
PHILIPPINES	77,679	$273,220,142	RUSSIAN FEDERATION	36,227	$375,284,915
JAPAN	22,537	$213,912,667	ARGENTINA	31,747	$93,975,759
BANGLADESH	20,536	$192,865,767	NORWAY	27,702	$157,447,595
MALAYSIA	26,945	$165,341,231	NEW ZEALAND	27,081	$130,144,903
NORWAY	27,702	$157,447,595	MALAYSIA	26,945	$165,341,231
HONDURAS	18,682	$146,191,632	PERU	25,567	$63,414,085
ICELAND	23,283	$139,888,413	ICELAND	23,283	$139,888,413
NEW ZEALAND	27,081	$130,144,903	JAPAN	22,537	$213,912,667
BRAZIL	15,290	$129,939,788	BANGLADESH	20,536	$192,865,767
PANAMA	16,758	$104,737,328	HONDURAS	18,682	$146,191,632

While the United States imports 86% of the seafood consumed domestically, it exports 80% of its domestic harvest. When ranked by volume, Japan, China, and Canada are the top three trading partners respectively. By volume, the top three exports to Japan are groundfish, salmon and Atka mackerel respectively. By volume, the top three exports to China are flatfish, fish/shellfish meal unfit for human consumption, and groundfish respectively. By volume, the top three exports to Canada are salmon, groundfish and lobster respectively. The groundfish category is a composite of all whitefish species and is dominated by Alaskan pollock. When ranked value, Canada moves into the second slot ahead of China, suggesting that Canada imports higher valued products than China. By value, the top three exports to Japan are groundfish, salmon, and sablefish respectively. By value, the top three exports to Canada are lobster, salmon, and flatfish respectively. By value, the top three exports to China are salmon, groundfish, and flatfish respectively.

As one would expect, higher valued products are exported. Export values include value added during processing. In 2001, export value rose to meet falling landed value and surpassed landed value in 2005. In 1997 55.6% of all landings were exported and by 2006 that percentage had increased to 80.6% of all landings are exported. While the top landed species where described above, the top three exports by volume are groundfish, salmon, and fish and shellfish meal unfit for human consumption. Groundfish exports are dominated by Alaskan pollock and salmon exports are dominated by wild Alaska salmon, making Alaska a very important player in the export arena. By value, the top two exported products are still groundfish and salmon, but third place is now lobster from New England. Groundfish completely dominates exports overall with almost three times the volume and just over two times the value of salmon exports.

Figure 6 details the volume and value of domestic shrimp, tuna, groundfish, shark, and swordfish landings. Toothfish, an Antarctic species, is not landed in the United States. Of the species groups, groundfish is by far the most landed by value or volume with 2.1 million metric tons worth $614 million. This group is lead by landings of Alaskan pollock with 1.5 million metric tons worth $329.9 million. Pacific hake is the second most landed groundfish species with 258,759 metric tons worth $35.2 million. As a note, orange roughy, also included in the groundfish group, is not harvested by U.S. fishermen. Shrimp is the second most landed group with 152,632 metric tons worth $466 million. When compared to groundfish, clearly shrimp is a much higher valued product. White shrimp rank first in volume and value with 65,468 metric tons and $220.3 million dollars followed closely by brown shrimp with 65,290 metric tons and $183.1 million dollars. Tuna, the second most landed group, is lead by albacore landings of 13,133 metric tons with a value of $25 million dollars with 23 metric tons landed by the U.S. distant water fleet. The second most landed tuna species is bigeye tuna with a volume of 5,093 metric tons and a value of $37.8 million dollars. Shark landings, a relatively low value product, are dominated by spiny dogfish landings with a volume of 2,927 metric tons and a value of $1.5 million dollars. Sandbar shark volume is 936 metric tons, the second most landed shark species by volume, and has a value of $681,860 dollars. When ranked by value, the second most landed species is unspecified shark with a volume of 740 metric tons and a value of $4.2 million dollars.

Figure 6. Volume and Value of Landings by Group.

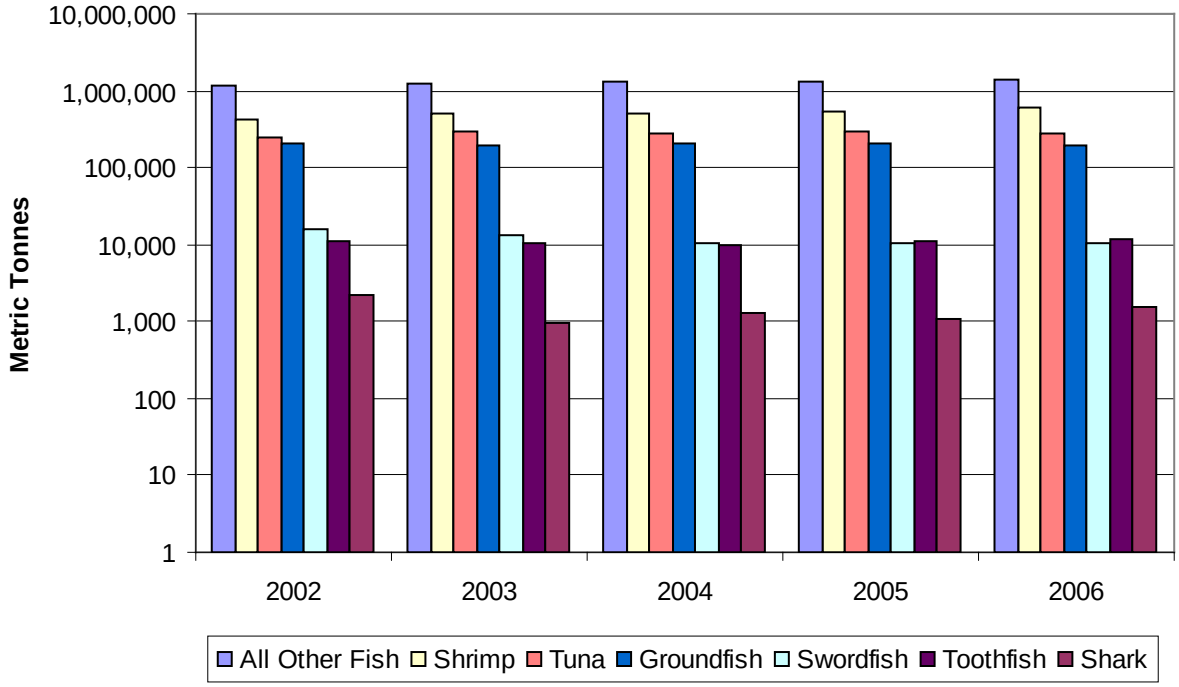


Over the last ten years, imports have grown from 62% of total U.S. consumption to 86% of U.S. consumption, driven by increasing costs in U.S. fisheries, decreasing import prices, and increases in consumer demand for seafood products in general. Import value increased from $7.8 billion in 1997 to $13.5 billion in 2006, an increase of 73%.

Figure 7 contains the volume of imports by species groups and Figure 8 contains the value of imports by species groups. The “All Other Fish” species grouping represents all other species not included in the

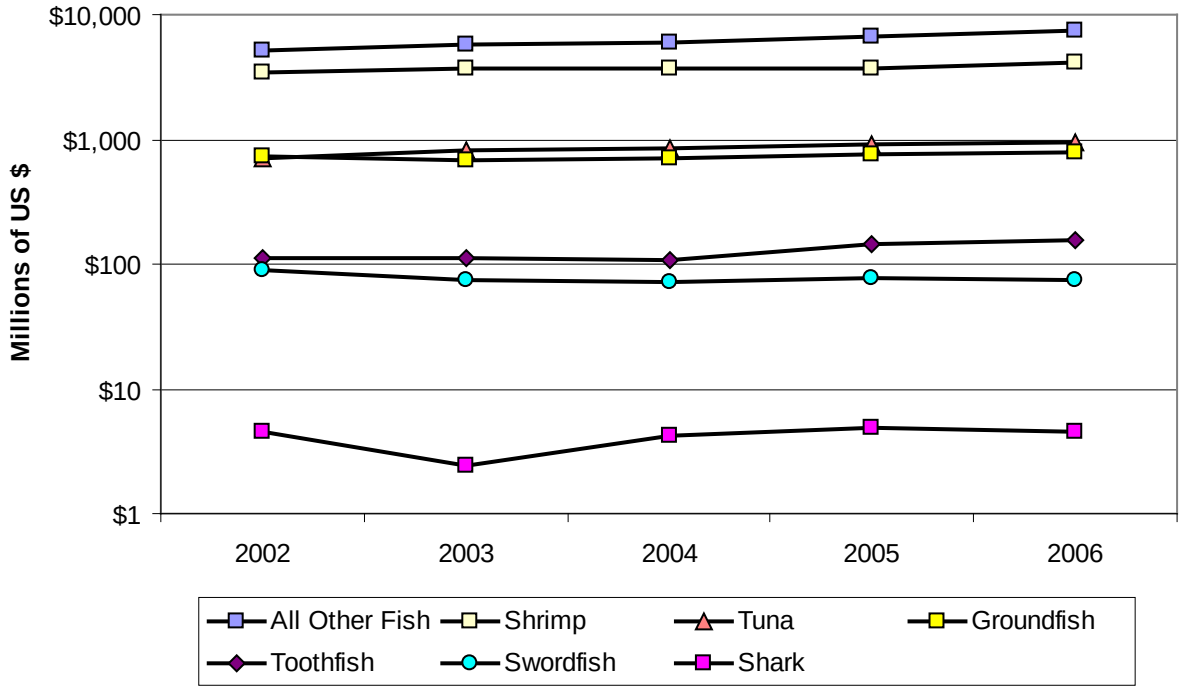
groupings defined above. This group ranks highest with 1.4 million metric tons in 2006. Upon more detailed examination of this group, the top two imports by volume are salmon (221,591metric tons) and tilapia (158,254 metric tons). The salmon in this group is almost exclusively farmed Atlantic salmon. When ranked by value, the top two species imported within the "All Other Fish" group include salmon ($1.5 billion dollars) and marine fish not specially provided for (NSPF) ($614.9 million dollars). It is likely that this category of marine fish NSPF includes a fair amount of groundfish, increasing this group's prevalence in the rankings. However, it is impossible to know what is exactly included in this grouping.

Figure 7. Volume of Imports by Species Group.



The United States imports 590,299 metric tons of shrimp valued at $4.1 billion dollars. When the "All Other Fish" group is broken out by species, shrimp is far and away the most imported and most valuable single species to the United States. Tuna is also an important import species group with 2006 import volume at 275,829 metric tons and value at $935 million dollars. Tuna outranks groundfish by volume but fails to surpass salmon as the most valuable grouping behind shrimp. The majority of tuna imported into this country is canned product. The single most imported groundfish species is pollock at 80,348 metric tons worth $167.5 million and followed by cod at 62,867 metric tons valued at $362.8 million. Clearly, cod is a higher valued product than pollock. While more toothfish (11,422metric tons) was imported than swordfish (10,334 metric tons) in 2006, this has not always been the case. Swordfish imports have declined by 34% since 1997 while toothfish imports have increased by 206%. Shark is the least imported of any species group with 1,153metric tons and $4.5 million dollars of imports. Further detail about individual species groups including product forms, origin and other trade details can be found in "Economic Analysis of International Fishery Trade Measures" (Gentner 2008).

Figure 8. Value of Imports by Group.



3.4.3 South Pacific Territories – Guam and American Samoa

In 1953, the U.S. Customs allowed direct landings by foreign vessels into American Samoa and Guam also granting these two territories duty free access to U.S. markets. There are two canneries in American Samoa: Chicken of the Sea and Starkist. The Chicken of the Sea facility was formerly owned by Van Camp, but is currently owned by Thai Union, the world's second largest tuna processor (Campling et al, 2007). They are the world leader in supplying food service and catering sectors. Chicken of the Sea alone has 15% market share in this sector, but when combined with Thai Union processing their market share in food service and catering rises to 60% worldwide. The Chicken of the Sea plant averages $708 million in sales annually (Campling et al, 2007).

Starkist is a subsidiary of Del Monte. The Starkist brand is a U.S. market lead in canned lightmeat tuna and also the U.S. market leader in foil pouch tuna. Currently Starkist sales average $596 million annually (Campling et al. 2007). Both plants have been increasing capacity to can loins as a way to reduce labor costs. Processing round tuna is relatively labor intensive. Bumble Bee's two U.S. canneries have transitioned to processing only loins because of rising labor costs in Puerto Rico and California where their plants are located.

All U.S. canneries voluntarily supply all their tuna purchase receipts, including volume and country of origin, to NMFS, but these receipts do not include price data. Because there are only two firms operating in American Samoa, it violates confidentiality restrictions to display the volume and origin of tuna brought to these two canneries. It is possible however to aggregate all cannery receipts and that data is displayed in the tuna imports section below.

As discussed earlier, Guam, like American Samoa, does not fall within the jurisdiction of U.S. Customs can allow landings of fish by foreign fleets. Transshipments in Guam are not included in either the CBP or the Census data. Guam operates as a major transshipment point for Asian distant water longline fleets. Starting in 1989, this transshipment port has become an important port for the Taiwanese and Japanese longline fleets, transshipping fresh fish for the Japanese market.

Table 5. Annual Port Calls, Vessels and Landings Volume by Species.

Origin Country	Year	Port Calls	Vessels	Bigeye	Yellowfin	Albacore	Swordfish	Other	Total
TAIWAN	2000	548	153	1,523.2	2,383.9	1.7	31.2	413.0	4,353.1
	2001	622	149	2,339.3	2,445.5	0.0	42.8	567.2	5,394.8
	2002	433	123	1,383.4	1,254.5	0.0	67.3	403.3	3,108.5
	2003	356	99	1,178.0	1,021.6	0.0	42.4	286.7	2,528.6
	2004	221	65	735.6	449.4	0.0	2.2	89.2	1,276.4
	2005	40	18	156.0	122.2	0.0	0.0	13.5	291.7
	2006	147	49	760.1	437.5	0.0	0.3	22.5	1,220.4
JAPAN	2000	621	70	4,196.3	2,400.7	194.0	94.6	399.1	7,284.7
	2001	590	68	3,612.1	3,217.6	48.2	77.3	263.6	7,218.8
	2002	441	67	2,493.2	1,736.7	28.6	68.0	193.9	4,520.4
	2003	422	55	2,216.7	1,735.9	129.9	46.4	284.5	4,413.3
	2004	471	48	2,663.0	1,852.4	72.4	61.1	301.6	4,950.4
	2005	446	49	2,461.5	2,451.9	91.1	53.1	311.0	5,368.5
	2006	392	44	2,689.3	1,940.7	94.9	51.6	314.3	5,090.7

Table 5 displays the annual port calls of fish at the Guam transshipment facility. The majority, 99%, of the landings in Guam are from Taiwanese and Japanese longline boats with the remainder coming from a few South Korean vessels (Hamm, 2007). The landings from South Korean flagged vessels cannot be listed because it involves less than three vessels. Since there are only three vessels, it would be a violation of confidentiality restrictions to share the landings of these vessels. The Japanese fleet lands the most fish and increasing so over the last few years. In every year for both fleets, the majority of the landings are bigeye tuna followed by yellowfin tuna.

The size of the Japanese fleet is declining; falling from its peak of 106 vessels in 1989 to 44 vessels in 2006. The number of trips has also been declining. From 1989 the number of Taiwanese vessels increased dramatically up from 118 to 364 at their peak in 1996. The Taiwanese fleet has retracted to 49 boats in 2006. While the number of vessels calling in Guam has decreased, the level of landings reported by the Secretariat of the Pacific Community have not fallen significantly suggesting that these fleets may be using other transshipping points closer to the fishing grounds in the Federated States of Micronesia.

Fish landed in Guam are graded into sashimi grade fish and rejects. The sashimi grade fish are air freighted out of Guam to Japan. Some of the rejected fish is retained for local consumption in Guam and the rest is put into containers and shipped to canneries. For Japanese caught bigeye, the annual average quality rejection rate was 6.04%. For Taiwanese caught bigeye, the annual average rejection rate was 7.1%. Typically, larger fish make the grade more frequently, so the rejected fish are generally

smaller. Even though yellowfin landings have been declining, the rejection rate for yellowfin has been increasing for both fleets with the current average annual rejection rate at 20.3% for the Japanese and 33.5% for the Taiwanese.

Currently rejected fish are purchased and stored frozen until a shipping container can be filled. These fish then sold to foreign canneries and transported via container ships. Unfortunately for this analysis, the Guam Bureau of Statistics and Plans (BSP) does not track the flag of the carrier vessel transporting the rejected fish nor does it track the destination of these fish. Additionally, Guam BSP only publishes total import value by broad product types and does not publish information on carrier flag or carrier type.

3.4.4 U.S. Harvesters

Table 6, adapted from Fisheries of the United States (FUS) of 2006, shows the contribution to the U.S. gross domestic product of the various sectors of the seafood industry in this country. Overall consumers and industrial purchasers of fish meal and oil spent $69.5 billion on seafood products, including imported product. These expenditures generated a contribution to Gross Domestic Product (GDP) of $35.1 billion across the U.S. industry including harvesters, primary wholesaling, processing, secondary wholesaling, and retail trade. According to FUS, U.S. consumers spent $46.6 billion in restaurant purchases of seafood and $22.7 billion in purchases at market for at home consumption generating $21 billion and $3.6 billion in GDP, respectively. The harvesting sector generated $2.5 billion in contributions to GDP on sales of $3.8 billion. Finally, all wholesaling and processing activity contributed $7.9 billion to GDP.

The exact number of vessels, harvesters, and related business is available in some limited fisheries in the United States, however no U.S. wide total exists. Aggregate landings are discussed above in Section 3.4.2. In 2006, ten species made up 74% of total landings by volume including: walleye pollock, Atlantic menhaden (industrial), Pacific hake, Pacific cod, Atlantic herring, sockeye salmon, pink salmon, yellowfin sole, pacific sardine, and blue crab respectively. It is a different story with regards to value. The top ten species make up 58% of total value including: American lobster, sea scallop, walleye pollock, white shrimp, Pacific halibut, Pacific cod, brown shrimp, sockeye salmon, Dungeness crab, and sablefish. The majority of these seafood products are fresh or frozen, 5% are canned, 1.2% are cured, and 17% go to the reduction plants.

Table 6. Contribution to GDP from US Seafood Production (FUS 2006).

Sector	Purchase of Inputs	Total Mark-Up	Value Added	Sales	Offshore Fleet & Exports
	Thousands of Dollars				
Domestic Harvest:					
Edible	-	$3,846,654	$2,452,982	$3,846,654	-
Industrial	-	$66,235	$40,003	$66,235	-
Harvest Not Landed in US	-	$61,151	$61,036	$61,151	$61,151
Unprocessed Imports	$5,492,720	-	-	$5,492,720	-
Unprocessed Exports	`	-	-	-	$1,433,578
Primary Wholesale and Processing	$7,972,031	$7,044,931	$4,240,579	$15,016,963	-
Processed Imports	$8,092,095	-	-	$8,092,095	-
Processed Exports	-	-	-	-	$2,346,916
Secondary Wholesale and Processing					
Edible	$20,566,638	$12,897,359	$3,616,876	$33,463,996	-
Industrial	$195,504	$122,601	$34,382	$318,104	-
Retail Food Service	$16,486,093	$30,071,639	$20,987,914	$46,557,732	-
Retail Stores	$16,977,904	$5,674,403	$3,644,756	$22,652,306	-
Total Contribution to GDP			$32,903,889		
Total Consumer Expenditures and Wholesale Purchases of Industrial Products				$65,158,590	

Because the AS canneries play a large role in the harvest and importation of tunas, the U.S. distant water fleet (DWF), which feed the canneries, is discussed in greater detail. The U.S. DWF used to be a captive fleet to the AS canneries, but that is changing. American Samoa provides infrastructure to the DWF and fuel purchases by the DWF total around $18 million a year (Campling et al. 2007). In 1985, there were 90 vessels in the US DWF, but the fleet shrank to 14 vessels in 2006. Over the last year, however four new vessels have been added bringing the fleet total to 18 vessels with a total hold capacity of 21,192 metric tons. On average, each vessel has a capacity of 1,177 metric tons (Fanning 2007).

The recent increase in fleet size is due to several factors. As tuna stocks decline, prices have been rising, encouraging new entrants. Additionally, the United States has extended the Andean Trade Promotion and Drug Eradication Act (ATPDEA) into 2008. Under the ATPDEA, a U.S. vessel can land tuna in American Samoa and have it transshipped to the Starkist cannery in Ecuador. The cannery in Ecuador produces foil pouch tuna products that, if produced with U.S. fish, are exempt from the import duties on canned tuna faced by the rest of the world. This is the same privilege that American Samoa has enjoyed for years. Currently, Ecuador is able to pay a higher price for tuna because their labor costs are lower and they are producing a higher valued product. Along the same lines, the United States is currently negotiating a free trade agreement (FTA) with Thailand that would give U.S. origin fish duty free access to Thai tuna processors. This could open up a new market for the U.S. DWF. Finally there may be may

be low cost financing programs available in the near future to improve existing boats and build new boats (Campling et al. 2007).

Another important issue is that a switch from selling to the canneries to transshipping product has increased the reliance on tuna catch from other nations in the cannery input stream. Increasingly, tuna used is being brought into American Samoa on carrier vessels instead of fishing vessels, which adds shipping costs thereby increasing input costs to the canneries. Unfortunately, the cannery receipts do not detail whether the fish delivered to the canneries are sourced from a fishing vessel or a cargo vessel.

Table 7 details the catch of the DWF by the purse seine boats and all other gear types. The purse seine fleets target skipjack tuna, but because they fish primarily around fish aggregating devices (FADs) they also catch bigeye and yellowfin. All other gear types are dominated by troll gear catching mostly albacore. All of the albacore harvest is transshipped to Ecuador (Fanning 2007). In fact, the majority of the DWF landings, at least since 2001 have been transshipped to Ecuador. Neither the cannery receipts nor the landings data contain value information. Campling et al. (2007) estimate the U.S. DWF fleets value was $632 million in 2001.

Table 7. U.S. Distant Water Fleet Catch and Disposition.

Year	Albacore	Bigeye	Skipjack	Yellowfin	Total
Purse Seine Catch (metric tons)					
2001	0	6,176	85,539	24,143	115,858
2002	0	4,889	88,535	27,191	120,615
2003	0	4,470	62,907	20,079	87,456
2004	0	5,031	47,896	14,492	67,419
All Other Gear Catch (metric tons)					
2001	3,400	2,644	769	1,853	8,666
2002	1,862	4,982	529	1,179	8,552
2003	2,098	3,855	744	1,521	8,218
2004	1,316	4,702	660	1,412	8,090
US Cannery Receipts (metric tons)					
2001	0	2	20	33	55
2002	0	0	0	0	0
2003	49	26	201	51	326
2004	143	45	281	3	472
2005	275	0	20	0	296
2006	23	0	0	0	23
Transhipments (metric tons)					
2001	3,400	8,818	86,288	25,963	124,470
2002	1,862	9,871	89,064	28,370	129,167
2003	2,049	8,299	63,451	21,550	95,349
2004	1,173	9,688	48,275	15,901	75,037

Overall, as illustrated by the information presented, the U.S. seafood industry is in the midst of challenging times. While domestic landings have generally been on the decline, the industry faces declining prices as lower priced foreign imports increasingly enter the market. Partly because of the lower prices for imports, consumers are buying more imported product reducing sales of domestically caught fish. Earnings are also in decline due to a number of factors. Energy prices have risen, driving

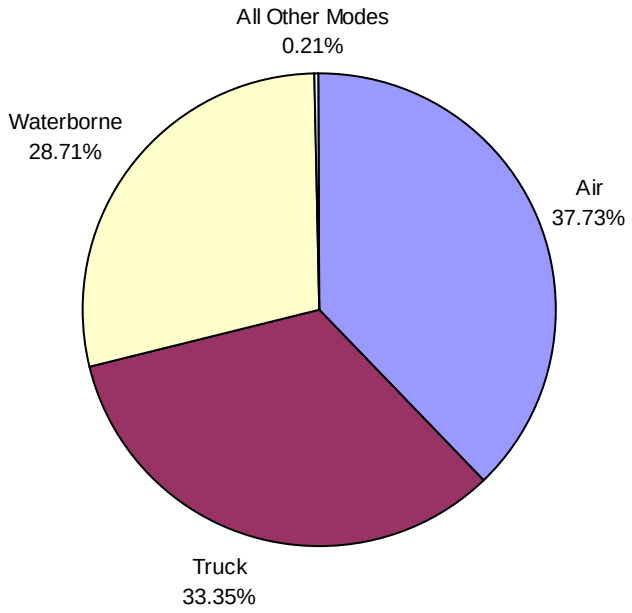
processing costs up and driving fuel dependent harvesting costs up as well. Additionally, labor costs are higher for the United States than for most U.S. import partners. In addition to the rising competition from wild caught imports, the United States faces strong competition from foreign aquaculture, which is much more prevalent outside of the United States. Finally coastal development pressure and a shrinking commercial harvesting sector have led to the conversion of the seafood infrastructure into other types of development.

In this era of challenges, it may be possible for the U.S. industry to increase domestic availability to offset a loss in imports. It would, however, be difficult for the industry to ramp up production even if harvests could be increase, at least in the short term. It might be possible to increase aquaculture production, but that is not without its own set of regulatory and infrastructure hurdles. Because the United States exports more than 80% of its landings, it would be possible for increased U.S. demand to be met by selling domestic product that would have been exported. A portion of these exports leave the country for processing only to return as imports. While it is not possible to estimate the amount of U.S. exports that return as processed product, it is expected the majority of U.S. imports did not originate in the United States.

3.4.5 Transportation

Imported seafood is transported into this country in a variety of modes detailed in Figure 9. The most frequently used mode, particularly for high value fresh product, is air transportation with 37.73% of the volume. That is followed by truck transportation with 33.35% of the volume imported. Across all species of fish, the waterborne mode is the third most used transportation mode transporting 28.71% of seafood imports. Finally all other modes, including mail and rail, account for less than one percent of all imports (0.21%).

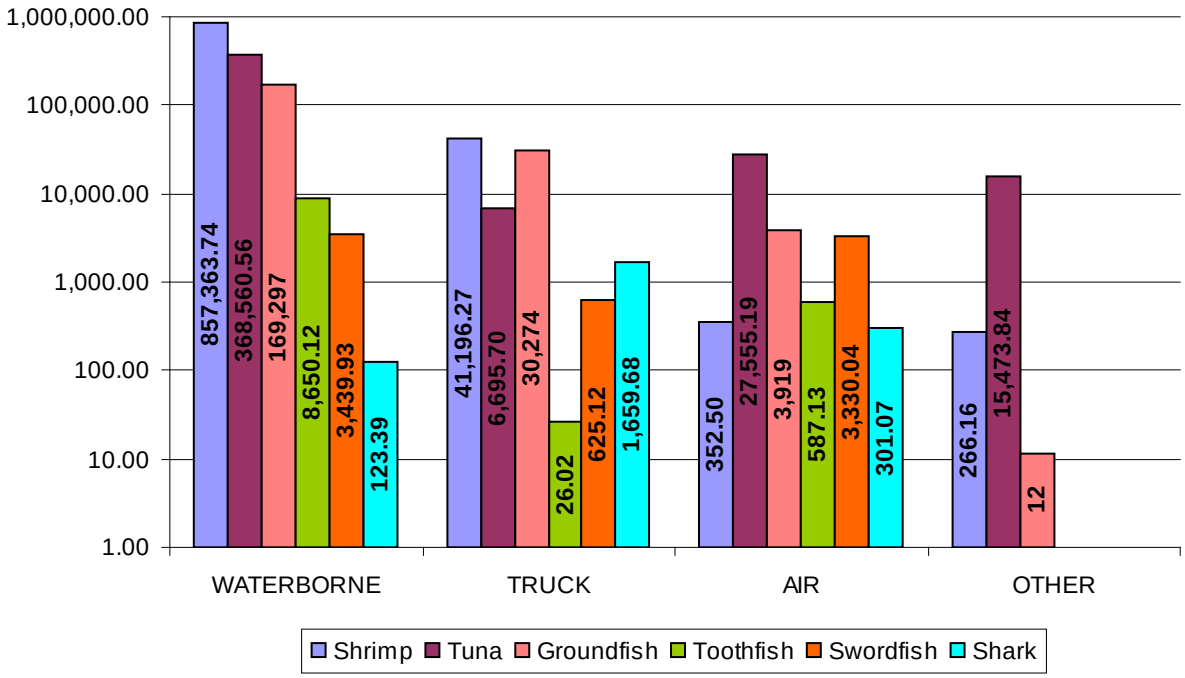
Figure 9. Seafood Import Transportation Mode by Percentage of Total Volume, 2006.



It is a much different story for the six species groups in this report, shown in Figure 10. Based on 2006 import data, the vast majority of these products, 92.7% by volume, is coming into this country via the waterborne mode followed by the truck mode at 3.8%, the air mode at 2.4%, and finally the "other modes" at 1.2%. The waterborne mode is dominated by shrimp imports at 857,364 metric tons followed by tuna at 368,561 metric tons, made up mostly of canned tuna. The higher valued product is coming to this country via air or truck modes due to the relative speed of transport for these modes when compared to waterborne transport. Taking tuna as an example, the average price of all tuna products in 2006 by mode are as follows: $6.89/kg via air, $4.86/kg via truck, and $3.13/kg via waterborne transportation. Shrimp imports tell a similar story with the average price by mode as follows: $10.25/kg via air, $8.54/kg via truck, and $4.37/kg via waterborne transportation. Groundfish prices by mode follow the same pattern; $3.48/kg via waterborne, $4.00/kg via truck, and $8.28 via air.

For swordfish, this pattern begins to break down with the average price for all swordfish products as follows: $7.91/kg via waterborne, $5.69/kg via truck, and $7.55/kg via air. Shark imports, in contrast to other species, follow the reverse pattern with the highest value product shipped in the waterborne mode. Shark product price by mode are as follows: $12.06/kg via waterborne, $2.68/kg via truck, and $8.33/kg via air. This pattern is driven by dried shark fins, a high value but non-perishable product well suited for the waterborne mode. Toothfish, a high value perishable product also follows this reverse pattern with the following prices by mode: $16.36/kg via waterborne, $1.92/kg via truck, and $14.34/kg via air.

Figure 10. Volume by Transportation Mode Across the Six Species Group, 2006.



Within waterborne transportation, there are two transportation options; container ships and general cargo vessels. The bulk of the seafood traffic into the United States is in the containerized mode with 99.5% by volume. The remaining 0.5% is transported in the general cargo mode. Over 16 million containers arrive in US ports each year, with 25% of all imports and 17% of all exports using containers (CBO, 2006). When ranked by value, fish and crustaceans rank 18th in containerized imported product value across all products imported through the containerized mode.

Port activity generates economic activity across many sectors including surface transportation, maritime services, cargo handling, federal/state/local governments, port authorities, importers/consignees, and the banking and insurance sectors. Maritime services include pilots, chandlers (food and other supplies), towing, bunkering (fuel), marine surveyors, and shipyard/marine construction. Cargo handling services include longshoremen, stevedoring, terminal operators, warehouse operators, and container leasing and repair.

While seafood is an important product in containerized imports when ranked by value, the volume of seafood on any one container ship is relatively low. According to the U.S. Maritime Administration (MARAD), which publishes annual volume estimates, the average volume of imports brought in during a port call in 2005 was 44,590 metric tons (MARAD 2007). Using the 2006 CBP data, the average volume of seafood per container ship call was 61 metric tons, or 0.14% seafood by volume for each port call. The minimum amount of seafood brought in on a container ship in 2006 was one kg and the maximum was 7,308 metric tons. Each containerized call hauls 5.9 different seafood products on average to slightly over two importers.

Table 8. Shipping Statistics for Waterborne Modes, 2006.

Statistic	Container Ship		Non-Container Ship	
Average Capacity per Call	44,590.37	mt	25,101.33	mt
Total Seafood Import Volume, Product Weight	2,486,624.48	mt	13,611.05	mt
Average Seafood Volume per Call	60.92	mt	36.87	mt
Average Seafood Value per Call	$308,065		$133,948	
Percent Seafood Volume per Call	0.14%		0.15%	
Products per Call	5.86		1.91	
Importers per Call	2.06		1.03	

Non-containerized cargo shipping is a much smaller industry than containerized transport. MARAD estimates that the average annual volume of imports brought into the United States in this mode were 25,101 metric tons per call in 2005 (MARAD 2007). Using the 2006 CBP data, the average volume of seafood per non-container ship call was 37 metric tons, or 0.15% seafood by volume for each port call. The minimum amount of seafood brought in on a non-container ship in 2006 was one kg and the maximum was 455 metric tons. Additionally, each general cargo vessel hauls 1.9 different seafood products on average to slightly over one importer. Complicating matters for this rule, product on container vessels originate from multiple countries.

Table 9 looks at the types of fisheries products imported in each of the two waterborne modes. The non-container mode is dominated by groundfish. Within this category, it is mainly product imported from Canada and Asia into Massachusetts, Alaska, and Seattle. The second most important species for the non-containerized mode is albacore tuna coming into Oregon from Canada. By far the single most important species in containerized shipping is shrimp with 859,960 metric tons in 2007. Shrimp is followed by All Other Fish, tuna and then groundfish.

Table 9. Volume, Value and Number of shipments of Species Groupings by Waterborne Importation Mode, 2006.

Species Group	Waterborne Mode	Number of Shipments	Metric Tons	Dollars
All Other Fish	NON-CONTAINER	633	5,453	$22,114,679
Groundfish	NON-CONTAINER	84	6,094	$20,276,639
Shark	NON-CONTAINER	2	18	$24,144
Shrimp	NON-CONTAINER	26	179	$1,126,731
Swordfish	NON-CONTAINER	4	14	$68,582
Tuna	NON-CONTAINER	34	409	$913,710
All Other Fish	CONTAINER	92005	793,056	$3,839,895,117
Groundfish	CONTAINER	10797	170,240	$684,196,272
Shark	CONTAINER	37	108	$1,460,401
Shrimp	CONTAINER	67837	859,960	$3,765,872,942
Swordfish	CONTAINER	370	3,458	$24,648,135
Toothfish	CONTAINER	464	8,773	$143,710,339
Tuna	CONTAINER	21438	387,201	$1,194,916,280

Unfortunately, the CBP data does not contain the flag of the vessels carrying these seafood imports. The CBP data does have the vessel names; however vessel names are not spelled consistently and therefore cannot be merged with other vessel databases. Table 10 lists the top 20 container flag states delivering imports to the United States (MARAD 2007). Panama leads the list, closely followed by Liberia. Table 11 lists the top 20 non-container flag states delivering imports to the United States. Panama also leads the non-containerized list also followed by China. Worldwide, the non-container fleet has far more flag states than the container fleet.

Table 10. Top 20 Container Flag States, 2006.

Flag of Registry	Number	Deadweight	TEU's	% by Number
Panama	588	25,324,473	1,860,833	18.60%
Liberia	537	22,974,787	1,739,966	16.98%
Germany	239	10,985,892	833,716	7.56%
Antigua & Barbadoes	233	4,919,372	372,653	7.37%
Singapore	194	5,455,688	381,804	6.14%
Cyprus	148	4,431,319	329,684	4.68%
Marshall Is.	148	4,890,448	376,358	4.68%
Hong Kong	112	5,168,320	392,092	3.54%
United Kingdom	112	5,105,053	396,702	3.54%
China P.R.	89	3,374,454	242,756	2.81%
Danish Int'l	77	5,723,825	408,198	2.44%
Bahamas	70	2,560,909	180,559	2.21%
United States	70	2,922,463	214,789	2.21%
Malta	49	1,316,427	86,968	1.55%
Greece	47	2,755,085	206,993	1.49%
South Korea	37	1,150,186	80,594	1.17%
Netherlands	32	1,353,138	99,537	1.01%
Taiwan	31	876,919	58,567	0.98%
Malaysia	28	755,362	51,545	0.89%
Italy	27	1,017,428	74,655	0.85%
All Others	294	9,400,862	673,284	9.30%

Table 11. Top 20 General Cargo Flags, 2006.

Flag of Registry	Number	Deadweight	% by number
Panama	253	3,724,322	16.66%
China P.R.	206	3,235,893	13.56%
St. Vincent & Grenadines	86	1,835,625	5.66%
Cyprus	75	1,323,717	4.94%
Liberia	73	1,117,662	4.81%
Bahamas	71	1,025,010	4.67%
Malta	65	1,056,839	4.28%
Netherlands	64	944,334	4.21%
Hong Kong	49	983,180	3.23%
Antigua & B.	41	577,059	2.70%
Marshall Is.	37	999,800	2.44%
Thailand	29	512,250	1.91%
Iran	27	566,486	1.78%

North Korea	25	376,589	1.65%
Singapore	23	464,092	1.51%
Philippines	21	415,386	1.38%
Vietnam	21	288,511	1.38%
Belize	19	292,168	1.25%
Russia	19	348,671	1.25%
Bangladesh	17	247,060	1.12%
All Others	297	4,439,599	19.55%

Table 12 details the revenue profiles and economic impacts per metric ton of cargo for container and non-container modes and their respective totals for an average container and non-containership calls as derived from the MARAD Port Kit (MARAD 2000). A number of other port impacts studies were examined, as detailed in "Economic Analysis of International Fishery Trade Measures" (Gentner 2008), but the MARAD estimates provide the best picture for both container and non-containerized imports. The model estimates were inflated using the consumer price index to 2006 dollars and converted to metric tons. The Port Kit shows that there are revenue and economic impact differences between containerized and non-containerized port calls. The MARAD Port Kit estimates will be used in the remainder of this report.

Table 12. Estimates of Revenue, Value Added, and Employment per Metric Ton for Container and Non-Container Transport Modes.

MARAD Port Kit	Value per Metric Ton	Total per Call
Containerized Mode		
Revenue	$78.37	$3,494,684
Output	$269.74	$12,027,864
Employment	0.002313	103
Income	$81.71	$3,643,335
Non-Containerized Mode		
Revenue	$87.18	$2,188,432
Output	$326.82	$8,203,500
Employment	0.003256	82
Income	$106.82	$2,681,375

Table 13 contains estimates of purse seine and longline fishing vessel expenditures and the economic impact of those expenditures. This information was taken from Hamnett and Pintz (1996). Hamnett and Pintz recognize that the surveys used to develop these expenditure profiles were taken during a period in the early 1990s when both the Guam transshipment industry and the American Samoan canneries were undergoing significant changes. These expenditure profiles were used to give an idea of the types of impacts that could be expected if fishing vessels from foreign nations (identified for having vessels engaged in IUU fishing and/or PLMR bycatch) failed to receive a positive certification from the Secretary of Commerce and were denied port privileges or if there were prohibitions on the importation of fisheries products into the United States from other countries. Due to the variation in expenditures between the various data sources, they developed a maximum expenditure and a low expenditure, representing upper and lower bounds, respectively. After adjusting for inflation, these expenditure profiles compare favorably with newer estimates by Kleiber (2002). Kleiber's estimates per port call were $358,150 and $21,522 for purse seiners and longliners respectively, but were not broken down into

categories. Details regarding the use of Hamnett and Pintz (1996) to estimate current expenditures and impacts are detailed in "Economic Analysis of International Fishery Trade Measures" (Gentner 2008).

Table 13. Fishing Vessel Expenditures and Economic Impacts per Port Call in Guam and American Samoa.

Expenditure Category	Maximum			Low		
	Purse Seiners	Longliners	Total	Purse Seiners	Longliners	Total
American Samoa						
Ship Fuel	$281,851	$22,206	$304,057	$247,687	$22,206	$269,893
Crew Shore Leave Expenditures	$5,112	$5,964	$11,076	$5,112	$994	$6,106
Ship Provisioning	$6,390	$5,254	$11,644	$6,390	$3,834	$10,224
Miscellaneous	$6,106	$7,242	$13,348	$0	$0	$0
Salt/Ice Purchases	$12,780	$142	$12,922	$2,272	$142	$2,414
Port and Other Infrastructure Fees	$6,390	$0	$6,390	$1,136	$0	$1,136
Total	$318,629	$40,808	$359,437	$262,597	$27,176	$289,773
Output	$440,340	$57,219	$497,558	$349,622	$34,483	$384,105
Income	1.666	0.411	2.076	1.074	0.121	1.195
Employment	$65,377	$12,987	$78,364	$44,398	$4,981	$49,379
Guam						
Ship Fuel	$281,851	$22,206	$304,057	$247,687	$22,206	$269,893
Crew Shore Leave Expenditures	$23,146	$5,964	$29,110	$12,212	$4,118	$16,330
Ship Provisioning	$22,862	$3,976	$26,838	$8,520	$4,118	$12,638
Miscellaneous	$25,134	$0	$25,134	$568	$0	$568
Salt/Ice Purchases	$11,360	$994	$12,354	$852	$994	$1,846
Port and Other Infrastructure Fees	$5,680	$0	$5,680	$5,680	$0	$5,680
Total	$370,033	$33,140	$403,173	$275,519	$31,436	$306,955
Output	$513,070	$43,122	$556,192	$368,522	$40,738	$409,260
Income	2.551	0.236	2.787	1.332	0.200	1.531
Employment	$90,505	$7,774	$98,279	$50,952	$7,006	$57,957

There is very little information regarding export destination or carrier flag that is publicly available. Commercially, PIERS data do give this level of detail on exports; however that data source was not considered necessary for purposes of this analysis. If seafood exports on container vessels follow the pattern of imports using container vessels, any individual shipment will be a very low proportion of all other goods on the container ship.

3.4.6 Processors, Wholesalers, and Importers Cannery Processing

The United States was the first nation with a cannery, and for many years it was the largest tuna canning nation (Campling et al. 2007). Currently, however, there are only four canneries in the United States and only one in the continental United States (near Los Angeles, California). One cannery is in the territory of Puerto Rico and the other two are in the territory of American Samoa. Overall, U.S. canneries employ 6,000 full-time employees. Of that total, the Puerto Rica and California canneries together employ between 800-900 employees and the balance is employed in American Samoa. Bumble Bee, owned by the Canadian firm Connors Brothers Income Fund, owns both the cannery in California and the cannery in Puerto Rico. Connor Brothers owns several other fish and other meat canning firms thereby dominating the North American canned protein market. Bumble Bee is the U.S. leader in

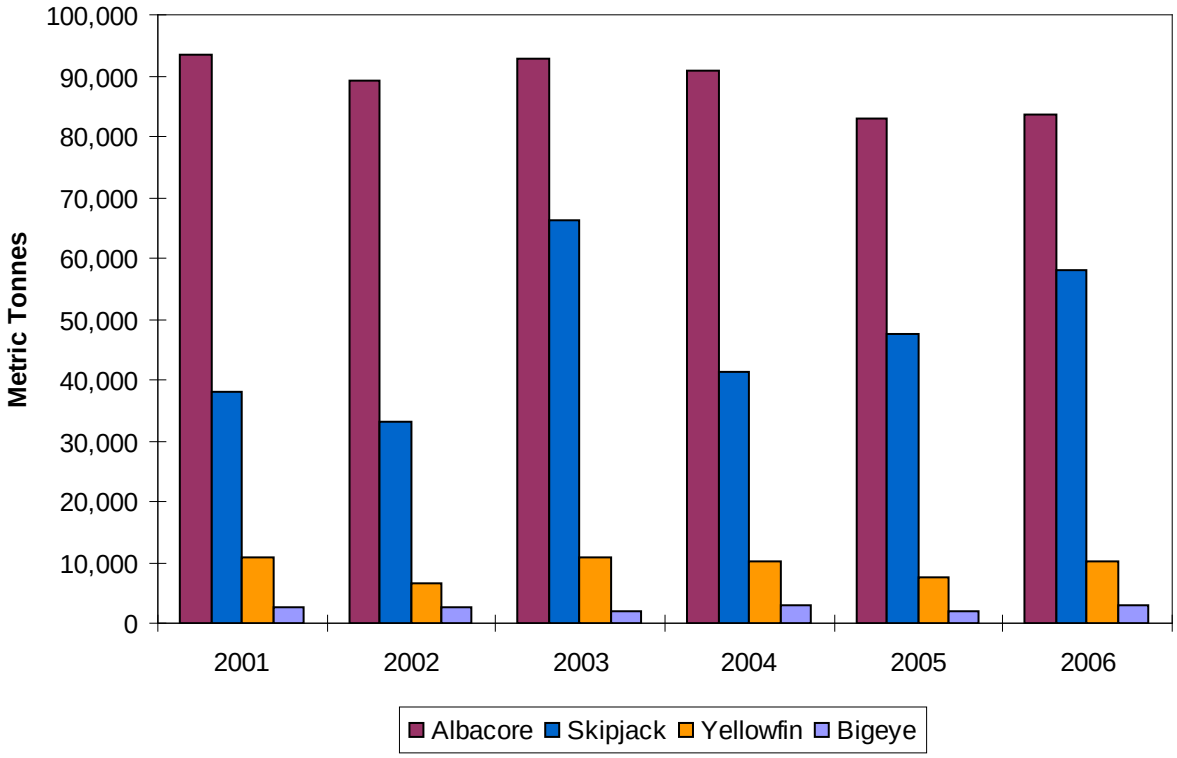
canned albacore and they also control 55-60% of the albacore consumed globally. The sales from these two plants topped $714 million in 2005. Both plants produce only canned tuna. The California plant has the annual capacity of 40,000 metric tons of loins and the Puerto Rico plant has the annual capacity of 20,000 metric tons of loins. Both facilities process only frozen loins and do not process whole fish.

In contrast, the canneries in American Samoa predominately process tuna in the round. The Starkist plant has the capacity to process 10,000 metric tons of loins but its main production capacity is in round tuna with 125,000 metric tons of capacity (Campling et al. 2007). The Starkist plant produces mostly traditional canned tuna but also produces pet food and some tuna in a foil pouch. Chicken of the Sea, the other AS cannery, has the capacity to process 20,000 metric tons of loins and 90,000 metric tons of round tuna. Chicken of the Sea produces primarily traditional canned tuna and pet food.

Due to confidentiality restrictions, the product imported by each of these facilities cannot be broken out by facility. Since Bumble Bee plants are within the jurisdiction of U.S. Customs, products imported into their facilities are captured in the Census data presented above as well as the cannery receipts. (Canneries do not report prices or value.)

Figure 11 details the volume of cannery deliveries by species. The majority of the landings and imports in every year are albacore. Albacore purchases by canneries have stayed relatively stable for the last five years. Skipjack purchases by canneries have fluctuated somewhat and have been on the rise in recent years. This is attributable to the fleets focusing on FADs when setting their purse seines. The FAD fishery captures mostly skipjack with yellowfin and bigeye bycatch (Campling et al. 2007). Yellowfin and bigeye purchases by canneries are small in comparison to either skipjack or albacore purchases.

Figure 11. Volume of Cannery Receipts by Species.



The origin of the tuna purchased for use in the canneries is shown in Table 14. The U.S. distant water fleet numbers were covered in Section 3.4.4. Taiwan is the largest supplier to the canneries, by far, with 31% of the volume. Vanuatu is the second largest supplier to the canneries, with 19% of the volume and New Zealand is the third largest supplier, providing 13%. For the cannery in California and the cannery in Puerto Rico, all of the tuna is frozen loined product being delivered via container ships. These two canneries use mostly albacore. The American Samoan canneries purchase mostly tuna in the round, although they have begun to purchase and utilize loins. More and more tuna is coming into American Samoa in container ships and other carrier vessels after being transshipped.

Table 14. Cannery Receipts 2006.

Year	Origin Country	Metric Tons
2006	TAIWAN	47,702
2006	VANUATU	29,930
2006	NEW ZEALAND	19,820
2006	CHINA	8,623
2006	REPUBLIC OF KOREA	8,545
2006	FIJI ISLANDS	5,871
2006	INDONESIA	3,390
2006	MARSHALL ISLANDS	3,172
2006	WESTERN SAMOA	2,314
2006	SPAIN	2,042
2006	FEDERATED STATES OF MICRONESIA	2,041
2006	BOLIVIA	1,930
2006	COOK ISLANDS	1,720

2006	GUYANA	1,652
2006	ST VINCENT	1,537
2006	REPUBLIC OF GEORGIA	1,525
2006	SOUTH AFRICA	1,515
2006	JAPAN	1,297
2006	PANAMA	1,224
2006	ECUADOR	1,203

American Samoa is not within the jurisdiction of U.S. Customs. Therefore, outside of the cannery receipts presented in Table 14, little is known about the transport mode or the flag of the carriers bringing product into American Samoa. In the past, most of the product was brought on fishing vessels, but with less reliance on the U.S. DWF, more and more of the product is coming in on carrier vessels. There were no data on these carrier vessels available for this analysis. American Samoa requires fish to be transshipped in port, so smaller carriers that transship at sea are not likely to be delivering product to American Samoa. American Samoa does have a container port, so it is likely that some of their inputs are coming in on container ships.

In Guam, the vast majority of product is minimally processed and sent to Japanese markets. There are essentially only two flag states landing fish in Guam: Taiwan and Japan. In 2006 Taiwanese fishing vessels made 147 port calls averaging 8.3 metric tons per call and Japanese boats made 392 calls averaging 13 metric tons per Guam call. No data were available regarding the value of these landings or the cost structure of the transshipping industry making impacts of a denial unknown. If either of these nations was identified as having vessels engaged in IUU fishing and/or PLMR bycatch, received a negative certification, and experienced the denial of port privileges, the economic impacts to Guam could be relatively large.

For American Samoa, the cannery receipt data are confidential and not subject to disclosure. Additionally, value is not reported by the canneries. In general, far more flag states made port calls at the canneries than in Guam with 36 flags delivering product to American Samoa in 2006, not including American Samoan or U.S. fishing vessels. Average annual off loadings of tuna per flag state was 2,895 metric tons across all port calls with an annual minimum of 22 metric tons and an annual maximum of 33,679 metric tons in 2006. The number of calls each flag state made is unknown so the average rate of volume per call is unknown. If one of the countries that export a relatively large amount of tuna to American Samoa were to be negatively certified, the impacts to the American Samoan economy could be large if adequate supply substitution possibilities did not exist.

Non-Cannery Processing

Overall, seafood processing plants in the United States process 2.6 billion metric tons annually and generate about $8.8 billion in revenue (Table 15). However, more and more processing is occurring overseas. It is projected that the market for value added products will grow and that much of this demand will be met by imports (Glitnir 2007). Value added products include ready to eat meals, breaded shrimp, and other items. Countervailing duties put in place for shrimp in January 2005 included only fresh shrimp and not breaded shrimp or other value added shrimp products. As a result, foreign producers have begun breading shrimp and otherwise adding value overseas and the United States has been importing more of these value added products. Breaded shrimp imports were up 12.9% in 2006 and could increase in 2007.

Table 15. Processing Activity by Species Group 2006.

Group	Firms	Metric Tons	Revenue	Average Annual Employment	Employment per Firm
All Other Fish	155	1,237,423	$4,109,097,714	9,321	60
Shark	18	848	$4,492,464	1,007	56
Shrimp	109	191,832	$1,352,565,642	8,156	75
Swordfish	55	1,919	$27,275,143	2,611	47
Toothfish	10	62	$1,463,514	228	23
Tuna	96	232,399	$819,198,076	9,632	100
Groundfish	41	684,231	$1,927,557,213	4,237	103
All Firms	931	2,604,776	$8,748,261,732	30,652	33

Table 16 details the number of processing and wholesaling plants and their employment in the United States by state for 2006, as taken from FUS (2006). These annual estimates are taken by the Bureau of Labor Statistics for NAICS sector 3117 (seafood processors) and 42446 (seafood wholesalers). According to these data, a majority of U.S. processing firms (99%) are small entities with less than 500 employees. The canneries in American Samoa that employ thousands of cannery workers are considered exceptions.

Table 16. Employment and Number of Plants in Processing and Wholesaling by State (FUS 2006).

States	Processing		Wholesale		Total	
	Plants	Employment	Plants	Employment	Plants	Employment
Alabama	41	2,008	20	276	61	2,284
Alaska	162	8,690	130	183	292	8,873
California	58	2,521	284	4,194	342	6,715
Connecticut	5	107	18	167	23	274
Delaware	(1)	(1)	(1)	(1)	(1)	(1)
District of Columbia	0	0	4	93	4	93
Florida	41	2,309	300	2,403	341	4,712
Georgia	8	560	30	412	38	972
Louisiana	74	1,932	126	661	200	2,593
Maine	37	823	175	897	212	1,720
Maryland	26	1,211	51	522	77	1,733
Massachusetts	59	2,440	187	2,309	246	4,749
Mississippi	33	3,510	32	104	65	3,614
New Hampshire	11	314	17	147	28	461
New Jersey	20	788	83	938	103	1,726
New York	21	445	257	1,896	278	2,341
North Carolina	31	827	68	670	99	1,497
Oregon	25	1,029	17	369	42	1,398
Pennsylvania	8	296	31	495	39	791
Rhode Island	10	265	33	183	43	448
South Carolina	(1)	(1)	16	116	16	116
Texas	26	1,525	77	825	103	2,350
Virginia	59	1,735	60	548	119	2,283
Washington	107	6,562	141	1,114	248	7,676
Inland States Total	69	3,910	208	2,435	277	6,345
Other Areas or States(2)	(1)	(1)	31	351	31	351

Total						
Grand Total	931	43,807	2,396	22,308	3,327	66,115

(1) Included with Inland States Total for confidentiality reason
(2) Includes American Samoa, Hawaii, and Puerto Rico

If there are three or less firms in a state, data cannot be reported to protect the confidentiality of proprietary information. Table 17 details the volume and value of seafood processed by state. Alaska processes the most seafood by weight and by volume. Alaska also has the most firms and the highest employment in processing. California processes the second most seafood by weight and value. California also has the second most employees working in processing with 3,628 employees and the most plants. While Florida and Alabama are tied for third in terms of the number of plants, they are much smaller plants in terms of the number of employees, volume, and value.

Table 17. Processing Plants Volume, and Value by State, 2006.

State	Metric Tons	Value (Dollars)
Alabama	18,540.4	$126,164,352
Alaska	986,816.1	$2,874,586,536
American Samoa	*	*
California	222,942.0	$951,556,297
Connecticut	*	*
Delaware	*	*
Florida	41,065.8	$307,018,595
Georgia	28,191.0	$170,699,612
Hawaii	4,408.9	$67,806,472
Louisiana	197,638.1	$383,395,352
Maine	13,507.8	$125,557,465
Maryland	17,360.2	$107,271,570
Massachusetts	151,953.8	$700,199,193
Minnesota	*	*
Mississippi	100,001.8	$321,389,685
New Hampshire	*	*
New Jersey	48,996.1	$109,253,076
New York	3,915.1	$39,291,661
North Carolina	5,705.3	$48,866,430
Oregon	33,726.4	$111,867,501
Pennsylvania	110,141.8	$144,902,788
Puerto Rico	*	*
Rhode Island	11,146.4	$65,302,587
South Carolina	*	*
Texas	37,072.7	$218,694,394
Virginia	92,562.3	$246,941,772
Washington	143,722.6	$537,617,733

*Confidential data.

For the purposes of this report, retail repackaging is not considered processing as most of this type of activity is handled directly by the retailer and involves very minimal trimming, cutting of whole fish for

the customer, and limited packaging of fish into smaller portions. There is no existing source of data that details how much of the import trade in seafood goes to retail repackaging versus more traditional processing. Instead, three methodologies were examined and details regarding those methodologies can be found in "Economic Analysis of International Fishery Trade Measures" (Gentner 2008). None of the methods examined included landings to the canneries in American Samoa. Currently, most of the product being landed in American Samoa is gutted whole tuna. However a small amount of tuna loins are being used and as labor prices rise in American Samoa, the canneries may look towards purchasing only loins as do the other U.S. canneries.

To be able to analyze changes in the import product flow through the processing sector, the percentages of imports processed domestically were applied to product weight imported in 2006 across the various species groups. Additionally, the data were used to estimate the employees needed per metric ton and the value generated per metric ton. These estimates were applied to the volume of imports processed in 2006, as shown in Table 18. . Tuna processing was the largest activity by volume and the number of jobs supported. However, shrimp was the most important by value.

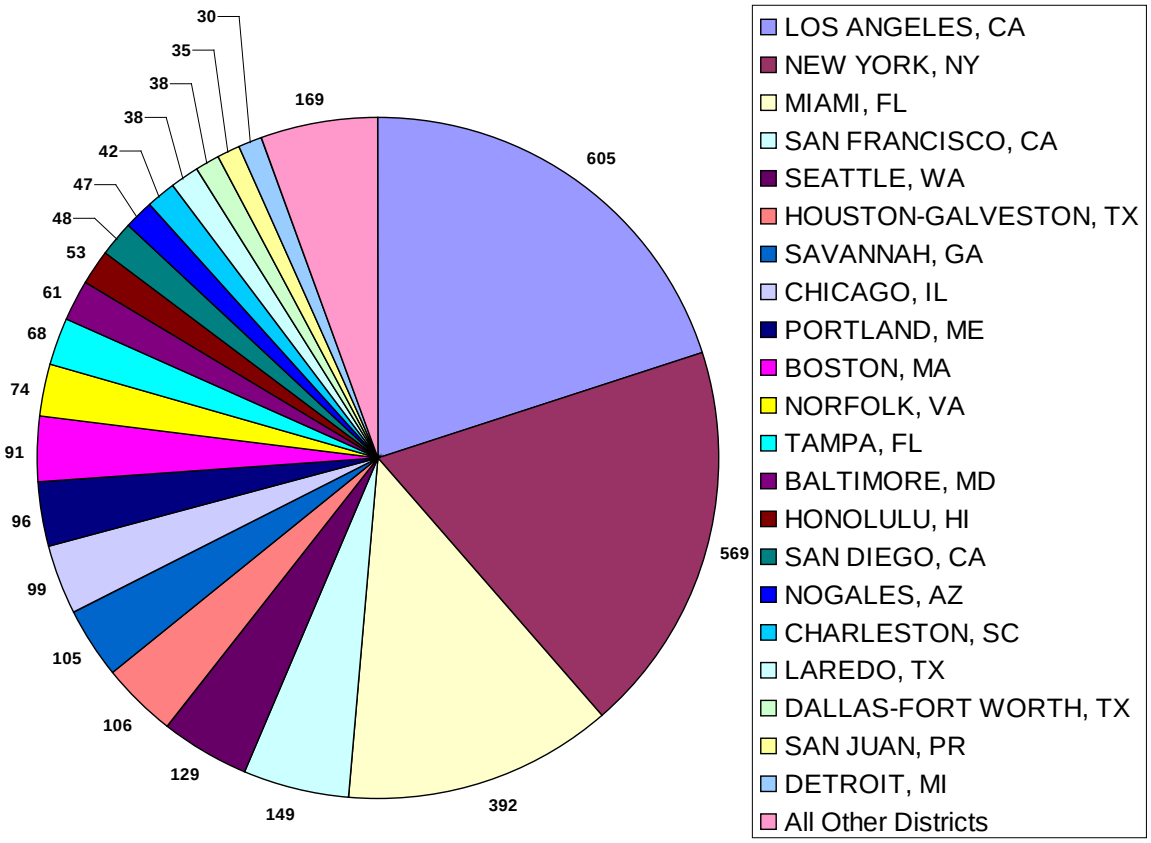
Table 18. Estimated Processing Volume, Value and Employment Supported by Imports in 2006.

Species Group	Percent Total Imports Processed Domestically	Metric Tons	Value (Dollars)	Employment Supported
Shark	15.83%	246	$1,302,830	292
Shrimp	26.27%	155,094	$1,093,531,437	6,594
Swordfish	14.60%	1,508	$21,441,920	2,053
Toothfish	0.54%	62	$1,463,514	228
Tuna	82.43%	227,376	$801,494,539	9,424
Groundfish	37.91%	75,902	$213,825,601	470
All Species	64.04%	1,601,272	$5,377,945,690	180,067

Wholesalers/Importers

In 2006 there were 1,628 importers in the United States importing the six species groups used in this report: shark, shrimp, swordfish, tuna, toothfish, and groundfish. Figure 12 shows how many importers there are by customs district. However, just because a product came in to a customs district, doesn't mean it is staying there. Since there is no mechanism to track imports from the ship to the consumer, customs district of entry is as spatially explicit as the data will allow.

Figure 12. Number of Importers by Customs District, 2006.



Importers provide warehousing and inventory management for retailers. In that respect, they are very similar to wholesalers that might deal with imports, exports, and/or domestic landings. There are 2,396 seafood wholesalers in the United States. Florida contains the most wholesalers with 300, followed by California with 284, and, in third is New York with 257. This corresponds with the data presented in Figure 12. There is no doubt that some importers are included in the number of firms listed in Table 9, however, some retailers import product directly into their own warehouses and those retailers would not be included in this table. There are no data for wholesalers comparable to the data used to produce Tables 8, 9, 10, and 11. As a result, it is not possible to use available data to ascertain how many wholesalers deal with imports. Similarly, the volume, value, and jobs supported by imports within the wholesale sector across these species groups cannot be ascertained based on available information.

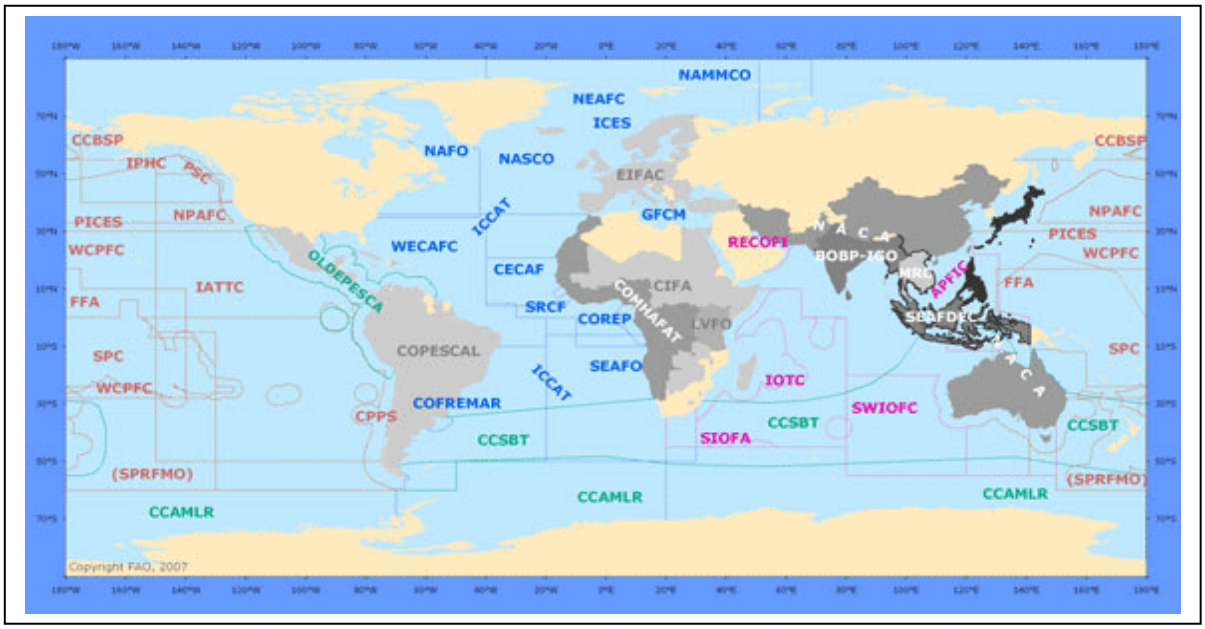
Using the average volume of seafood imports per containerized port call from Table 8 and applying the percent of species processed domestically from Table 18, 40 metric tons of containerized seafood are destined for additional processing and 21 metric tons are headed directly to retail. Similarly, for non-containerized port calls, 24 metric tons of non-containerized seafood imports are destined for additional processing and 12 metric tons are headed directly to retail. Each average port call represents 0.0024% or 0.0015% of all seafood imports for containerized and non-containerized cargo respectively. There is no existing data source that tracks retail purchase from the processor to the retailer. Additionally, there

is no existing data on retail seafood prices. As a result, it is impossible to calculate the impacts forward from a denied port call to processing, distribution, and wholesale of fish and fish products. Because such a small percentage of total imports are spread across multiple products, 5.86% and 1.91% for container and non-container port calls respectively, and multiple importers/processors, 2.06% and 1.03% for container and non-container port calls respectively, the change in product flow will be very small for the individual product/firm combination. As an example, the largest containerized shipment in 2006 weighed 7,308 metric tons, which still only represents 0.3% of all seafood imports. For non-containerized shipments, the largest seafood volume in 2006 was 0.018% of all imports. Therefore, unless port calls were denied for a relatively large number of vessels, businesses could simply source these relatively small amounts of product domestically or from other transportation modes such as air, truck, or rail. For consumers, such small changes in product flow are unlikely to change prices or availability. Therefore, no adverse impact is expected. Notably, these conclusions are based on average port calls and may over (or under) estimate the potential impacts if shipment is larger (or smaller) than average.

3.5 MANAGEMENT SETTING

International agreements concerning living marine resources of concern to NMFS are described in a 2008 report by the NMFS Office of International Affairs, the primary office responsible for implementing the certification procedures that are proposed and analyzed in this EA. The report is available at http://www.nmfs.noaa.gov/ia/docs/2008_International_Agreements.pdf. Analyses of agreements pertaining to marine mammals, sea turtles, sharks and IUU fishing are provided in memoranda to NOAA completed as background to this EA and included as Appendices B, C, D and E. A summary of the agreements to which the United States is party is available on the website of the NMFS Office of International Affairs at http://www.nmfs.noaa.gov/ia/intlagree/. The United States also holds consultations with a number of countries on a bilateral basis including Canada, Chile, China, European Union, Japan, Mexico, Russia, Taiwan and Vietnam and is a member of numerous RFMOs. The area of interest of these and other regional bodies are shown in Figure 13.

Figure 13. Jurisdiction of Regional Fishery Management Organizations. Source: FAO.



4.0 ENVIRONMENTAL IMPACTS

Below is an analysis of the environmental impacts of the action alternatives. A detailed cumulative impacts discussion has not been conducted because the proposed action has the effect of developing procedures that result in a certification process, rather than an action with a direct or indirect impact on the environment. Therefore, there is limited potential to incrementally contribute to cumulative impacts. The proposed action alternatives could, however, provide additional leverage to address IUU fishing and bycatch beyond what is available under existing authority.

4.0.1 Framework for Analysis of Impacts

Fishing around the globe has implications for the United States for many reasons, such as U.S. fishermen fish on the high seas, the United States shares fish stocks with other nations, fish targeted primarily within the U.S. EEZ may migrate out of it at times, U.S. fishermen compete with fleets of other nations that may not be bound by the same rules and standards, and fishing practices of vessels of other nations affect U.S. seafood markets and businesses. The United States is an importer, processor and consumer of seafood caught beyond our EEZ, and public concern about the sustainability of those products is widespread and growing. With regard to PLMRs, such as sea turtles, fleets from other nations are growing annually, and where these fleets fish without protective measures there is an increasing threat to these species. IUU fishing activity and PLMR bycatch undermine the ability of managers to maintain sustainable fisheries. In an effort to improve management domestically and around the world, the U.S. Congress passed the MSRA.

While policy makers and U.S. consumers are concerned generally about IUU fishing and PLMR bycatch, the law focuses on several specific aspects of these activities:

- fishing in violation of international agreements to which the United States is a party;
- overfishing or bycatch on the high seas or in international waters where no management agreement exists and where the United States shares the fish stocks or PLMRs;
- bycatch on high seas of PLMRs protected by international agreement to which the United States is a party; and
- fishing that harms seamounts, hydrothermal vents, cold water corals.

The certification procedures under MSRA result in a list of identified nations that are positively or negatively certified by the Secretary of Commerce. Fishing vessels of nations that do not receive a positive certification may be subject to the denial of port privileges and could be subject to Presidential action at the recommendation of the Secretary of Commerce. The certification procedures do not result in a specific sequence of ensuing actions affecting the human environment. However, in order to assist the public in understanding the potential actions and effects that might ensue, the analysis of proposed alternatives presented here examines the proposed certification procedures with respect to potential environmental and socio-economic effects in fisheries that meet specified criteria. This appropriately focuses the scope of the analysis to fisheries that are the subject of the MSRA and its certification procedures, though there may be additional IUU fishing or harmful bycatch of protected resources that are beyond this scope. The analysis does not examine fisheries that have bycatch or IUU activity within the

EEZ of the United States or the EEZ of another nation unless the bycatch activity affects a PLMR that is shared with the United States. The analysis does not examine IUU activity in areas under the jurisdiction of an agreement to which the United States is not a party, or in EEZs where the United States does not share a stock. To reach an understanding of PLMRs, fisheries, and areas the proposed alternatives would affect, what the speculative environmental consequences of the alternatives could be, and subsequently, how those effects would play out in U.S. markets, the analysis focuses in the following manner:

1. Eliminate examination of fisheries that occur entirely within the EEZs of other nations and do not affect stocks shared by the United States.

2. Eliminate examination of fisheries on high seas where there is no occurrence of fish stocks shared by United States.

3. Eliminate examination of fisheries in areas of RFMO or treaty jurisdiction where United States is not a party.

4. Eliminate examination of fisheries on high seas where no documented bycatch of PLMRs occurs or cannot be inferred because the gear has not been documented to have PLMR bycatch or there is no occurrence of PLMR species that are protected under United States or international treaty in the area of the fishery.

Of the fisheries that remain, the analysis examines a representative sample of fisheries that occur in regions where the United States has identified an interest (shared stock, party to RFMO, PLMR, bottom habitat features).

Since the proposed action is the establishment of procedures, this framework for the analysis appropriately makes no determination whether IUU fishing and/or PLMR bycatch is occurring in fisheries, flag nations, or regions, but rather establishes the process by which these fisheries, nations, or regions would be evaluated to determine if they meet the guidelines for the nexus of shared interest specified in the MSRA.

Using the FAO classification of epipelagic and deep-water species discussed above, one can examine species and fisheries that emerge as examples of the kind of fisheries that may be affected by the certification procedures called for in the MSRA. Table 19 provides a list of species the FAO has identified as epipelagic or deepwater and therefore likely to be caught on the high seas. Because these fisheries are exemplary only, the alternatives analysis that follows is qualitative, and suggestive of possible impacts that might result from the certification procedures, such as denial of port privileges and any possible prohibitions on imports of fish and fish products.

Table 19. Selected oceanic species likely to be caught on high seas. Source: FAO. Trends in oceanic captures.

Species	Fishery has had IUU reports	Fishery uses gear known to have bycatch	Fishery in jurisdiction of RFMO in which U.S. party	Fishery targets stock shared by U.S.	Fishery has bycatch of PLMR shared by U.S.
Billfish	X	X	X	x	x
Tuna	X	X	X	x	x
Sharks (epipelagic)		X	X	x	x
Squid	X	X	X	x	x
Cusk			X	x	
Blue whiting			X		
Ling			X	x	
Sablefish			X	x	
Grenadiers			X		
Redfish			X	x	
Toothfish	X		X		
Sharks (deepwater)		X	X	x	x
Royal red shrimp		X			

4.1 IUU CERTIFICATION PROCEDURE ALTERNATIVES ANALYSIS

4.1.1 Alternative I-1: No Action Alternative

NMFS would not develop any procedures to address certification of nations whose vessels are engaged, or have been engaged in IUU fishing activities. The no action alternative would leave in place existing procedures for the certification of nations fishing illegally or in a manner that undermines international agreements to which the United States is a party. The no action alternative would retain NOAA's authority to take action under the Lacey Act, the Pelly Amendment to the Fisherman's Protective Act and other statutes discussed above, as well as under international law. For example, contracting parties under the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) may restrict port access or impose unloading prohibitions on listed IUU vessels regardless of whether the fish or fish products being transported by the vessel were legally harvested. Under existing authority, the United States has been able to address IUU fishing to some extent. Examples of prior actions taken in fisheries of the type listed in Table 19 include notification of the potential to restrict port access to an IUU vessel identified by CCAMLR, seizure of a vessel engaged in large-scale driftnet fishing, and changes in documentation requirements for imports of bigeye tuna that were adopted by the International Commission for the Conservation of Atlantic Tunas (ICCAT). The United States has also used its authority under the Lacey Act to address IUU catches of tuna and imports of toothfish.

Failure to develop new procedures would not comply with 16 U.S.C. 1826j(d)(1), which states the Secretary of Commerce shall establish a certification procedure. If the United States fails to develop procedures for the certification of nations that are identified in the biennial report to Congress (called for in section 609(a) of the Moratorium Protection Act) as having vessels engaged in IUU fishing, it is anticipated that compliance in implementing and enforcing recommendations in the fleets of other nations will not improve over the current status. Unchecked IUU fishing not only harms managed fisheries populations, but it undermines the management regime itself. Should this scenario result, the effectiveness of international management regimes for shared resources such as tuna, billfish and toothfish might not be as effective as they could be with the addition of a U.S. role as envisioned and required in the MSRA. In the absence of strong regional management bodies whose recommendations are enforced by members, IUU fishing could reach unsustainable levels.

4.1.2 Alternative I-2

Under this alternative, the Secretary of Commerce would provide positive certification for a nation identified in the biennial report to Congress called for in Section 609(a) of the Moratorium Protection Act as having vessels engaged in IUU fishing activities, if the Secretary determines the nation has taken appropriate corrective action to address the activities for which it was identified. When making such a determination, the Secretary shall take into account whether such nation has taken corrective action against the offending vessels, **or** the relevant RFMO has implemented measures that are effective in ending the IUU fishing activities by vessels of the identified nation.

In order to make a positive certification under this alternative, the Secretary may use one of two possible approaches: a national approach or an RFMO approach. The Secretary could determine that a nation whose vessels have been engaged in IUU fishing has taken action against the offending vessels flagged to such nation, or the Secretary could determine that the relevant RFMO has implemented effective measures to address the relevant IUU fishing activity.

This alternative would provide additional leverage to address IUU fishing beyond what is available under existing authority. It would provide a means for the United States to address IUU fishing that may not be available under current bilateral agreements. The procedure provided in Alternative 2 would enable the United States to elicit information from the nation about corrective actions such as sanctions, fines and penalties, enhanced monitoring, control and surveillance and other measures flag states are expected to take against vessels engaged in IUU fishing. Adoption of this alternative could potentially result in improvements in existing or future fishery management procedures via improved catch reporting, better compliance with allowed catch levels and future adoption of other management measures that are aimed at stopping overfishing on shared stocks. Considering the types of fisheries likely to be examined in this certification procedure, the alternative has the potential to deter illegal catches of toothfish, reduce catches of juvenile swordfish, and minimize overfishing of bigeye, yellowfin and bluefin tuna—all species that are or have been subject to overfishing.

With regard to unreported fishing, this alternative has the potential to increase catch information on species such as toothfish, tuna and sharks. Unregulated fishing for oceanic species such as

tuna, flying squid and sharks could occur in the Eastern Central Pacific (Area 77) and no management system exists for deepwater species such as blue whiting, deep water sablefish, deep water sharks, lanternfish, lightfish or grenadiers in the North Pacific's Area 61. Little is known about many deepwater species, but they are generally long-lived and late to mature, making them vulnerable to unregulated fishing pressure. Many deepwater shark species have been assessed as vulnerable. Development of management measures or a regional management authority would contribute to conservation of species such as thresher, silky, finetooth, sandbar and other sharks (See Table 4 of Appendix D for a listing of sharks by FAO area).

If the Secretary of Commerce were to use the approach provided in Alternative 2, the procedure to determine whether to issue a positive certification could also rely on evidence from the RFMO. Under the RFMO approach, the factors under consideration could include whether the RFMO requires actions such as mandatory reporting; exchange of information on vessels engaged in or supporting IUU fishing; records of authorized and IUU vessels in the area of competence; methods of compiling and using trade information to monitor IUU fishing; a range of specified monitoring, control and surveillance measures; boarding and inspection regimes; observer programs; market-related measures to prevent, deter, and eliminate trade in IUU product; and education and public awareness programs. The element of "effectiveness" evaluates whether the RFMO's measures are sufficient to warrant a positive certification for a member nation whose vessels have been engaged in IUU fishing. This element remains flexible to allow for development of new approaches and types of measures that have not yet been designed.

The potential environmental benefits of using a certification procedure at the RFMO level are similar to those described in the national approach. In addition, the RFMO approach has the effect of improving performance on a wider scale by other members of the RFMO, not just the nation with the vessels engaged in IUU fishing. Increased reporting and compilation of information on vessels, catch, effort and trade assists managers at the regional level in improving conservation and management measures for the fishery as a whole in addition to improving compliance by individual vessels. Using toothfish as an example, implementation by CCAMLR member nations of a set of stringent reporting and inspection tactics has resulted in dramatic declines in the amount of IUU toothfish catches, which had risen to unsustainable levels and far outstripped legal catches. It is reasonable to expect that similar reductions in illegal catches would occur under RFMO regimes that included some or all of the same kinds of measures.

4.1.3 Alternative I-3

Under this alternative, the Secretary of Commerce would provide positive certification for a nation identified in the biennial report called for in Section 609(a) of the Moratorium Protection Act as having vessels that are engaged, or have been engaged, in IUU fishing activities, if such nation has taken corrective action against the offending vessels, **and** the relevant RFMO has implemented measures that are effective in ending the IUU fishing activities by vessels of the identified nation.

This alternative has the potential to be incrementally more beneficial than Alternative 2 because it combines the benefits of national and RFMO action. It combines the effectiveness of flag state action on the offending vessel with the regional scope of management organization actions throughout the fishery. The United States is a member of numerous RFMOs that keep lists of

IUU vessels, many of which are registered to nations that are not members of the RFMO. Alternative 3 would require the Secretary to assess both the measures taken by the flag state against its offending vessels and the measures the RFMO had in place to address IUU fishing, whether by members or non-members. In terms of consequences for the environment, this alternative has the potential to reduce unsustainable IUU fishing and contribute to the management of as yet unregulated fisheries on the high seas.

Table 20 shows the potential benefits to conservation and management of shared oceanic fish species by FAO areas where the United States shares high seas stocks. The species groupings combine individual listings of U.S. shared stocks shown in Table 3, above. Even though regional bodies exist in each of the areas, they do not deal with all the oceanic species, particularly deepwater species. In some cases, the relevant RFMO may not regulate catches of vulnerable species or take action for illegal or unreported catches. The incremental difference between Alternative 2 and Alternative 3 can be seen where there is an entry for implementing management for unregulated stocks. In the case of these species or stocks, Alternative 3 would potentially provide more opportunity to institute management than would Alternative 2. The species that would receive the most incremental benefit under Alternative 3 include sharks and unregulated deepwater species such as sauries, lanternfish, grenadiers and some species of hake. Tuna and billfish species of interest to the United States fall under the auspices of an RFMO with management measures and IUU provisions, so the improvement in conservation measures for those stocks could be in addressing illegal fishing (exceeding TACs, violating size limits, closures, etc.) and in improving catch reporting.

Table 20. Examples of potential environmental benefits under Alternatives I-2 and I-3.

Species	**Area 21 (NAFO, ICCAT)**	**Area 31 (WECAFC, ICCAT)**	**Area 61 (CCBSP, NPAFC)**	**Area 67 (CCBSP, NPAFC, IPHC)**	**Area 77 (IATTC)**
Billfish	IO, RO	IO, RO	N/A	N/A	IO, RO
Tuna	IO, RO	IO, RO	N/A	N/A	IO, RO
Sharks (epipelagic)	IO, RO, MO	IO, RO, MO	MO	MO	IO, RO
Squid	RO	RO	MO	MO	MO
Hakes	IO, RO	MO	N/A	IO, RO	MO
Ling	N/A	N/A	MO	IO, RO, MO	N/A
Sablefish	N/A	N/A	MO	IO, RO, MO	N/A
Grenadiers, lantern	MO	MO	MO	MO	MO
Salmon	IO, RO	N/A	IO, RO	IO, RO	N/A
Sharks (deepwater)	IO, RO, MO	MO	MO	MO	IO, RO

Key: address illegal catches of overfished stocks (IO), improve reporting for overfished or vulnerable stocks (RO), implement management for unregulated stocks (MO).

4.2 BYCATCH CERTIFICATION PROCEDURE ALTERNATIVES ANALYSIS

4.2.1 Alternative B-1: No Action

Marine Mammals

Under the Status Quo—No Action Alternative, there would be no substantial change in the potential for the U.S. to exert additional influence in the reduction of bycatch of marine mammals. With the exception of the International Dolphin Conservation Program administered by the IATTC in the ETP, no other RFMO has adopted marine mammal bycatch limits or has implemented an observer program to document the frequency of marine mammal bycatch in international waters. Under this alternative, the Secretary will continue to certify nations under the IDCPA.

Sea Turtles

Similarly, the U.S. influence on the bycatch reduction measures for sea turtles would remain relatively unchanged. The State Department and NMFS will continue to implement Public Law 101-162. NMFS and the Department of State will continue to inform nations about the new larger TED opening requirements. NMFS and Department of State representatives will continue to implement the International Bycatch Reduction Task Force's Plan of Action to: (1) implement the strategy to promote international agreements that reduce sea turtle bycatch in foreign longline fisheries, and (2) promote the implementation of the Food and Agriculture Organization (FAO) International Plan of Action (IPOA) for Reducing Incidental Catch of Seabirds in Longline Fisheries and the FAO IPOA for the Conservation and Management of Sharks. NMFS would likely continue to support research to develop measures to reduce the incidental take, mortality, and serious injury of sea turtles in pelagic longline fisheries. NMFS would work cooperatively with other nations (including through establishment of international agreements) to share the results of gear research and to advance the adoption of technology and fishing practices that will reduce global sea turtle longline interactions.

NMFS will continue to provide information to longlining nations on the results of gear experiments that have been conducted with the U.S. fleet; disseminate educational and outreach materials that have been translated into multiple languages; conduct training workshops on safe handling and release practices; provide technical guidance and circle hooks for the development of research programs; and coordinate on longline gear experiments. NMFS will continue to partner with the Department of State's Bureau of Oceans, Environment and Science (OES) to develop and support scientific, technological, and environmental initiatives in longlining nations to expand the capacity of these nations to reduce bycatch of sea turtles in longline and trawl fisheries.

NMFS would continue to assist in the planning and/or execution of international and domestic workshops focusing on technology transfer and outreach relating to reduction of sea turtle bycatch in longline fisheries. These workshops should continue to focus on transfer of circle hook and bait technology to Latin American, Asian, and other countries that have longline fleets that interact with sea turtles. NMFS should continue to engage with Japan on Japanese-style

tuna hook experiments.

The Inter-American Convention for the Protection and Conservation of Sea Turtles in the Western Hemisphere, which entered into force in May 2001, establishes a comprehensive framework for international protection of sea turtles and their habitats, including specific provisions relating to the interaction of sea turtles in commercial fisheries. The conference of the Parties has already passed a resolution encouraging Parties to implement bycatch mitigation techniques outlined in the FAO guidelines to reduce sea turtle fisheries bycatch. The United States will continue to work with the other Parties to establish the framework, including a permanent Secretariat, for the Parties to carry out their Convention obligations.

Sharks

Shark finning is the practice of taking a shark, removing the fin or fins from it, and returning the remainder of the shark to the sea. The Shark Finning Prohibition Act of 2000 prohibited the practice of shark finning for any person under U.S. jurisdiction. The Act requires NMFS to promulgate regulations to implement the prohibitions of the Act, initiate discussion with other nations to develop international agreements on shark finning and data collection, and establish research programs.

Under this Alternative, NMFS would continue to implement this law and to track the importation and exportation of shark fins. NMFS would continue its bilateral discussions pertaining to the implementation of the Shark Finning Prohibition Act with Canada, Chile, the European Union, Japan, Morocco, Taiwan, and Russia. Emphasis of these bilateral discussions has been on the collection and exchange of information, including requests for data such as shark and shark fin landings, transshipping activities, and the value of trade. In addition, the United States continues to encourage other countries to implement the FAO International Plan of Action for the Conservation and Management of Sharks, by finalizing their own national plans of action. Additionally, the U.S. Government will continue to work within regional fishery management bodies to facilitate shark research, monitoring, and management initiatives, as appropriate. Possible avenues for the development of international initiatives supporting the conservation of sharks include a number of regional fishery management organizations.

In 2005, the import and export of shark fins continued. During 2005, imports of shark fins were entered through the following U.S. Customs and Border Protection districts: Los Angeles, New York City, San Francisco, Savannah, and Miami. In 2005, countries of origin in order of importance based on quantity were Philippines, Hong Kong, Brazil, Panama, Indonesia, Nicaragua, Australia, China, and Guatemala (See Table 10a of Appendix D). It should be noted that, due to the complexity of the shark fin trade, fins are not necessarily produced close to or even in the same country as those from which they are exported.

The vast majority of shark fins exported in 2005 were sent from the United States to Hong Kong, Denmark, China, and Canada, and small amounts were sent to Mexico and Portugal (Table 10b of Appendix D). The mean value per kilogram (kg) has been increasing since 2002, most notably in the Hong Kong market. Using data from Table 10a, mean values of dried shark fins for all countries combined increased from approximately $28/kg in 2002 to approximately $84/kg in 2003, down to $52/kg in 2004 and back up to $59/kg in 2005. Hong Kong's

significantly higher dollar value to quantity, as compared to shark fin trade with other countries, is associated with the higher quality demanded in Hong Kong's inelastic market, and historically high consumption patterns based on ethnic food consumption patterns.

Finally, under this alternative, NMFS would continue to undertake research to reduce shark bycatch including:

- Test the use of chemical deterrents to reduce shark bycatch;
- Explore the operational differences in the longline fishery that might reduce shark bycatch;
- Explore the efficacy of an experimental deep setting longline technique, which eliminates shallow hooks, to reduce epipelagic bycatch and maximize the catch of target species such as bigeye tuna; and
- Examine alternative measures (such as reduced soak time, restrictions on gear length, and fishing depth restrictions) in the shark bottom longline fishery to reduce mortality on prohibited sharks.

4.2.2 Alternative B-2

Marine Mammals

With the exception of the IATTC, documentation of marine mammal bycatch in high seas fisheries is lacking and bycatch mortality limits are virtually non-existent. The IATTC's Agreement on the International Dolphin Conservation Program (AIDCP) includes among its purposes to seek ecologically sound means of capturing large yellowfin tunas not in association with dolphin; and to progressively reduce the incidental dolphin mortalities in the tuna fishery of the eastern Pacific Ocean to levels approaching zero. The Agreement applies to dolphins (family *Delphinidae*) associated with the yellowfin tuna fishery in the ETP—the principal species concerned are spotted and, to a lesser extent, common and spinner dolphins, although other species, including striped and bottlenose dolphins, are also relevant. A system of dolphin mortality limits (DMLs) is the principal means by which dolphin mortality is reduced under the agreement. These work by setting a basic objective of limiting total incidental dolphin mortality in the purse seine tuna fishery to no more than 5,000 individuals annually and using the basic approach of allocating DMLs to vessels. The Agreement establishes per-stock per-year dolphin mortality caps with the objective of achieving a limit of 0.1 percent of the minimum estimated abundance of stocks (Nmin) from the year 2001 onwards (an objective which was achieved). The Agreement contains various provisions which require parties to manage their DMLs in a responsible manner and provides for the reallocation of DMLs that have either not been used or have been forfeited during a particular year because of irresponsible use. In addition to the DML system, the Agreement includes provisions for the establishment of a system for the tracking and verification of tuna harvested with and without mortality or serious injury of dolphins; the exchange of scientific research data collected by the parties pursuant to the Agreement; and the conduct of research for the purpose of seeking ecologically sound means of capturing large yellowfin tuna not in association with dolphins.

It is anticipated that Alternative B-2 would result in no change to the conservation measures of

this Agreement. The basis for judging whether a nation's regulatory program for implementation of the AIDCP is comparable to that of the US should be whether a nation has an affirmative finding. The affirmative finding process requires that the harvesting nation meet several conditions related to compliance with the AIDCP and the requirement and process are set forth in 50 CFR 216.24(f) and summarized below:

The Assistant Administrator determines whether to make an affirmative finding based upon documentary evidence provided by the government of the harvesting nation or by the IDCP and the IATTC. To make an affirmative finding, the Assistant Administrator must find that:
(A) The harvesting nation participates in the IDCP and is either a member of the IATTC or has initiated all steps required of applicant nations to become a member of the IATTC;
(B) The nation is meeting its obligations under the IDCP and its obligations of membership in the IATTC, including all financial obligations;
(C) The nation did not exceed its annual total dolphin mortality allocation;
(D) The nation did not exceed and prevented its fishery from exceeding the per-stock per-year individual stock quotas.

Implementation of Alternative B-2 in the ETP tuna fisheries could result in nations that have vessels engaged in marine mammal bycatch failing to receive a positive certification under the B-2 option from the Secretary of Commerce unless such nations can demonstrate adoption of a regulatory program for the affected marine mammal that is comparable in effectiveness with that of the United States, taking into account different conditions, and establish a management plan that will assist in species-specific data collection to support international stock assessments and conservation enforcement efforts for the PLMR. The vessels of such nation could be subject to the denial of port privileges unless the vessel is not engaged in IUU fishing.

The potential imposition of these measures could motivate such nations with vessels engaged in PLMR bycatch to implement better documentation of marine mammal bycatch in longline fisheries and improve compliance with the AIDCP, among other actions. The requirements for establishment of a management plan could lead to nations to develop FAO plans of action for marine mammals and could, for example, help the United States initiate and conduct marine mammal stock assessment research on stocks shared with other nations.

In other areas such as the Western Pacific and the Atlantic Ocean, especially off the coast of Africa, implementation of Alternative 2 could potentially result in programs to better document and monitor marine mammal/fisheries interactions. Again, it could result in identified nations developing management plans, possibly in the form of FAO plans of action to assess marine mammal population status and document marine mammal bycatch.

Sea Turtles

In addition to those activities already undertaken under Alternative 1, implementation of Alternative 2 could bolster those efforts and help motivate nations with PLMR bycatch to increase their regulatory oversight. Under Alternative 2, in order to receive a positive certification from the Secretary of Commerce, nations identified for having vessels engaged in sea turtle bycatch would be required to provide documentary evidence of a regulatory program

that implements TED requirements for shrimp trawl fisheries and the bycatch reduction requirements for purse seine fisheries targeting tuna and tuna-like species. Although the TED inspections and the actual implementation of Public Law 101-162 would remain relatively unchanged, pairing these existing requirements with these new procedures could result in greater oversight of and compliance by nations that incidentally drown sea turtles in trawl and purse seine fisheries.

Under Alternative 2, nations identified for having vessels engaged in sea turtle bycatch would be required to develop and implement a management plan for the conservation of sea turtles to receive a positive certification from the Secretary of Commerce. The development and execution of such an action plan could greatly benefit sea turtles through the combination of population assessments, documentation and mitigation of bycatch, and increased habitat protection. The bycatch information collected as part of an action plan would also assist nations in meeting the data collection and sharing requirements of the various sea turtle resolutions within the various RFMOs. The plan of action could provide the United States with a basis upon which to pursue joint research, technology transfers, and gear exchange or grant programs. All in all, Alternative 2 has the potential to reinforce and encourage the continuance of existing outreach and bycatch reduction efforts, and broaden the scope of the regulatory, research, and monitoring programs to meet the comparability standard set forth in the Moratorium Protection Act.

Sharks

Implementation of Alternative B-2 would require that each nation identified for having vessels engaged in the bycatch of sharks provide documentary evidence that it has adopted regulations to implement the prohibition on shark finning in order to receive a positive certification from the Secretary of Commerce. Implementation of Alternative 2 would require each nation that seeks a positive certification to establish and implement a management plan for the conservation and management of sharks. With regard to bycatch, the requirements of these resolutions to document bycatch, encourage the release of live sharks, and conduct research into the development of more selective gear provide the United States with a mechanism to work with nations to document and mitigate shark bycatch.

Alternative B-2 would be expected to increase the ability of the U.S. to influence global conservation for sharks. Through the certification procedures, the United States would call on identified nations that seek to import product into the United States to implement regulations to prohibit shark finning. The alternative would provide greater impetus for nations to finalize management plans, collect species-specific information, participate in stock assessments, and conduct research to reduce bycatch.

4.2.3 Alternative B-3

Under the implementation of Alternative 3, in order to receive positive certification, identified nations must provide documentary evidence of the adoption of a regulatory program, by the identified nation **and** the relevant international organization for the conservation and protection of the PLMRs or the international/regional fishery organization (and proof of the identified nation's participation with such organization) governing the conservation of the PLMRs that is comparable with that of the United States, taking into account different conditions, and establish

a management plan that will assist in species-specific data collection to support international stock assessments and conservation efforts, including but not limited to enforcement efforts for PLMRs. This alternative could strengthen the provisions, oversight, and compliance of bycatch reduction measures and management plans that are developed under Alternative 2. Specifically, this alternative requires that, to receive positive certification, the relevant RFMO provide documentary evidence that the nation has indeed adopted a regulatory program to reduce the bycatch of sea turtles, marine mammals, and sharks. Requiring that the RFMO provides this information for an identified nation to receive a positive certification should bring about greater oversight from the RFMO and would encourage nations and RFMOs to act collectively to reduce bycatch. Bycatch reduction measures that are adopted at the level of an RFMO would be expected to result in greater conservation of these highly migratory PLMRs, thereby increasing the influence of the U.S. in extending bycatch reduction to high seas fisheries and involving more nations in bycatch reduction efforts. Also, it is the RFMO that often has the observer programs that provide the level of monitoring necessary to both document bycatch and also to enforce bycatch reduction provisions that have been adopted through the RFMO. Finally, the RFMO structure would benefit greatly from management plans that are both coordinated with and support the efforts of the RFMO to collect stock assessment data for PLMRs. Alternative B-3 would encourage nations to collaborate both with the RFMO and other nations to conduct stock assessments and document bycatch levels in ways that will lead to greater cooperation.

5.0 SOCIOECONOMIC IMPACTS

This section addresses background and general information on the economic and socioeconomic considerations associated with IUU fishing and bycatch of PLMRs. The background discussion in Sections 5.0 through 5.4 provides a broad economic context. Similar to the broad overview of the affected environment provided in Chapter 3, it is not expected that this proposed rulemaking itself affects all of the economic factors presented in this section, rather an extensive background discussion is provided to assist with the context for how the proposed certification tools might contribute to the overarching effort to reduce IUU fishing and PLMR bycatch. Therefore, following the background discussions in section 5.0 through 5.4, the analysis of the socioeconomic impacts associated with the proposed alternatives for IUU fishing and bycatch reduction are more specifically addressed in sections 5.5 and 5.6, respectively.

As noted earlier, this analysis does not focus on trade sanctions, but does provide an analysis regarding potential denial of port privileges. Although the Secretary of Treasury has authority to deny port privileges under the Enforcement Act, NMFS chose to evaluate these impacts. The Enforcement Act states that denial of port privileges will be imposed upon failure of an identified nation to receive a positive certification from the Secretary of Commerce. In contrast, trade sanctions may only be applied if Presidential action is taken in response to recommendations by the Secretary of Commerce once an identified nation fails to receive a positive certification.

Because the process leading to certification determinations is consultative and will take several years, it is very difficult and may not be meaningful to estimate the benefits and costs of such determinations. The following analysis consists of a bounded analysis showing the highest potential impact of port privilege denial but recognizing that, due to the consultative nature of the process, actual impacts are expected to be much lower or non-existent. U.S. businesses are not being regulated by this rulemaking

as the entire regulatory burden is on foreign States. As such, no U.S. businesses are directly impacted by this rulemaking.

Through consultation and prior notification of imported product, domestic importers, wholesalers, and processors should have an opportunity to substitute negatively certified sources of fish and fish product, reducing or eliminating negative impacts to the U.S. economy. This substitution also has the effect of enhancing the positive impact of this proposed regulation.

The goal of this regulation is to fulfill requirements of the Moratorium Protection Act, enhance fishery resources, enhance conservation of PLMRs, and improve the economic returns of the U.S. fishing industry. As such the long term benefits will likely outweigh any short term costs.

While it is difficult to estimate the current economic damage stemming from IUU fishing and bycatch, it is understood that these activities reduce profits for legitimate producers, induce social costs on fishing communities, reduce food security, and create human rights abuses. As such, the United States stands to benefit from the reduction or cessation of these activities.

Reducing these activities involves increasing the cost of bycatch and IUU fishing. Since monitoring, control, and surveillance (MCS) measures can be costly, it may not be optimal to try and ensure complete compliance through MCS. Since some harvesting states are unable or unwilling to enforce IUU and bycatch rules, port and market state controls can provide an important, necessary, and cost effective tool to combat IUU and bycatch. The imposition of trade-related measures, encouragement of private initiatives, capacity building, and improving the knowledge of the full range of social costs associated with IUU fishing and bycatch can also reduce IUU fishing activities and bycatch in a cost effective way. These activities will increase benefits to U.S. industry and consumers in the long term.

5.1 Economics of IUU and Bycatch

Bycatch and IUU are closely related activities economically. Due to the clandestine nature of IUU fishing and bycatch, it is difficult to estimate the total IUU catch and bycatch and the economic impact of that catch as it moves through the processing, wholesaling, distribution and retail markets. With regards to volume of IUU harvest, worldwide estimates vary widely. Le Gallic (2007) states that up to 30% of total catch in many high value fisheries is from IUU activities. Additionally, in some fisheries, that number may climb to three times the legal allowed harvest in the fishery. Across the 2001-2002 season it was estimated that 18% of all tuna harvest, 39% of toothfish harvest and 20% of redfish harvest was from IUU activities. Clark (2006) states that 20% of Sub-Saharan catch stems from IUU activity. Across Indonesia, van Mulekom et al. (2006) estimate that 10% of regional production is from IUU activity. Andrew and Barnes (2004) estimate that up to 80% of the Indian Ocean toothfish harvest is IUU harvest. In 2002, 11,000 metric tons of toothfish was harvested from the Indian Ocean illegally, representing 45% of total toothfish catch worldwide. They also estimate that 25,000 metric tons of tuna is caught illegally every year. Roheim and Sutinen (2006) in their literature review found that 5-19% of worldwide harvest stems from IUU operations. Less is known about the value lost to bycatch.

In addition to IUU harvest of targeted species, IUU activity has bycatch impacts. One of the many drivers of IUU activity and bycatch is to enjoy the benefits of reduced fishing costs by not adhering to fishing regulations. That means that IUU fishers don't participate in bycatch reduction activities, as

those activities increase costs. The work of Andrew and Barnes (2004) supports claims that boats engaging in IUU fishing have high rates of cetacean bycatch.

In monetary terms, Clark (2006) estimates that the annual wholesale value of IUU harvests total $3 billion U.S. dollars (USD) annually. In Indonesia, it has been estimated that the wholesale value of IUU harvest is $1.4 to $4 billion USD annually (van Mulekom et al. 2006). Griggs and Lutgen (2007) estimate that since the 1990's over 1 billion Australian dollars of toothfish, wholesale value, has been harvested illegally. Andrew and Barnes (2004) estimate that toothfish IUU vessels generate profits of $4.5 - $6 million USD per vessel per year. Roheim and Sutinen (2006) found in their review of the literature that IUU generates between $2.4 – $9.5 billion USD per year in wholesale value. Outside of these large regional or worldwide estimates, very little information exists on the value of IUU. As a matter of comparison, the total US harvest of seafood products was slightly over $4 billion in 2006 and the US imported $13.5 billion in 2006. Some of the value lost to IUU and bycatch could be captured by US industries if these activities were curtailed.

In a general sense, IUU fishing distorts competition, reduces the ability of legitimate fishers to stay in business, and imposes social costs on fishing communities (Le Gallic 2007). Andrew and Barnes (2004) and OECD (2005) list a number of economic effects generated by IUU fishing. IUU activity reduces the contribution of EEZ and high seas fishing fleets to a nation's GDP and reduces resource rents. If IUU fishing is occurring within a nation's EEZ, employment in fishing industries will be negatively impacted. Port revenues also fall under IUU fishing as IUU reduces the potential for local landing of fish and reduce the ability to generate added value for those products not landed in country.

Andrew and Barnes (2004) and OECD (2005) also state that IUU activity reduces landings fees and taxes. Less domestic landings translates into less tax revenue from landings. Fewer fish entering the processing chain means less income tax revenues from those businesses. IUU fishing reduces the economic activity across all other supporting shore side businesses reducing income tax revenues across those sectors as well. Because IUU fishers operate outside the law, they do not use technologies or techniques that reduce bycatch or habitat destruction. This has a direct and negative impact on the overall productivity of the resource which leads to reductions in legitimate fisher's revenues. IUU fishing also greatly increases management costs. All of these negative economic consequences have spill over or multiplier effects on U.S. economy through the industries that support commercial fishing, processing, wholesaling, distributing, and retailing of seafood products. Andrew and Barnes (2004) also discuss how bad publicity surrounding IUU fishing reduces consumer confidence in seafood. This erosion of confidence has the potential to reduce demand for legitimately caught fish from fisheries characterized as having problems with IUU fishing.

IUU fishing also induces negative social impacts. Both Andrew and Barnes (2004) and van Mulekom et al. (2006) state that for developing countries, IUU fishing can jeopardize food security. Along the same lines, IUU harvesters often conflict with local artisanal fleets. Whitlow (2004) focuses on the humanitarian problems associated with IUU fishing. IUU vessels can be crewed from impoverished countries in order to reduce costs. Whitlow found conditions that approached slavery including the use of bonded labor, poor nourishment, widespread injuries, and unhygienic conditions leading in many cases to illness, violence towards workers including restraining crew with chains or shackles, and unfair labor contracts. Additionally, because IUU boats operate outside the law, they ignore safety regulations and avoid inspections that increase costs. Also, due to the risk of vessel forfeiture, IUU boats are old

and decrepit, increasing safety risks. As a result, safety conditions on these boats often are ignored leading to greater injury and death.

This literature shows a biologic and economic downward spiral induced by IUU and bycatch activities. IUU fishing leads to non-attainment of management goals and results in unsustainable harvest levels (Sumaila et al. 2006, Doulman 2000). Evans (2000) develops the idea that under the precautionary approach to fisheries management, this downward spiral is exacerbated. Management is forced to be even more cautious in the light of under reporting of harvest, which leads to lower legal catch limits. Confidence in stock assessments is reduced, which indirectly pressures legal harvest limits to be lowered. Restricting the harvest of legal fishers to rebuild the fishery increases the level of IUU and bycatch activity, leading further down this spiral.

Essentially, the economic impacts induced by IUU fishing and bycatch stem from the fact that IUU fishing costs do not reflect the social costs of resource exploitation (Tokrisna 2000, OECD 2005, Hatcher 2004, Roheim and Sutinen 2006 and others). This lack of accounting of the full social costs leads to overexploitation as IUU caught fish are priced too cheaply making it difficult for legitimate fishers to compete in the market place. Hatcher (2004) states that IUU fishing is only a problem if it imposes a net social cost. A net social cost is likely as excessive fishing mortality over management set quotas damages stocks and reduces future returns. IUU fishing and bycatch damage non-target species such as seabirds, turtles, and cetaceans imposing further social costs.

The socioeconomic impacts of IUU and bycatch are particularly exacerbated as legitimate fishers are pushed out of the market. "Because of their lower operating costs, IUU fishers gain an unjust economic advantage over legitimate fishers (OECD 2005, p.13)." The quote could have correctly included bycatch along with IUU fishing. The OECD report goes further to say that the competition between legitimate and IUU fishers generates negative impacts on legitimate fishers and fishing communities through smaller catches, lower incomes, and lower employment. Following this idea of a downward spiral, these impacts are compounding and will likely be worse in the future as stocks become increasingly depleted. Ultimately, unchecked IUU fishing and bycatch will push legitimate fishers out of fisheries which will be particularly harmful to communities dependent on fishing. Agnew and Barnes (2004) echo these concerns and push the argument further. Global demand for seafood is increasing, as evidenced by the US data presented above, while supply is fixed or decreasing due to management constraints. This has the effect of pushing seafood prices up increasing the incentives for IUU fishing as IUU fishers tend to target the most valuable species (Hatcher 2004). This also has implications for bycatch through high-grading. As IUU increases, the presence of IUU boats in a fishery may act as a signal of lax enforcement further exacerbating the problem.

5.2 Economic Drivers of IUU Fishing

In order to address solutions to IUU fishing and bycatch, it is important to examine the incentives that drive fishers to fish illegally. As with all enterprises, the profit motive drives IUU fishing and discarding of catch (OECD 2005). Economic theory says criminals maximize their utility by balancing the costs of being caught with the benefits of stealing fish or throwing fish away (Sumaila et al. 2006). The more legal fishing is constrained by catch and effort limits (if demand for fish is unchanged or increasing) the greater the gains possible from IUU fishing, and the greater the motivation for fishermen

to participate in these activities. IUU fishing vessels do not generally pay for observers, licenses, access fees, data collection, or monitoring, which keeps their costs much lower than the legitimate operator.

Sumaila et al. (2006) made some observations on the determinants of IUU fishing. If the stock is robust, the probability of participation in IUU activities increases. The higher the catch per unit effort (CPUE), the easier it is to steal and avoid detection. Additionally, unless food security is a factor, the higher the price for the product, the more likely that cheating will exist. IUU fishers must balance these benefits against the costs, which include penalty costs, avoidance costs, and moral and social costs. If any of these costs rise, the likelihood of participation decreases. Detection likelihood is driven by the effectiveness and efficiency of enforcement, social acceptance of cheating, awareness of regulations, and level of private or nongovernmental organization (NGO) detection activities. Penalties increase costs directly and can include fines, forfeiture of boat, forfeiture of catch, and exclusion from the fishery. IUU fishers spend resources to avoid detection such as paying bribes to falsify documents, tampering with VMS, using transshipment vessels, etc. Finally, moral and social standing in the community can impact participation. In many communities, the true social cost of cheating is not understood by the community therefore reducing the moral or social cost of participating. These findings were echoed by Le Gallic (2007).

Additionally, IUU fishers face lower operating costs as they don't comply with safety rules, bycatch requirements, labor rules, or other regulations that legitimate operators face that increase costs. OECD (2005) also points to global overcapacity as a potential driver for IUU fishing. As catch and effort restrictions increase, the race to fish increases, which leads to investments in capacity over the social optimum. Legitimate fishers owning more capacity than they need to prosecute their quota may be induced to participate in IUU to keep that capacity employed.

5.3 Deterrents

Broadly characterized, deterrent measures seek to increase the costs of IUU and bycatch operations to the point where it is no longer profitable to participate in either activity. Le Gallic (2007) states that combating IUU fishing means changing the incentive structure facing IUU operators primarily through reducing revenues, increasing operating costs, and increasing capital costs. Hatcher (2004) concludes that IUU costs must be driven up to the point where it is no longer makes sense to invest in IUU capacity. Hatcher goes further to recommend that penalties should increase and MCS should increase to increase the probability of capture and decrease the ability to sell IUU product. FAO (2007) increases the scope of the argument saying that IUU fishing is complex and involves much more than just the fishers. It also encompasses processing, shipping, sale and distribution. Tracking fish is as important as on-water enforcement as much of the product is transhipped at sea, avoiding detection at first landing by the fishing vessel. Whitlow (2004) agrees with FAO and states the focus should definitely be broadened to include merchant vessels involved in transhipment, refuelling, and resupplying these IUU vessels. OECD (2005) recommends making IUU unprofitable by reducing revenues, reducing the value of catch, and increasing IUU costs. Full enforcement is not considered possible and is an incredibly expensive pursuit.

Clark (2006) found that most IUU activity is carried out by distant water fleets in the EEZs of other states in breach of access agreements. It is difficult for these states to control through enforcement alone as it is expensive to enforce large EEZs through the use of observers, VMS, aerial surveillance, and

blacklists. Additionally many of these states have inadequate infrastructures including overall low quality of national governance in developing countries and corruption leaving these states unable to properly enforce their own access rules. Even when the infrastructure exists, most states do not have the resources to enforce IUU fishing entirely on their own. Clark proposes that purchaser enforcement through various certifications schemes can reduce IUU efficiently and less expensively than traditional enforcement.

Sumaila et al. (2006) found that, in general, penalties are too low to effectively deter IUU fishing. Their research showed that on average penalties would have to increase 24 times higher than their current levels to act as sufficient deterrents. Currently, operators cover fines as just another operating expense if they cover them at all. The practice of hiding of beneficial interests and flags of non-compliance (FONCs) make it impossible to identify the responsible party. Also, boat profits typically exceed boat purchase prices annually, meaning that operators can afford to lose their boats and begin again next season with a new boat. They also found the current level of MCS is far too low to also serve as an effective deterrent. Additionally, there is currently near zero MCS on the high seas.

Because of the complexity, FAO (2007) states that effective control of IUU fishing requires a broad array of partners including: flag states, port states, market states, RFMOs, industry, NGOs, financial institutions, and consumers. Specifically, FAO indicates that developing countries often don't have the resources or the political will to enforce rules within their fishing grounds. Regarding flag, port, and harvest states FAO states that "A new emphasis on other tactics is needed to overcome the problems caused by those States which cannot or do not fulfill their responsibilities and obligations (FAO 2007, P.3)." These new tactics include MCS and management capacity building for flag/harvest/port states as well as increase use of sanctions and embargoes by port/market states. Specifically, the FAO report talks about the denial of port privileges to IUU fishing and transhipment vessels. Denial of port privileges cause vessels to search for a port that will allow offloading. This increased search time can dramatically increase costs as fuel costs dominate the operation of fishing or transhipment vessels.

While important, MSC is not the only tool for reducing IUU. Additionally, if US industries assist other countries with MSC and other measures for that matter, it will benefit the US economy. Given the size of national EEZs, monitoring fishing activity by air or by water is incredibly costly. Port/market state actions offer cost effective solutions and can include: denial of port access; prohibitions on landing, transhipment, and processing; seizure and forfeiture of catch; prohibit the use of port services; prohibiting the sale, trade, purchase, export, import of IUU fish; and initiating criminal, civil or administrative proceedings under national law. Tokrisna (2000) supports this idea that in the absence of effective flag//harvest state control, port/market state actions are an appropriate tools.

Vince (2007) acknowledges that fighting IUU is a challenge and Australia's and Indonesia's attempts to control IUU activity using MSC alone have been ineffective. They have developed many legal instruments which have not been uniformly enforced or have been subject to corruption. This result further argues for port/market state controls. Le Gallic (2007) also thinks that trade measures, such as embargoes, price premiums, documentation and labelling schemes, are important tools to combat IUU. Le Gallic (2007) points out that traditional harvest state and RFMO enforcement actions are not working as costs are too high, institutional constraints too high and the political will is lacking. He also recommends pursuing corporate structure reform to eliminate tax havens and shadow corporations, but acknowledges that corporate reform faces strong resistance outside of fishing.

OECD (2005) lists a number of other non-traditional IUU enforcement priorities including; banning imports, catch documentation schemes, education and promotion campaigns, encouraging non-participants to join RFMOs, increase monitoring, and listing banned vessels. The OECD states that trade sanctions and naming and shaming campaigns have high potential payoffs with relatively low costs. OECD (2006) takes these recommendations one step further. They recommend that trade measure should be applied to countries whose vessels are fishing illegally and not just the vessels. They also recommend, inter alia, naming and shaming campaigns and capacity building.

There is no silver bullet; it takes both local enforcement and pressure from market states to combat IUU and bycatch (Tokrisna 2000, Roheim and Sutinen 2006). Further gains in enforcement will be costly or impossible to achieve in the case of uncooperative flag states or corrupt harvest and flag states (Le Gallic, 2007). Compounding this problem is the fact that IUU fishing has become highly organized, making traditional bottom up enforcement less practical. Shutting down access to markets puts top-down pressure on flag states to control their fishing vessels or risk revenue losses. At the same time, constructive engagement and management capacity building encourages a bottom up approach. Constructive engagement and capacity building includes training data collectors, improving managements, human resource development, financial assistance, and technical assistance. Financial assistance and technical assistance are necessary conditions for success and this policy provides avenues for constructive engagement and capacity building. These types of activities can also capture benefits for U.S. industries involved in assistance programs.

5.4 Summary of Benefits of Port/Market State Controls

The United States restricts fishermen with regards to bycatch and IUU fishing, raising their costs and making them less competitive. If other nations continue to fish illegally at the same level, their costs are lower than US industry costs. This rulemaking will produce economic benefits in the United States by increasing costs for IUU fishers and fisheries with high bycatch, returning the United States to a more competitive footing. It is not possible to quantify many of these benefits. Potential benefits include use and non-use values for PLMRs, potential increased profits in the fishing industry through reduced reliance on imports and through capacity building activities, and reducing U.S. reliance on imports reduces the reliance on fossil fuels and reduces pollution.

Decreasing harm to PLMRs will produce positive economic values. While this EA does not quantify the increases possible with additional protection under this rule, qualitatively it is known that many of these species have positive use and non-use values. The use values in this case are non-consumptive use values obtained through wildlife watching activities. Non-use values, on the other hand include existence values, option value, and bequest value (Freeman, 1993).

In 1985, Hageman published a study looking at U.S. citizens' willingness to pay (WTP) to protect various marine mammals both for use and non-use. Hageman did not separate use and non-use values (Hageman 1985). He found that US citizens would be willing to pay $54 to prevent a 92% population decline across all marine mammals. He also found people would be willing to pay $36 to prevent losses of bottlenose dolphins and $37 to prevent the loss of the Northern elephant seal. Samples and Hollyer (1990) found that people were willing to pay $110 to $182 to prevent the extinction of monk seals and

$125 to $142 to prevent the extinction of humpback whales. Both of their estimates include use as well as non-use values. Loomis and Larson (1994) found that people were willing to pay $38 to increase humpback whale populations 50% and $45 to increase their populations 100% for use, and $25 for a 50% increase and $28 for a 100% increase in the population for non-use. Finally, Whitehead (1991) found that people are willing to pay $51 to reduce the risk of loggerhead turtle extinction to zero for the next 25 years, including use and non-use values. All values presented have been converted to 2007 dollars.

While some of these studies go outside the species identified as problematic bycatch species in this EA, it is likely that people hold some positive WTP for the species identified. This is reinforced by the loggerhead turtle and bottlenose dolphin estimates, both PLMRs identified in this report. As a result, any increased protection of the PLMRs identified in this report will increase the stream of benefits to the United States.

All of the alternatives, besides the no action alternatives will have the effect of raising the cost of imports, at least in the long run. Complying with increased regulations will increase harvester costs in countries found to be out of compliance or in countries trying to avoid falling out of compliance. Whether or not these compliance costs increase import prices enough to close the current gap between domestic prices and import prices remains to be seen. If the import prices rise enough to cause switching in the U.S. market from imports to domestically harvested fish, U.S. commercial fishermen may benefit.

Currently U.S. fisheries are heavily regulated and there is very little room to increase domestic supply in most fisheries using harvest increases. Additionally, the U.S. imports seafood products grown in aquaculture facilities. Currently there are infrastructure and regulatory hurdles to overcome if the United States is to expand domestic aquaculture production. It is also possible that ending IUU fishing or high grading of transboundary stocks will increase the abundance of those stocks to a level that would allow increases in domestic harvests, increasing profits for commercial fishermen. This is particularly true for the tuna fisheries targeted by the DWF, salmon and sablefish fisheries on the West Coast, and groundfish fisheries on the East Coast. Also, increased stock sizes would also reduce harvesters' costs by reducing the effort needed to catch fish even without increasing allowable harvest limits.

The United States exports the majority of its landings (80%). While some of this seafood is exported for processing and brought back to this country as an import, it is likely that increases in demand for domestic fish, driven by rising import prices or sanctions, could be met by exporting less. This would be driven primarily by prices. Products that are exported not for processing but for consumption are generally exported because they fetch a higher price in the importing country. Again, compliance cost would need to drive import prices high enough that export prices looked relatively less attractive.

For commercial harvesters to become more profitable from this shift from imports to domestic production that is currently being exported, prices would have to rise above the level currently obtained for exports. This would likely have an impact on consumers, as prices would increase. It is unlikely, however, that increases in producer surpluses would exceed decreases in consumer surplus as import prices rise, as evidenced in the demand models estimated in "Economic Analysis of International Fishery Trade Measures" (Gentner 2008). It is unknown whether the benefits to consumers from

increased protection of PLMRs or the ensuing reductions in pollution will outweigh these losses in consumer surplus.

Finally, constructive engagement with offending countries is the preferred pathway to meeting the goals and objectives of this rule. Much of this constructive engagement will involve increasing the capacity of foreign nations to manage their fisheries at level of conservation already maintained by the U.S. industry. As such, it is expected that U.S. industry could be instrumental in providing this capacity to foreign governments. U.S. industry may provide consulting services and sales of technology needed to meet the goals of this rule. Additionally, cooperative research exploring better technologies will provide income and jobs for commercial fishermen and related industries.

5.5 IUU Certification Procedure Alternatives Analysis

5.5.1 IUU Alternative I-1: No Action/Status Quo

Less effective international management regimes mean less sustainability across world fishery resources. Declining sustainability reduces economic benefits for US commercial fisherman and support industries such as processing, wholesaling, distribution, and retailing. Additionally, non-market benefits for the preservation of PLMRs will be lower as will benefits for reduced shipping that accrue if the US industry substitutes away from imports towards domestic supplies. As such, the no-action alternative will produce fewer benefits than either IUU alternative I-2 or I-3. That being said, the no action alternative will produce fewer indirect impacts on US industries as port privileges will be denied less frequently than under either IUU alternative I-2 or I-3.

5.5.2 IUU Alternative I-2

When other nations fish illegally, their costs are lower than U.S. industry costs. Alternative I-2 would produce economic benefits in the United States if identified nations seeking positive certification take corrective action or the relevant RFMO implements measures that are effective in ending the IUU fishing activities; these foreign actions would be expected to raise foreign harvesting costs to more closely reflect the full social cost of fish harvest. By raising the costs faced by IUU fishers, IUU fishing is reduced. Reduced IUU fishing, particularly across stocks that the U.S. fleet currently targets, provides indirect benefits to U.S. fleets in three ways. First, as stocks recover, catch per unit effort will increase, reducing U.S. fleet costs by reducing fishing time. Second, if stocks recover enough to allow increased quotas, U.S. fleets may be allowed to harvest more fish, also increasing benefits. Third, as costs rise for IUU fishers as a result of this alternative, the cost of imports will rise. Whether or not costs increase enough to close the current gap between domestic prices and import prices is not reasonable to assess at this time. If the import prices rise enough to cause switching in the U.S. market from imports to domestically harvested fish, commercial fishermen and support industries will benefit. The first two benefits only accrue in fisheries currently prosecuted by the U.S. fleet that have an IUU component, however, the third benefit accrues to U.S. industries regardless of whether or not the US fleet targets stocks subject to current IUU fishing as long as U.S. demand for fish is met by more domestic production. While it is not likely that U.S. harvesters or aquaculture can increase production in the short term, currently the US exports 80% of its harvest and these exports could be kept in the U.S. market. It is impossible currently to quantitatively estimate these benefits as so little is known about the volume of current IUU harvests, and it is speculative to assess which nations might be identified and where corrective actions might be implemented by the nation or via the RMFO.

IUU fishers operate outside the law and, as such, IUU fishers do nothing to avoid bycatch of non-target fish or PLMRs. Evidence shows their bycatch levels are far above the legal fishers in the same fishery. Decreasing harm to PLMRs will produce positive economic values. While this EA does not quantify the increases possible with additional protection under this rule, qualitatively it is known that many of these species have positive use and non-use values. The use values in this case are non-consumptive use values obtained through wildlife watching activities. Non-use values, on the other hand include existence values, option value, and bequest value (Freeman, 1993).

Constructive engagement with offending countries is the preferred pathway to meeting the goals and objectives of this alternative. Much of this constructive engagement will involve increasing the capacity of foreign nations to manage their fisheries at level of conservation already maintained by the US industry. New reporting requirements, new or increased MCS activities, public awareness programs, observer programs, and other measures recommended for flag states to achieve compliance are all forms of capacity building for fisheries management. It is expected that U.S. industry will be instrumental in providing this capacity to foreign governments and RFMOs. Therefore, capacity building will yield benefits for US industries.

This alternative produces no direct negative economic impact on U.S. businesses as no U.S. businesses are targeted by this rulemaking. As a result, the focus is on indirect negative impacts. Due to the consultative nature of this proposed rulemaking it is unlikely that large numbers of vessels would be denied port privileges. It is even less likely that large container ships or large non-container ships would be denied port privileges, as the majority of their cargo is non-fishery products. Additionally, since a negative certification will be made with advance warning, shipping companies will not risk being turned away at port. Also, the U.S. Customs 24-hour advance manifest rule requires that no container be loaded without the advance clearance of U.S. Customs.

Furthermore, it is assumed that no cargo vessel will enter a U.S port for the purpose of carrying exports out of the country. As a result, only positively certified flags will be in port to carry U.S. exports therefore having little impact on the export trade. As long as the number of positively certified carrier flag vessels is high relative to the negatively certified flag states, there will be no impact on export trade.

While it is unlikely that there will be any indirect economic impacts as the result of this rulemaking, it is possible that a vessel from a negatively certified state will be denied port privileges. This is particularly true for the U.S. territories Guam and American Samoa. For these ports, foreign fishing vessels are permitted to land fish. These vessels may be less informed of the impact of a negative certification against their flag state and/or may be less able to change the location of their landing.

Table 13 contains the economic impacts of a port call in Guam and American Samoa by a fishing vessel. These estimates include only the impacts on the ports and supporting industries. Impacts on wholesaling, processing, and retailing are be detailed below. Because no data were available to determine the number of fishing vessels landing product versus container ships delivering product to the canneries, it is not currently feasible to know how many fishing vessels versus cargo ships might be impacted by this alternative. If a purse seiner was denied port privileges in American Samoa, revenues would be reduced between $262,597 and $318,629 per port call. With this reduction in revenues, each lost purse seiner port call supports between 1.2 and 1.7 jobs and generates between $49,379 and $65,377 in income. If port privileges were denied to a longliner, revenues would be reduced by between $27,176 and $40,808. This level of revenue supports between 0.1 and 0.4 jobs and produces between $4,981 and $12,987 in income. Data were unavailable to estimate producer surplus, however income impacts, while overstating producer surplus, can serve as a proxy.

For Guam, if a purse seiner is denied port privileges, revenues would be reduced between $275,519 and $370,033. This level of revenue supports between 1.3 and 2.6 jobs and produces between $50,952 and $90,505 in income. If a longliner is denied port privileges in Guam, between $31,436 and $33,140 in revenue would be lost. This level of revenue supports 0.2 jobs and produces $7,006 - $7,774 in income.

Because it is impossible to know which ports in the United States might be impacted under this rulemaking, U.S. national averages for port calls from Table 12 will be used.

No data on general cargo for American Samoa and Guam were available for this report. Therefore, it is assumed that the impacts would be the same in American Samoa or Guam as they would be for the U.S. national average port call. This assumption will result in an overestimate (underestimate) if the ships calling in either Guam or American Samoa are smaller (larger) than the U.S. national average. Additionally, because multipliers are generally lower for islands, the multipliers are overstated, therefore overestimating the income and employment impacts.

Using the average volume of seafood imports per containerized port call from Table 8 and applying the percent of all species processed domestically from Table 18, 40 metric tons of containerized seafood are destined for additional processing and 21 metric tons are headed directly to retail. Similarly for non-containerized port calls, 24 metric tons of non-containerized seafood imports are destined for additional processing and 12 metric tons are headed directly to retail. Each average port call represents 0.0024% or 0.0015% of all seafood imports for containerized and non-containerized cargo respectively. There is no existing data source that tracks retail purchase from the processor to the retailer. Additionally, there is no existing data source on retail seafood prices. As a result, it is impossible to calculate the impacts of this rulemaking forward from a denied port call.

Because such a small percentage of total imports are spread across multiple products, six and two for container and non-container port calls respectively, and multiple importers/processors, two and one for container and non-container port calls respectively, the change in product flow will be very small for any individual product/firm combination. Therefore, unless many port calls were denied, these businesses would simply source these very small amounts of product domestically or from other transportation modes such as air, truck, or rail. For consumers, such small changes in product flow are unlikely to change prices or availability thereby they are expected to have no negative impact on consumers.

These conclusions are based on average port calls, and, as such, may over (under) estimate the potential impacts if the shipment is larger (smaller) than average. As an example, the largest containerized shipment in 2006 weighed 7,308, which still only represents 0.3% of all seafood imports. For non-containerize shipments, the largest seafood volume in 2006 was 0.018% of all imports.

American Samoa and Guam also suffer from the inability to track landings or shipments to the consumer. For Guam, the vast majority of the product is minimally processed and sent to Japanese markets, and, therefore, there are no impacts on U.S. consumers. However, there are essentially only two flag states landing fish in Guam; Taiwan and Japan. In 2006, Taiwanese fishing vessels made 147 port calls averaging 8.3 metric tons per call and Japanese boats made 392 calls averaging 13 metric tons per Guam call. No data were available regarding the value of these landings or the cost structure of the transshipping industry making impacts of a denial unknown. However, if either Taiwan or Japan is negatively certified, the impacts could be large in Guam.

For American Samoa, the cannery receipt data are confidential. Additionally, value is not reported by the canneries. The cannery receipt data is by origin flag, and, in general, far more origin states made

port calls at the canneries than in Guam with 36 origin states delivering product to American Samoa in 2006, not including American Samoan or U.S fishing vessels. Average annual off loadings of tuna per origin state was 2,895 metric tons across all calls with an annual minimum for one state of 22 metric tons and an annual maximum for one state of 33,679 metric tons in 2006. The number of calls each flag state made is unknown so average volume per call is unknown. Additionally, the data do not exist to calculate any impacts to the canneries, and, even if data were available, that information would be confidential. Regardless, if one of the higher volume countries were to be negatively certified, the impacts to the American Samoan economy could be large if adequate supply substitution possibilities did not exist.

For commercial harvesters to become more profitable from this potential shift from imports to domestic production that is currently being exported, domestic prices would have to rise above the level currently obtained for exports. This would likely have an impact on consumers, as prices would increase. It is unlikely, however, that increases in producer surpluses would exceed decreases in consumer surplus as import prices rise, as evidenced in the demand models estimated in "Economic Analysis of International Fishery Trade Measures" (Gentner 2008). It is unknown whether the benefits to consumers from increased preservation of PLMRs or the ensuing reductions in pollution will outweigh these losses in consumer surplus. However, if IUU fishing continues unchecked, sustainability will suffer, reducing global supplies of seafood, forcing prices up over the long term.

5.5.3 IUU Alternative I-3

Since this alternative requires both flag state and RFMO compliance, the economic benefits within the United States may potentially be greater while being the same in nature as Alternative I-2. This alternative has the potential to bring more stocks into sustainable RFMO management, increasing economic returns to U.S. industries as outlined in Alternative I-2. This alternative has the potential to raise foreign fishing costs higher than Alternative I-2.

Because the hurdle for positive certification is higher under this alternative, it is possible that costs will also be higher if this alternative results in more vessels being denied port privileges. However, it is impossible to determine if denials will be higher due to the consultative nature of the proposed certification process. Because the consultative process should result in few actual denials and because several parallel port state controls are already in place or being developed, the actual number of vessels denied port access may be no more or less than under Alternative I-2. Since this alternative could potentially increase foreign costs, consumer prices for imports may increase more than under Alternative I-2, resulting in a comparative reduction in consumer surplus. As a result, economic benefits under Alternative I-3 could potentially be higher whereas costs may be equal to or greater than costs under Alternative I-2.

5.6 Bycatch Certification Procedure Alternatives Socioeconomic Impact Analysis

5.6.1 Bycatch Alternative B-1: No Action/Status Quo

Continuation of the status quo means that the United States is not taking procedural action which increases the ability of the United States to influence the reduction of bycatch by foreign fisheries, thus exerting no change on the continued mortality for PLMRs including seabirds,

turtles, and marine mammals beyond those controls already available in existing international agreements. Additionally, the continued discards of non-target, non-protected species and high-grading of target species reduces overall stock sustainability, and declining sustainability reduces economic benefits for U.S. commercial fisherman and support industries such as processing, wholesaling, distribution, and retailing. Additionally, the ability to influence non-market benefits for the preservation of PLMRs will be lower than Alternative B-2 or B-3, as will effects for reduced shipping that might result if the U.S industry substitutes away from imports towards domestic supplies. As such the no-action alternative could result in fewer economic benefits than either bycatch alternative B-2 or B-3. Because the proposed certification procedures are consultative in nature and may result in very few denial of port privileges, any difference between the alternatives in this respect is expected to be insignificant, however, the no action alternative may produce less indirect impacts on US industries as port privileges would be expected to be denied less frequently than under either bycatch alternative B-2 or B-3.

5.6.2 Bycatch Alternative B-2

U.S. fishermen face many regulations on bycatch. To avoid bycatch, the U.S. fleet changes fishing patterns, changes fishing gear, or utilizes other methods that all increase U.S. fleet operating costs. When other nations' fish without taking bycatch into account, their costs are lower allowing foreign harvesters to outcompete U.S. producers on price grounds. This alternative would produce economic benefits in the United States by raising foreign harvesting costs to more closely reflect the full social cost of fish harvest. Reduced bycatch, particularly across stocks that the U.S. fleet currently targets, provides benefits to U.S. fleets in three ways. First, as stocks recover, catch per unit effort will increase, reducing U.S. fleet costs by reducing fishing time. Second, if stocks recover enough to allow increased quotas, U.S. fleets may be allowed to harvest more fish, also increasing benefits. Third, as costs rise for foreign producers that use fish from fisheries with high bycatch, the cost of imports will rise. Again, these are benefits that may occur based on the proposed certification procedures, but they are not a definitive outcome of what actions foreign nations might take or what actions may be taken by the United States based on certification. Whether or not costs increase enough to close the current gap between domestic prices and import prices is too speculative to assess. If import prices rise enough to cause switching in the U.S. market from imports to domestically harvested fish, commercial fishermen and support industries will benefit. The first two benefits only accrue in fisheries currently prosecuted by the U.S. fleet that have a bycatch component , however, the third benefit accrues to U.S. industries regardless of whether or not the U.S. fleet targets stocks subject to current foreign bycatch as long as U.S. demand for fish is met by more domestic production. While it is not likely that U.S. harvesters or aquaculture can increase production in the short term, currently the United States exports 80% of its harvest and it is possible that a higher percentage of these exports could be kept in the U.S. market. It is impossible currently to quantitatively estimate these benefits as so little is known about the volume of current bycatch.

Bycatch of non-target fish or PLMRs reduces benefits to U.S. society beyond the damage done to commercial ventures depending on sustainable fish stocks and, as such, measures to increase the U.S. influence on the reduction of PLMR bycatch can increase benefits. While this EA does not quantify the increases possible with additional U.S. influence on conservation under this rule, qualitatively it is known that many of these species have positive use and non-use values. The use values in this case are

non-consumptive use values obtained through wildlife watching activities. Non-use values, on the other hand include existence values, option value, and bequest value (Freeman, 1993).

The economic analysis for bycatch Alternative B-2 mirrors the discussion of costs for IUU Alternative I-2. If more nations are subject to negative certifications under Alternative B-2 than under Alternative I-2, then costs to U.S. businesses will be higher than the costs discussed under Alternative I-2. In contrast, if fewer nations are subject to negative certifications under Alternative B-2 than under Alternative I-2, then costs to U.S. businesses will be lower than the costs discussed under Alternative I-2. Due to the proposed consultative nature of certification, it is impossible to know how many port calls might be denied under this alternative. Because the consultative process will give nations advance notice of negative certification, it is unlikely that port privileges will be denied on a large scale. Several parallel port state control measures are already in place, such as the 24-hour advance manifest rule, or are being designed, allowing flag states to know whether they will be granted port privileges before leaving their home port, further reducing any impact on US businesses. Additionally, long time scales give U.S. businesses the ability to change their input stream to avoid any potential impact.

For commercial harvesters to become more profitable from any shift from imports to domestic production that is currently being exported, prices would have to rise above the level currently obtained for exports. This would likely have an impact on consumers, as prices would increase. It is unlikely, however, that increases in producer surpluses would exceed decreases in consumer surplus as import prices rise, as evidenced in the demand models estimated in "Economic Analysis of International Fishery Trade Measures" (Gentner 2008). It is unknown whether the benefits to consumers from increased preservation of PLMRs will outweigh these losses in consumer surplus. However, if bycatch continues unchecked, sustainability will suffer, reducing global supplies of seafood, forcing prices up in the long term.

5.6.3 Bycatch Alternative B-3

Since this alternative requires both flag state and RFMO compliance, the benefits may be greater while being the same in nature as Alternative B-2. This alternative has the potential to bring more PLMR stocks into sustainable RFMO management, increasing economic returns to U.S. industries as outlined in Alternative B-2. This alternative has the potential to raise foreign fishing costs higher than alternative two, benefiting U.S. industry.

Because the hurdle for positive certification is higher under this alternative, it is possible that costs will also be higher if this alternative results in more vessels being denied port privileges. However, it is impossible to determine if denials will be higher due to the proposed consultative nature of this rulemaking. Because the consultative process will result in few actual denials and because several parallel port state controls are already in place or being developed, the actual number of vessels denied port access may be no more or less than under Alternative B-2. Since this alternative could increase foreign costs, consumer prices for imports may potentially increase more than under Alternative B-2, reducing consumer surplus more than this alternative. As a result, benefits under Alternative B-3 could be higher whereas costs may be equal to or greater than costs under Alternative B-2.

5.7 Environmental Justice

Pursuant to EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, the Council on Environmental Quality's (CEQ) Environmental Justice Guidance under NEPA identifies factors requiring consideration in evaluating whether environmental effects to minority populations and low-income populations are disproportionately high or adverse. Because the environmental effects of the alternatives are not considered adverse, environmental justice concerns are not raised by the proposed action.

6.0 SUMMARY SOCIOECONOMIC COMPARISON OF ALTERNATIVES

Due to the consultative nature of this rulemaking, it is unknown how many port calls might be affected by any alternative, besides the no action alternatives. Also, it is unlikely that any flag state would, once negatively certified, allow a ship to leave its home port if it were only to be denied access, lessening or eliminating negative economic consequences. Additionally, it is impossible to know how these impacts will be distributed spatially. Because importers, processors, and retailers can maintain input supplies by sourcing product from different transportation modes, different flag states, or potentially from domestic production, impacts outside the ports themselves will be small or non-existent. This conclusion is supported by a recent Congressional Budget Office report on much more significant port closures (CBO 2006). Table 21 summarizes potential benefits and costs from this rulemaking.

For many of the same reasons, potential benefits are difficult to quantify. US citizens hold positive use and non-use values for the preservation of PLMRs and all alternatives besides the no-action alternative will increase protection for these species. Commercial harvesters stand to potentially benefit under the IUU alternatives and the bycatch alternatives as imports of IUU product may be reduced and foreign nations are encouraged to use reduce and mitigate the adverse impacts of fishing on PLMRs by using practices and gear that are comparable to those used by U.S. fishermen. Additionally, for transboundary stocks, like salmon, sablefish, tuna, groundfish, and others, that are currently subject to IUU and currently targeted by domestic harvesters, revenues should increase as IUU fishing is curtailed. Also, industries that can support capacity building in countries targeted by this rulemaking will benefit. Finally, if this rulemaking reduces reliance on imports in general, less energy resources will be expended to obtain the nation's seafood needs.

6.1 Preferred Alternatives

Alternatives I-1 and B-1 are not feasible options since the establishment of certification procedures to address IUU fishing and PLMR bycatch is required under the Moratorium Protection Act, as amended by MSRA.

For a variety of reasons, NMFS has selected I-2 and B-2 as its preferred alternatives. First, these alternatives reflect the text of the Moratorium Protection Act's provisions on certification. Second, relative to Alternatives I-3 and B-3, these alternatives could result in fewer increases in foreign costs, resulting in less comparative reductions in consumer surplus. Third, because the consultative process will result in few actual denials and because several parallel port state controls are already in place or

being developed, the actual number of vessels denied port access may be no more or less than under Alternatives I-2 and B-2 relative to Alternatives I-3 and B-3.

6.2 Other NEPA Considerations

The proposed regulations would result in the development of a procedural regulation, and, as such, no unavoidable adverse impacts on the human environment are anticipated in association with the proposed action. Similarly, the proposed regulation would not result in any irretrievable or irreversible commitment of resources. The proposed action would not result in any short term uses or effects to the environment, thus there would be no adverse effects to the long-term productivity of the environment. Depending on the action by others that may ensue from the certification procedures, it is anticipated that the proposed procedures should benefit long-term productivity.

Table 21. Summary of Benefits and Costs by Alternative.

Alternative	Benefits		Costs
	Use Value	Non-Use Value	
IUU No Action Alternative One	No Additional Benefits		No Additional Costs
IUU Alternative Two			
Seabird Protection	Positive	Positive	
Turtle Protection	Positive	Positive	
Marine Mammal Protection	Positive	Positive	
Commercial Harvesters	Positive		
Seafood Processors	Positive		Negative
Seafood Wholesalers/Importers			Negative
Ports			Negative
Capacity Related Industries	Positive		
Consumers	Positive	Positive	Negative
Reduced Energy Footprint	Positive		
IUU Alternative Three			
Seabird Protection	Higher Positive	Higher Positive	
Turtle Protection	Higher Positive	Higher Positive	
Marine Mammal Protection	Higher Positive	Higher Positive	
Commercial Harvesters	Higher Positive		
Seafood Processors	Higher Positive		Negative
Seafood Wholesalers/Importers			Negative
Ports			Negative
Capacity Related Industries	Higher Positive		
Consumers	Higher Positive	Higher Positive	Higher Negative
Reduced Energy Footprint	Higher Positive		
Bycatch No Action Alternative One	No Additional Benefits		No Additional Costs
Bycatch Alternative Two			
Seabird Protection	Positive	Positive	
Turtle Protection	Positive	Positive	
Marine Mammal Protection	Positive	Positive	
Commercial Harvesters	Positive		
Seafood Processors	Positive		Negative
Seafood Wholesalers/Importers			Negative
Ports			Negative
Capacity Related Industries	Positive		
Consumers	Positive	Positive	Negative
Reduced Energy Footprint	Positive		
Bycatch Alternative Three			
Seabird Protection	Higher Positive	Higher Positive	
Turtle Protection	Higher Positive	Higher Positive	
Marine Mammal Protection	Higher Positive	Higher Positive	
Commercial Harvesters	Higher Positive		
Seafood Processors	Higher Positive		Negative
Seafood Wholesalers/Importers			Negative
Ports			Negative
Reduced Energy Footprint	Higher Positive		
Consumers	Higher Positive	Higher Positive	Higher Negative
Capacity Related Industries	Higher Positive		

Overall IUU alternative I-3 may produce more socioeconomic benefits than IUU Alternative I-2. Likewise for the bycatch alternatives, Alternative B-3 may produce more benefits than Alternative B-2. Due to the consultative nature of this rulemaking, it may be possible for the costs to be ameliorated by new port state controls, substituting different transportation modes, or substituting different products all together. As a result, it is difficult to know if costs will also be higher moving from the less restrictive IUU or bycatch Alternative B-2/I-2 to IUU or bycatch Alternative I-3/B-3.

7.0 REGULATORY IMPACT REVIEW

7.1 Description of the Management Objectives

Please see Section 1.3 of the Environmental Assessment for a description of the objectives of this rulemaking.

8.2 Description of the Industry

Please see Section 5.4 of the Environmental Assessment for a description of the industries that could be affected by this rulemaking.

7.3 Purpose and Need

Please see Section 1.1 of the Environmental Assessment for a description of the problem and the need for this rulemaking.

7.4 Description of Management Alternatives

Please see Section 2.0 for a summary of each IUU alternative and a summary of each bycatch alternative. Please see Sections 4.0, 5.0, and 6.0 for analyses of each alternative and its expected ecological, economic, and social impacts.

7.5 Economic Analysis of Expected Effects of Each Alternative Relative to the Baseline

No U.S. industry is directly affected by the rulemaking, although indirect effects may cause short term disruptions in the flow of seafood imports potentially impacting U.S. businesses. NMFS does not anticipate that national net benefits and costs would change significantly in the long term as a result of the implementation of the proposed alternatives. Section 5.0 summarizes the net economic benefits and costs of this rulemaking and includes Table 21 summarizes the possible net economic benefits and costs of each alternative.

7.6 Conclusion

Under E.O. 12866, a regulation is a “significant regulatory action” if it is likely to 1) have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public

health or safety, or State, local, or tribal governments or communities; 2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; 3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights, and obligations of recipients thereof; or 4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order. NMFS indicated to the Office of Management and Budget (OMB) that it did not believe this action met the above criteria. However, OMB subsequently determined that this action was significant for the purposes of E.O. 12866. A summary of the expected net economic benefits and costs of the alternatives may be found in Table 21.

8.0 REGULATORY FLEXIBILITY ACT ANALYSIS

8.1 Description of the Reasons Why the Actions are Being Considered

The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSRA), which was signed into law in January 2007, amends the Moratorium Protection Act to require that actions be taken by the United States to strengthen international fishery management organizations and address IUU fishing and bycatch of PLMRs. The Moratorium Protection Act requires the Secretary of Commerce to identify in a biennial report to Congress those foreign nations whose fishing vessels are engaged in IUU fishing or fishing activities or practices that result in bycatch of PLMRs. The Moratorium Protection Act also requires the establishment of procedures to certify whether appropriate corrective actions have been taken to address IUU fishing or bycatch of PLMRs by fishing vessels of those nations. Identified nations that are not positively certified by the Secretary of Commerce could be subject to prohibitions on the importation of certain fisheries products into the United States and other measures, including limitations on port access, under the Enforcement Act.

The National Environmental Policy Act (NEPA) requires federal agencies to evaluate the impacts of federal actions on the human environment. It has been NOAA policy to prepare NEPA documents for actions that affect the marine environment within and beyond the U.S. Exclusive Economic Zone. NOAA Administrative Order 216-6 describes how the agency will comply with NEPA requirements. Although the regulatory action needed to develop certification procedures could be considered for applicability of one of the existing Categorical Exclusions (216-6.03c.3) addressing procedural regulations, the agency has determined that an EA is more appropriate for this action to provide the public with additional environmental information regarding the proposed action.
For a complete description of the need for this action, please see Section 1.1.

8.2 Statement of the Objectives of, and Legal Basis for, the Rule

This action is under the authority of the High Seas Driftnet Fishing Moratorium Protection Act. The objective of the rule is to implement the Moratorium Protection Act and to ensure sustainable use of transboundary stocks, enhance the conservation and recovery of protected living marine resources by encouraging nations to work multilaterally, in cooperation with the United States, to implement conservation and management measures that reduce IUU fishing and bycatch of PLMRs. The Moratorium Protection Act envisions a multilateral process to implement effective measures to end IUU fishing and eliminate or reduce the bycatch of PLMRs. Congressional policy that informs the proposed rule encourages constructive engagement through regional fishery management organizations or bi-

lateral arrangements between the United States and other fishing nations. The certification procedure described in the proposed rule works in combination with identification, notification and consultation procedures described in the statute and the advanced notice of proposed rulemaking (ANPR). For a complete description of the need for this action, please see Section 1.3.

8.3 Description and Estimate of the Number of Small Entities to which the Proposed Rule Will Apply

See section 5.4 above.

This rule does not apply directly to any U.S. business small or otherwise as the rulemaking is aimed at foreign countries that harvest seafood.

The universe of indirectly affected industries includes the following: U.S. port activity and U.S. seafood harvesters, processors, wholesalers, and importers. Port activity generates economic activity across many sectors including surface transportation, maritime services, cargo handling, federal/state/local governments, port authorities, importers/consignees, and the banking and insurance sectors. Maritime services include pilots, chandlers (food and other supplies), towing, bunkering (fuel), marine surveyors, and shipyard/marine construction. Cargo handling services include longshoremen, stevedoring, terminal operators, warehouse operators, and container leasing and repair.

8.4 Description of the Projected Reporting, Record-Keeping, and Other Compliance Requirements of the Proposed Rule

This action contains new collection-of-information, reporting, record keeping, or other compliance requirements. To facilitate enforcement, nations that do not receive a positive certification may be required to submit documentation of admissibility along with fish or fish products not subject to the import restrictions that are offered for entry into the United States. In addition, those identified nations that do not receive a positive certification and wish to take advantage of the alternative procedures will be required to submit documentation of admissibility along with fish or fish products subject to the import restrictions that are offered for entry into the United States. NMFS is delaying the effective date of these requirements until it develops and submits a Paperwork Reduction Act package to OMB and receives OMB approval. After OMB approval is received, NMFS will publish the effective date for these sections in the Federal Register.

8.5 Relevant Federal Rules which may Duplicate, Overlap, or Conflict with the Proposed Rule

This action does not duplicate, overlap or conflict with any other Federal rules.

NMFS received public comments on the proposed rule, and made some revisions to the final rule to clarify provisions. A summary of public comments on the proposed rule and agency

responses is provided in the final rule. NMFS did not receive comments specifically on the initial regulatory flexibility analysis (IRFA) for this action or on issues related to the IRFA.

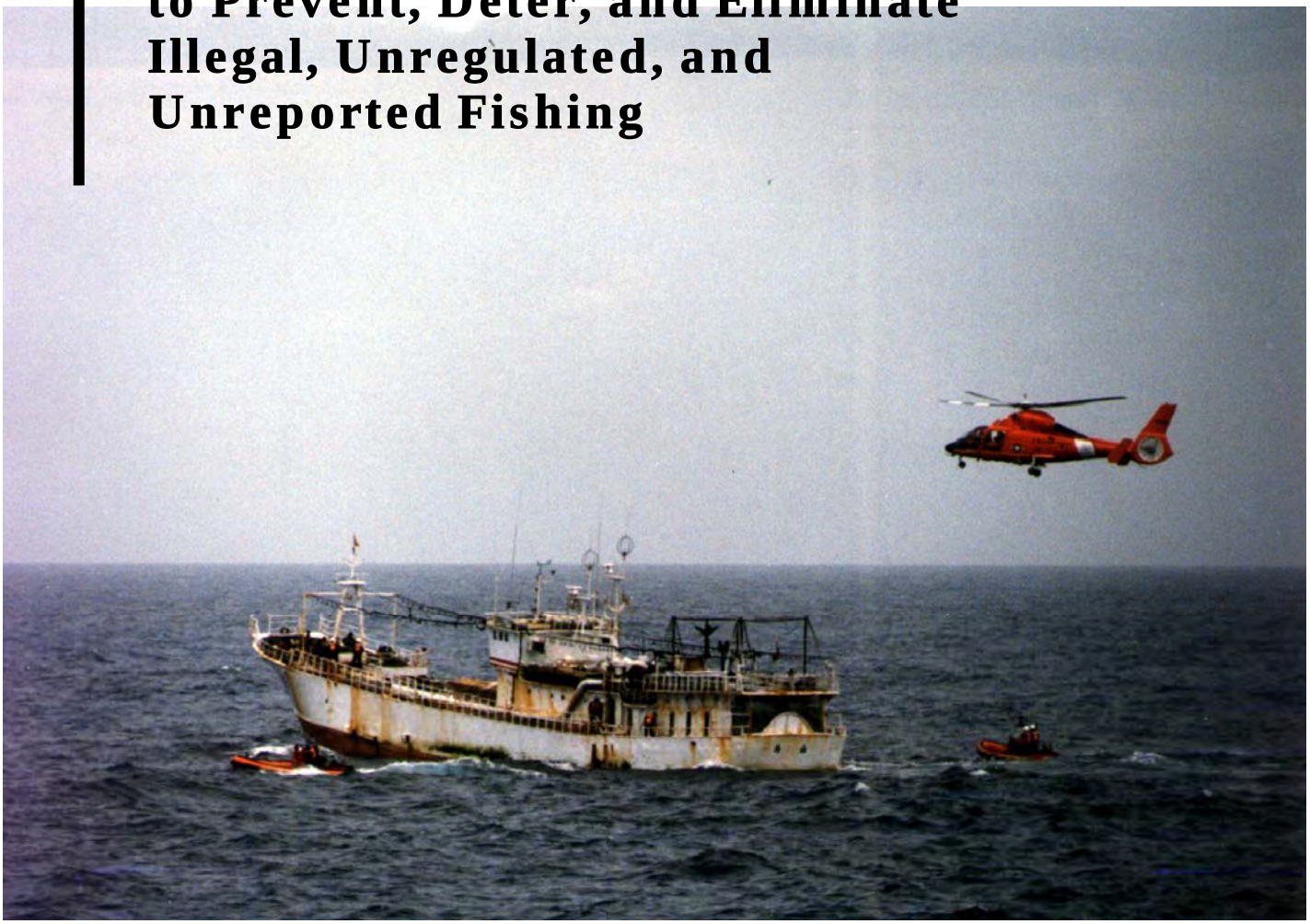
Although this action will not have significant economic impacts on a substantial number of small U.S. entities, NMFS decided to analyze different alternatives in the IRFA for the certification procedures in this rule. In order to meet the objectives of the Moratorium Protection Act and this final rule, NMFS cannot exempt small entities, change reporting requirements only for small entities, or use performance or design standards in lieu of the regulatory requirements in the rule.

As noted above, NMFS does not anticipate significant economic impacts from any of the alternatives analyzed. IUU Alternative I-3 may produce more socioeconomic benefits than IUU Alternative I-2. Likewise for the bycatch alternatives, Alternative B-3 may produce more benefits than Alternative B-2. Due to the consultative nature of this rulemaking, it may be possible for the costs to be ameliorated by new port state controls, substituting different transportation modes, or substituting different products all together. As a result, it is difficult to know if costs will also be higher moving from the less restrictive IUU Alternative I-2 or bycatch Alternative B-2 to IUU Alternative I-3 or bycatch Alternative B-3. Because Alternatives I-2 and B-2 most closely mirror the text of the Moratorium Protection Act, NMFS has decided to implement them in this final rule.

APPENDIX A

NATIONAL PLAN OF ACTION OF THE UNITED STATES OF AMERICA TO PREVENT, DETER, AND ELIMINATE ILLEGAL, UNREGULATED, AND UNREPORTED FISHING

National Plan of Action of the United States of America to Prevent, Deter, and Eliminate Illegal, Unregulated, and Unreported Fishing



Coordinated by the U.S. Department of State

in conjunction with
the National Oceanic and Atmospheric Administration
the National Marine Fisheries Service
the U.S. Coast Guard
the Office of the U.S. Trade Representative
the U.S. Fish and Wildlife Service
and the U.S. Customs Service

U.S. NATIONAL PLAN OF ACTION
TO PREVENT, DETER, AND ELIMINATE
ILLEGAL, UNREGULATED, AND UNREPORTED FISHING

1 INTRODUCTION

The United States and other members of the international community have experienced a growing incidence of fishing activity that does not respect applicable laws and regulations, including fishing rules adopted at the national and international levels. Examples of such activity include reflagging of fishing vessels to evade controls, fishing in areas of national jurisdiction without authorization by the coastal State, failure to report (or misreporting) catches, etc. Such irresponsible fishing activity directly undermines efforts to manage fisheries properly and impedes progress toward the goal of sustainable fisheries.

The term "illegal, unreported and unregulated fishing" – or IUU fishing – has emerged to describe a wide range of such activity. IUU fishing can occur in all capture fisheries, whether they are conducted within areas under national jurisdiction or on the high seas. IUU fishing poses a direct and significant threat to effective conservation and management of fish stocks, causing multiple adverse consequences for fisheries and for the people who depend on them in the pursuit of their legitimate livelihoods.

Under the auspices of the Food and Agriculture Organization of the United Nations (FAO), a concerted effort was undertaken to develop a comprehensive "toolbox" of measures that States could take, both individually and collectively, to address the problems of IUU fishing. This effort culminated with the adoption in 2001 of the FAO International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA).[1]

As its title suggests, the objective of the IPOA is to prevent, deter and eliminate IUU fishing. The principles to guide the pursuit of this objective include: (1) broad participation and coordination among States, as well as representatives from industry, fishing communities and non-governmental organizations; (2) the phasing in of action to implement the IPOA on the earliest possible timetable; (3) the use of a comprehensive and integrated approach, so as to address all impacts of IUU fishing; (4) the maintenance of consistency with the conservation and long-term sustainable use of fish stocks and the protection of the environment; (5) transparency; and (6) non-discrimination in form or in fact against any State or its fishing vessels.

The IPOA is voluntary. However, like the FAO Code of Conduct For Responsible Fisheries, certain parts of the IPOA are based on relevant rules of international law, as reflected in the 1982 UN Convention on the Law of the Sea and other pertinent instruments. The IPOA also contains provisions that may be, or have already been, given binding effect by means of other legal instruments, including certain global, regional and sub-regional instruments.

The IPOA calls upon all States to develop and adopt national plans of action to achieve the objectives of the IPOA and to give full effect to its provisions as an integral part of their fisheries management programs and budgets.

[1] The text of the IPOA-IUU is available on the website of the FAO Fisheries Department: http://www.fao.org/DOCREP/003/y1224e/y1224e00.HTM.

The U.S. National Plan of Action is organized along the same lines as the IPOA, including sections on All State Responsibilities, Flag State Responsibilities, Coastal State Measures, Port State Measures, Internationally Agreed Market State Measures, Measures to be Implemented Through Regional Fisheries Management Organizations and Special Requirements of Developing States. Although IUU fishing may occur in all fisheries, this plan focuses on marine fisheries. As envisioned in the IPOA, the United States intends to review the implementation of this National Plan of Action at least every four years after its adoption.

2 OVERVIEW

IUU fishing poses a direct and significant threat to effective conservation and management of many fish stocks, causing multiple adverse consequences for fisheries and for the people who depend on them in the pursuit of their legitimate livelihoods.

By frustrating fishery management objectives, IUU fishing can contribute to the overfishing of fish stocks, impair efforts to rebuild such stocks, and, in principle, even lead to the collapse of a fishery. This, in turn, may result in lost economic and social opportunities, both short-term and long-term, and may diminish food security. Left unchecked, IUU fishing can significantly diminish the benefits of effective fisheries management.

Those who conduct IUU fishing are also unlikely to observe rules designed to protect the marine environment from the harmful effects of some fishing activity, including, for example, restrictions on the harvest of juvenile fish, gear restrictions established to minimize waste and bycatch of non-target species, and prohibitions on fishing in known spawning areas. To avoid detection, IUU fishers often violate certain basic safety requirements, such as keeping navigation lights lit at night, which puts other users of the oceans at risk. Operators of IUU vessels also tend to deny to crew members fundamental rights concerning the terms and conditions of their labor, including those concerning wages, safety standards and other living and working conditions. Other rules that can be flouted by IUU fishers include those associated with food safety and aquatic animal health, potentially putting consumers and fish populations at risk in IUU fish importing countries.

In addition to its detrimental economic, social, environmental and safety consequences, the unfairness of IUU fishing raises serious concerns. By definition, IUU fishing is either an expressly illegal activity or, at a minimum, an activity undertaken with little regard for applicable standards. IUU fishers gain an unjust advantage over legitimate fishers, i.e., those who operate in accordance with those standards. In this sense, IUU fishers are “free riders” who benefit unfairly from the sacrifices made by others for the sake of proper fisheries conservation and management. This situation undermines the morale of legitimate fishers and encourages them to disregard the rules as well. IUU fishing may promote additional IUU fishing, creating a downward cycle of management failure.

As this National Plan of Action demonstrates, the United States has been – and will continue to be – among the leaders of the international community in efforts to address IUU fishing. The United States contributed actively to the development of the IPOA and to measures

adopted in various regional fisheries management organizations (RFMOs) on this topic. At the national level, U.S. laws and regulations to combat IUU fishing are among the strongest, most comprehensive and best enforced in the world.

Still, much remains to be done to address problems of IUU fishing. Although the precise amount of IUU fishing is difficult to quantify, available evidence suggests that, as a worldwide phenomenon, it is increasing.

One inherent difficulty is the question of defining the terms "illegal fishing," "unreported fishing," and "unregulated fishing." This National Plan of Action adopts the definition of these terms set forth in the IPOA:

- Illegal fishing refers to activities:

  conducted by national or foreign vessels in waters under the jurisdiction of a State, without the permission of that State, or in contravention of its laws and regulations;

  conducted by vessels flying the flag of States that are parties to a relevant regional fisheries management organization but operate in contravention of the conservation and management measures adopted by that organization and by which the States are bound, or relevant provisions of the applicable international law; or

  in violation of national laws or international obligations, including those undertaken by cooperating States to a relevant regional fisheries management organization.

- Unreported fishing refers to fishing activities:

  which have not been reported, or have been misreported, to the relevant national authority, in contravention of national laws and regulations; or

  undertaken in the area of competence of a relevant regional fisheries management organization which have not been reported or have been misreported, in contravention of the reporting procedures of that organization.

- Unregulated fishing refers to fishing activities:

  in the area of application of a relevant regional fisheries management organization that are conducted by vessels without nationality, or by those flying the flag of a State not party to that organization, or by a fishing entity, in a manner that is not consistent with or contravenes the conservation and management measures of that organization; or

  in areas or for fish stocks in relation to which there are no applicable conservation or management measures and where such fishing activities are conducted in a manner inconsistent with State responsibilities for the conservation of living marine resources under international law.

Notwithstanding the above, certain unregulated fishing may take place in a manner that is not in violation of applicable international law, and may not require the application of measures envisaged under the IPOA.

3 ALL STATE RESPONSIBILITIES

The United States is generally in compliance with relevant international rules and standards regarding the conservation and management of living marine resources. Although the United States is not a party to the 1982 United Nations Convention on the Law of the Sea, we regard its provisions relating to the conservation and management of living marine resources as reflecting customary international law.

The United States is party to most of the significant international agreements in this field. The United States was among the first to ratify the 1995 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (the UN Fish Stocks Agreement), which entered into force on December 11, 2001. The United States has also deposited an instrument of acceptance of the 1993 Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (FAO Compliance Agreement), which has not yet entered into force. However, the United States has fully implemented the FAO Compliance Agreement since 1996. The United States has actively encouraged other States to become party to both instruments and to implement them fully.

In addition, the United States is party to many of the international agreements that have created RFMOs and, accordingly, is a member of many RFMOs.[2] In addition, the United States has made significant contributions to the development and implementation of many of the non-binding instruments in this field, including the FAO Code of Conduct for Responsible Fisheries, the FAO International Plans of Action on fisheries and UN General Assembly Resolution 46/215, which created a moratorium on the use of large-scale driftnets on the high seas.[3]

The United States intends to continue to take a proactive stance in the implementation of these international instruments and the development of any necessary new international instruments.

3.1 Legislation

A chart summarizing all relevant U.S. domestic legislation is annexed to this NPOA. The chart also includes proposals for new legislation or amendments to existing legislation that may

[2] For example, the United States is a member of the Inter-American Tropical Tuna Commission, the International Commission for the Conservation of Atlantic Tunas, the Northwest Atlantic Fisheries Organization, the North Pacific Anadromous Fish Commission, North Atlantic Salmon Conservation Organization, and the Commission for the Conservation of Antarctic Marine Living Resources, among others.

[3] See www.nmfs.noaa.gov/sfa/international/index.htm

be necessary or desirable to implement the IPOA. Recommendation contained in this NPOA, particularly as they relate to possible changes in U.S. Law or the allocation of federal resources, will be considered in accordance with the Administration's overall program of management and budget and, as appropriate, with Congress.

3.2 State Control over Nationals

The IPOA calls upon each State to take measures to ensure that its nationals do not engage in or support IUU fishing. Relevant situations include (1) a national of one State owns or controls a fishing vessel registered in another State that engages in IUU fishing; (2) a national of one State is employed as a master or crew member of a fishing vessel registered in another State that engages in IUU fishing; and (3) nationals of one State knowingly import IUU-caught fish or fish products from another State.

The U.S. Lacey Act makes it unlawful for any person subject to U.S. jurisdiction to "import, export, transport, sell, receive, acquire, possess or purchase any fish ... taken, possessed or sold in violation of any ... foreign ... law, treaty or regulation."[4] The United States has used the Lacey Act successfully to prosecute U.S. nationals who engage in certain forms of IUU fishing.[5] Such prosecutions occur only where there is some "nexus" between the activity in question and the United States, e.g., where the fish or fish products are landed, brought, or introduced into any place subject to the jurisdiction of the United States.

The Lacey Act explicitly covers acts in violation of any treaty. Certain other U.S. laws also make it unlawful for U.S. nationals (and other persons subject to U.S. jurisdiction) to engage in fishing activity in violation of conservation and management measures adopted by RFMOs.[6] It may be possible to strengthen the Lacey Act or the other fisheries-related statutes to broaden the available tools to even more effectively tackle fishing contrary to RFMO rules.

The United States could also improve its ability to identify U.S. nationals who own or control foreign fishing vessels that are engaged in IUU fishing. The International Network for the Cooperation and Coordination of Fisheries-Related Monitoring, Control, and Surveillance Activities (MCS Network)[7] and other forms of international cooperation offer the most promising means for exchanging information that could lead to the identification of such persons.

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[4] 16 U.S.C. 3371 et seq. Note that the Lacey Act prohibitions do not apply to, inter alia, any activity regulated by a fishery management plan in effect under the Magnuson-Stevens Fishery Conservation and Management Act or certain highly-migratory fisheries (see § 3377).

[5] A recent case, involving both foreign nationals and U.S. nationals who were illegally importing large quantities of Honduran spiny lobster into the United States, was prosecuted criminally under the Lacey Act and resulted in some of the longest jail terms ever given under that statute. (See U.S. vs. McNabb, et. al.)

[6] See, e.g., Atlantic Tunas Convention Act (16 U.S.C. 971), North Pacific Anadromous Stocks Act of 1992 (Title VII of P.L. 102-567), etc.

[7] See Section 3.6, "Acquisition, Storage, Dissemination of MCS Data," for additional information on the MCS Network.

Although a limited number of U.S. fishing vessels have reflagged in recent years, available evidence does not indicate that such vessels have engaged in any significant amount of IUU fishing. As a general matter, U.S. laws and regulations do not offer a direct means to prevent U.S. nationals from reflagging fishing vessels, but the American Fisheries Act of 1998 does prevent the return of large class fishing vessels to U.S. registry once they have been reflagged.[8] The U.S. Government typically becomes aware of such transactions only after they have occurred.

3.3 Vessels without Nationality

The IPOA calls on States to take measures consistent with international law in relation to vessels without nationality that are involved in IUU fishing on the high seas. The system of rules established for the high seas, and international agreements managing the fishery resources found there, are meaningless unless vessels lawfully sail under the flag of a recognized state or entity. According to both international and U.S. law, all vessels must have a nationality. By defining "vessels subject to the jurisdiction of the United States" to include stateless vessels, whether those not properly flying the flag of any state or those assimilated to stateless status, U.S. law allows the United States to take enforcement action against vessels without nationality.

Two key pieces of legislation extend this general principle specifically to IUU fishing. First, under the Magnuson-Stevens Fishery Conservation and Management Act,[9] the United States may seize and prosecute stateless vessels engaging in large-scale high seas driftnet fishing in contravention of UN General Assembly Resolution 46/215.[10] The United States has exercised this authority on several occasions, most recently in 1999, by seizing the high seas driftnet vessel YING FA after the People's Republic of China refuted its registration.

The High Seas Fishing Compliance Act[11] gives the United States even broader tools for acting against stateless IUU vessels. Under the Act, the United States can prosecute vessels without nationality found on the high seas violating any international conservation and management measure recognized by the United States.

The United States also supports efforts to prevent vessels from becoming stateless during their transfer to a new flag. With U.S. support, the International Maritime Organization approved Assembly Resolution 923 that urges the originating flag State to receive confirmation from the new flag State that the owners have completed all administrative procedures and that the vessel is ready to be registered with the new flag State before releasing the old registration.

[8] 46 U.S.C. 12102(c)(6) addresses reflagging of certain vessels over 165 feet or 750 gross tons.
[9] 16 U.S.C. 1801 et. seq. (hereinafter Magnuson-Stevens Act).
[10] 16 U.S.C. 1857 (1)(M) prohibits the use of a "fishing vessel of the United States" to engage in large-scale driftnet fishing beyond the EEZ of any nation; once a stateless vessel is assimilated to U.S. nationality, it falls subject to this prohibition.
[11] 16 U.S.C. 5501.

3.4 Sanctions

The IPOA provides that sanctions should be of sufficient severity to effectively prevent, deter and eliminate IUU fishing and to deprive offenders of the benefits accruing from such fishing. The legislative chart at Appendix 1 summarizes the current levels of sanctions available under U.S. law for IUU fishing violations and includes recommendations to increase penalty levels or add permit sanctions where appropriate.

The United States apprehends and prosecutes foreign flag vessels that engage in IUU fishing within waters under the jurisdiction of the United States and through appropriate international authorities. The cases described below are examples of such sanctions.

In September 1994, the Honduran-flagged, Korean owned, F/V HAENG BOK #309 was determined to have made three incursions into the U.S. EEZ, and it complied promptly with U.S. Coast Guard attempts to conduct a boarding. The case was settled for a civil penalty of $1.12m and the company was required to put Vessel Monitoring Systems (VMS) on their entire fleet of 19 longliners for a period of five years.

The Polish flag vessel ADMIRAL ARCISZEWSKI was detected fishing 1000 yards within the U.S. Exclusive Economic Zone (EEZ) on June 14, 1996. This was the vessel's second offense. The case was settled for $750,000, plus $10,276 for U.S. Coast Guard costs.

The South Korean flag vessel KUM KANG SAN was detected fishing 500 yards within the U.S. EEZ on September 6, 2000, and it complied promptly with U.S. Coast Guard attempts to conduct a boarding. The case was settled for $300,000 plus $16,415.29 in costs.

In July 1997, the unflagged F/V CAO YU #6025 was detected conducting large scale driftnet fishing, and the vessel failed to cooperate with the U.S. Coast Guard boarding attempts, resulting in a forced boarding of the vessel. The vessel was forfeited to the United States along with its entire catch of 120 mt of albacore tuna, for an estimated total loss to the unknown owner of $435,000.

The South Korean flag vessel MAN JOEK was detected fishing 400 yards within the U.S. EEZ on November 10, 2001, and it complied promptly with U.S. Coast Guard attempts to conduct a boarding. The case was settled for $250,000.

3.5 Economic Incentives

The IPOA provides that to the greatest extent possible under their domestic laws, States should not confer economic support including subsides to companies, vessels, or persons involved in IUU fishing. The United States fishing industry is not subsidized to the extent of the fishing industries of other nations. The United States does maintain some modest loan guarantee and tax deferral programs, as well as some government support for applied research, which may convey some advantage to U.S. industry. These initiatives do not, in the view of the United States, contribute to IUU fishing.

3.6 Monitoring, Control and Surveillance

At the heart of the IPOA are its measures on monitoring, control, and surveillance (MCS). The IPOA calls for a comprehensive tracking of fishing activities, development of control schemes, vessel and owner documentation, implementation of VMS and observer programs, training of officials involved in MCS, meaningful and effective MCS operations, promotion of industry knowledge and cooperation, outreach to national judiciaries, establishment of systems for acquisition, storage, and dissemination of MCS data, consideration of privacy and confidentiality requirements, and implementation of internationally agreed procedures for boarding and inspection regimes, where applicable.

Planning and Funding MCS Activities

The IPOA calls upon all States to plan, fund and undertake MCS operations in a manner that will maximize their ability to prevent, deter, and eliminate IUU fishing. Within the U.S. Government, a number of federal agencies have responsibility for MCS functions, including the National Oceanic and Atmospheric Administration (NOAA), U.S. Coast Guard, Customs, the Immigration and Naturalization Service, the Fish and Wildlife Service, the Department of Justice, the Department of State, and others.

The United States has recently taken significant steps to update its fishery MCS program. Since 2000, the United States has more than doubled the budget for the National Marine Fisheries Service (NMFS) Office for Law Enforcement, expanding federal-state law enforcement partnerships and funding a national VMS program. This increased support has enhanced U.S. capacity to monitor fishing operations and landings, and to oversee the passage of fishery products through commerce at unprecedented levels.

Over the past twenty years, the U.S. Coast Guard's role in fisheries law enforcement has shifted from monitoring foreign fishing activity in waters under the jurisdiction of the United States to ensuring compliance by U.S. fishing vessels while minimizing illegal incursions of foreign vessels into U.S. waters.

Schemes for Access to Fishery Resources

The IPOA calls upon all States to develop and implement schemes for access to waters and resources, including authorization schemes for vessels. The U.S. Government, usually working in conjunction with the Regional Fisheries Management Councils established pursuant to the Magnuson-Stevens Act, evaluates the need to bring fisheries under federal management. Various management approaches, including many that utilize access limitations, are currently in effect. Over-utilization in many fisheries has resulted in the need to reduce fishing capacity.

Vessel and Gear Marking

All vessels and fixed gear being utilized in the U.S. commercial fishing industry are required to be marked so that they can be readily identified. Some examples of gear identification would include lobster trap tags, permit numbers on gear buoy markers, and requirements on placement and size of vessel identification numbers. There is no single standard method of marking gear or vessels since there are so many different types of vessels and gear use in the U.S. industry.

VMS

The IPOA encourages the use of Vessel Monitoring Systems (VMS), in accordance with the relevant national, regional or international standards, including the requirement for vessels under their jurisdiction to carry VMS aboard. VMS systems are proliferating worldwide. These systems provide outstanding compliance without intrusive at-sea boardings, enhance safety at sea, and provide new tools to managers for real time catch reporting. To date, NMFS's Office for Law Enforcement has actual or pending arrangements for the monitoring of nearly 2,500 fishing vessels in both domestic and international fisheries.

Domestically, the United States first used VMS in the Hawaiian pelagic longline fishery in 1994. VMS monitors approximately 130 longliners, deterring them from fishing in large closed areas established to reduce localized overfishing, and minimizing conflicts with endangered species. VMS is also required in certain fisheries in New England and Alaska. Currently NMFS and the U.S. Coast Guard are working on implementing a National Vessel Monitoring System (N-VMS). N-VMS will not require VMS on all vessels. It will, however, consolidate all VMS information into one database and promote near real-time transmission of this data to on-the-water assets.

Observer Programs

The IPOA also encourages use of observer programs. NMFS deploys approximately 500 observers who monitor more than 42,000 fishing days in more than 20 fisheries annually. Observers are generally used to collect data for monitoring catch, discards, and incidental takes of protected species such as marine mammals, seabirds and sea turtles. In some fisheries, observers may also be used to monitor compliance with regulations. Observers are, however, recruited as biological technicians to perform primary activities that are scientifically oriented. In any event, before observers could be given a broader role that included as a significant objective the monitoring of compliance with relevant rules, they would need to be given different training.

Training

The IPOA calls upon all States to provide training and education to all persons involved in MCS operations. The NMFS Office for Law Enforcement trains its officers and special agents at the Federal Law Enforcement Training Center. Required core training for all includes

satisfactory completion of the Marine Law Enforcement Training Program, NMFS Basic Training Program, and either Criminal Investigator Training Program (agents) or Natural Resource Police Training Program (officers). In addition to these core requirements, all commissioned personnel are required to participate in annual in-service training sessions. Training opportunities are also extended to state personnel.

In addition to the other training, NOAA's enforcement attorneys also meet at least once per year to receive specialized MCS training. Legal updates for attorneys and federal MCS personnel are done as needed. This is also done in the regions and on a nationwide basis. Periodic educational programs are held for the benefit of the Administrative Law Judges, federal prosecutors, and investigative personnel to help them better appreciate the issues involved in MCS.

The U.S. Coast Guard requires core training for all boarding officers and boarding team members that includes satisfactory completion of either a boarding officer or boarding team member course, or completion of personal qualification standards. To supplement these core requirements, the U.S. Coast Guard maintains and operates five regionally based fisheries training centers. These centers allow for the provision of vital and up-to-date fishery enforcement training to personnel of the U.S. Coast Guard and other fisheries enforcement agencies.

Industry Knowledge and Cooperation

The IPOA encourages all States to promote industry knowledge and understanding of the need for, and their cooperative participation in, MCS activities to prevent, deter, and eliminate IUU fishing and to undertake general programs to educate the general public about these issues. A variety of methods are used to provide outreach to industry to increase understanding of the requirements and need for them. This is done at trade shows, targeted educational sessions for industry groups, public affairs work, news releases, and with a toll-free number to report activities that merit investigation. The Fishery Management Councils maintain enforcement committees where MCS professionals and council members focus on enforcement activities and their integration into fisheries management plans and approaches.

In international negotiations where industry and public interest groups are stakeholders, U.S. delegations often include representatives from groups, allowing diverse interests to have a voice and participate firsthand in the process.

NOAA has also implemented direct outreach efforts in certain fisheries to educate fishermen on enforcement issues. In particular, the NMFS Office of Law Enforcement and the NOAA General Counsel for Enforcement and Litigation use the opportunity provided by federally mandated skipper education workshops.

Advisory groups representing relevant constituent interests generally support U.S. participation in a large number of regional fishery management organizations and arrangements. These groups have been active in identifying and addressing IUU fishing problems.

Judicial Systems

The IPOA encourages all States to promote knowledge and understanding of MCS issues within national judicial systems. NOAA has also been active in promoting and sharing information within national judicial systems as called for by the IPOA. A good example of sharing this type of information involves the first known case worldwide relying exclusively on VMS evidence to be decided by a court of law.[12] The decision and other information on the case were immediately shared with national representatives on the MCS Network and other interested countries and widely distributed on the Internet. As VMS proliferates, information sharing is essential, as judges around the globe will face similar issues within the context of their legal structures.

Acquisition, Storage, Dissemination of MCS Data

The International Monitoring, Control, and Surveillance Network for Fisheries-Related Activities (MCS Network) is a newly-established worldwide network of MCS professionals. Participating countries agree to cooperate and coordinate in the direct exchange of information and experiences. This includes a wide range of MCS-related data. The MCS Network is designed to support countries in satisfying their obligations from international agreements as well as in performing their domestic MCS functions. Terms of Reference, which provide the Network's basic structure, detail the types of information to be shared, including information called for by the FAO Compliance Agreement on vessels, permits and authorizations, catch and landing data as well as contact information, legal and legislative materials and other relevant information. This information resides in the MCS Network website which can be accessed at www.imcsnet.org. The United States is a founding member and believes this Network is a significant tool in the fight to reduce IUU fishing. Countries that are already members of the Network are actively involved in recruitment of additional countries, as a broad-base membership is desirable. An MCS conference is anticipated for late 2004.

Boarding and Inspection Schemes

The IPOA calls upon all States to ensure effective implementation of national and, where appropriate, internationally agreed boarding and inspection regimes consistent with international law. The U.S. Government participates actively in numerous international fisheries organizations and continually seeks to promote MCS mechanisms and regimes that are consistent with international as well as domestic laws.

The United States is already party to several international agreements that provide for the boarding and inspection of foreign vessels fishing on the high seas, under certain conditions and subject to certain limitations. Those regimes are the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean, the Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea, and a scheme established under the

[12] See NOAA case In the Matter of Lobsters, Inc. and Mr. Lawrence M. Yacubian.

auspices of the Northwest Atlantic Fisheries Organization. In addition, the United States is among those States that have signed the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean, which provides for a similar scheme. Under the Magnuson-Stevens Act, the United States has full authority to board and inspect all vessels fishing in waters under the jurisdiction of the United States, as well U.S. vessels fishing on the high seas.

3.7 Publicity

The IPOA calls upon States to publicize widely, including through cooperation with other States, full details of IUU fishing and actions taken to eliminate it, in a manner consistent with any applicable confidentiality requirements. The United States will publicize the results of IUU fishing cases to include: countries involved, and in general for violations and resulting convictions in order to deter IUU violations and support compliance with international agreements and domestic fishing laws. This information will be distributed through a variety of means including posting on the websites of various federal agencies, including the U.S. Coast Guard and NOAA, and press releases to international and national media venues.

3.8 Cooperation between States

The IPOA calls upon States to coordinate their activities and to cooperate directly, and as appropriate through relevant regional fisheries management organizations, in preventing, deterring and eliminating IUU fishing.

Combating IUU fishing at the global level is very important, but efforts undertaken at the bilateral and regional level are often particularly effective. The United States has various bilateral cooperative enforcement agreements. In addition to more general arrangements such as mutual legal assistance treaties, which can be useful in fisheries cases, the United States maintains several fisheries-specific agreements. While most of these involve neighboring coastal States, and are discussed in greater detail in Section 5, several are worth noting here.

Since 1991, the United States has maintained a Memorandum of Understanding (MOU) with the People's Republic of China that facilitates joint enforcement of the high seas driftnet moratorium in the North Pacific. The MOU allows boarding of vessels of one Party suspected of large-scale high seas driftnet (HSDN) fishing by enforcement officials of the other Party. The MOU also provides for officials of the People's Republic of China to embark on U.S. Coast Guard cutters engaging in high seas driftnet patrols. For the last several years, in addition to deploying on cutters on an as-needed basis, PRC officials have taken part in U.S. Coast Guard fisheries law enforcement training in Kodiak, AK and in U.S. Coast Guard HSDN surveillance flights.

Since 1993, there has also been extensive multilateral cooperation in research and enforcement through the North Pacific Anadromous Fish Commission. This group has been instrumental in the near elimination of HSDN fishing in the North Pacific. Russia, Japan, the United States, and Canada are all party to this agreement. Since its inception, this Commission

has always shared information on enforcement efforts in this region, and this has culminated in the last several years with the creation of an enforcement coordinating body that meets before the major HSDN threat season to discuss lessons learned from the past year and to plan for the optimal utilization of limited patrol assets during the upcoming season. In addition to this meeting, members of the coordinating body maintain regular discussions during the season to share information regarding ongoing investigations and HSDN sightings.

Another initiative to promote cooperation in the North Pacific began in 2000. The North Pacific Heads of Coast Guard Agencies consists of heads of the Coast Guards or equivalent agencies from the United States, Russia, Japan, Canada, Korea, and the People's Republic of China. In less than three years, this has grown into a key forum to discuss issues of mutual interest, including maritime security, maritime smuggling, combined operations, and fisheries enforcement. In 2002, a fisheries working group was created. The group will develop best-practice guidelines for international fisheries enforcement and focus on operational partnering.

More recently, the American Institute in Taiwan and the Taipei Educational and Cultural Representative Office in the United States also concluded a Memorandum of Understanding on fisheries cooperation and aquaculture. Through this MOU, Taiwan agreed to be bound by the tenets of the 1995 UN Fish Stocks Agreement and the FAO Compliance Agreement, and to cooperate on implementation of the FAO Code of Conduct for Responsible Fisheries and all recent FAO International Plans of Action. This MOU is a significant action against IUU fishing, by providing a framework through which the world's sixth largest fishing fleet pledges to operate in keeping with international fisheries conservation and management rules.

The United States should look at expanding its use of mutually beneficial agreements of this nature to induce States who may be the source of IUU fishing to hew to international fisheries law and abide by global conservation and management regimes.

Recommendations:

- Consider increasing penalty levels or add permit sanctions where appropriate under Magnuson-Stevens Act, Lacey Act, and other fisheries legislation.
- Consider increasing implementation and use of VMS systems, including a U.S. National VMS System as soon as possible.
- Assess and develop additional nationwide policies with regard to appropriate utilization and release of VMS data.
- Coordinate with international partners to ensure VMS requirements put into place are consistent with regional and international standards.
- Consider providing increased observer coverage in previously unobserved fisheries or increase coverage to provide improved statistical validity.

- Investigate co-locating NMFS special agents at the U.S. Coast Guard fishery training centers to improve fisheries training.
- Pursue shiprider agreements and/or enforcement officer exchanges with critical fishing nations.
- Investigate exchange of enforcement technicians to facilitate data transfer.
- Fully participate in the International MCS Network to support NPOA objectives.
- Develop routine contact lists of law enforcement personnel authorized to exchange MCS information.
- Modernize NOAA's enforcement data tracking system.
- Consider strengthening measures available in the Lacey Act, Magnuson Stevens Act, and other fisheries legislation to prosecute fishing in violation of RFMO conservation and management measures.
- Publicize the results of IUU fishing cases.
- Consider broadening existing regional specialized, multi-discipline import task forces to monitor imports, to enhance the investigative capacity of the United States to track transactions in IUU-caught fish involving U.S. nationals.

4 FLAG STATE RESPONSIBILITIES

The United States is responsible under international law to control the fishing activities of U.S. flagged vessels. Control of fishing vessels can be implemented by: (1) fishing vessel registration; (2) record of fishing vessels; and (3) authorization to fish. The following sections discuss current and recommended actions to control U.S. flagged fishing vessels.

4.1 Fishing Vessel Registration

The IPOA-IUU calls upon each flag State to ensure, before it registers a fishing vessel (grants nationality to a vessel), that it can exercise its responsibility to ensure that the vessel does not engage in IUU fishing.

All vessels of five net tons or greater that are owned by a U.S. citizen or corporation are required by under U.S. law to be federally documented through the U.S. Coast Guard's National Vessel Documentation Center (NVDC) if the vessels are to be used in the fishery trade.[13] Fishing vessels less than five net tons may not be federally documented, but are otherwise

[13] 46 Code of Federal Regulations 67.7.

registered by individual states of the United States. Authorization for U.S. vessels to fish in U.S. federally managed fisheries or upon the high seas is a responsibility of NMFS.

The IPOA-IUU recommends that, where different governmental agencies are responsible for registering vessels and providing authorization to fish, those agencies should coordinate functions and improve communication. Currently, a system does not exist where NMFS shares information on a vessel's past fishing activity to the U.S. Coast Guard's NVDC as criteria for issuance of federal documentation or to individual states as criteria for state registration. However, Section 401 of the Magnuson-Stevens Act directs the Secretary of Commerce, in cooperation with several other officials and organizations, to "develop recommendations for implementation of a standardized fishing vessel registration and information management system on a regional basis." NMFS is developing a National Fishing Vessel Registration and Fisheries Information System, which would be a cooperative federal-state partnership.

The IPOA-IUU calls upon flag States to deter vessels from reflagging for the purposes of non-compliance with international conservation and management measures. Flag-hopping is characterized as the practice of repeated and rapid changes of a vessel's flag for the purposes of circumventing conservation and management measures or provisions adopted at a national, regional or global level or facilitating non-compliance with such measures or provisions. The NVDC requires proof of U.S. citizenship for the owner, proof that the vessel was built in the United States, and evidence of removal from the previous flag prior to issuing a federal document with fisheries endorsement. This review by NVDC prevents vessels from jumping flags repeatedly, and may provide the opportunity for review of historical flagging of vessels.

The IPOA calls upon all States involved in a chartering arrangement to take measures to ensure that chartered vessels do not engage in IUU fishing. Vessel owners and operators can often take advantage of chartering arrangements to engage in IUU fishing because the States involved in the arrangement may each believe that the other is primarily responsible for regulating the activity of such vessels.

The United States participates in a number of regional fishery management organizations that are developing rules to prevent vessels involved in chartering arrangements from being used for IUU fishing. The International Commission for the Conservation of Atlantic Tunas (ICCAT), for example, adopted measures to increase transparency of chartering arrangements and to formalize requirements for data reporting and control and enforcement. In the ICCAT context, U.S. regulations require U.S. vessels to receive permits from, and report catches to, NMFS. The United States has the authority to issue exempted fishing permits to certain U.S. vessels involved in chartering operations for ICCAT species and to link reporting requirements so that we could collect the same information that the foreign chartering partner receives.

The Northwest Atlantic Fisheries Organization (NAFO) has a pilot program allowing the use of national fishing privileges by chartered vessels flying the flag of another NAFO member. Catches made using such arrangements are assigned to the NAFO member that received the fishing privileges. All MCS responsibilities remain with the flag State.

Consideration should be given to a thorough review of U.S. permitting regulations with the Maritime Administration to ensure that they provide a sound basis for addressing all situations in which U.S. nationals or vessels are involved in chartering arrangements.

4.2 Record of Fishing Vessels

The IPOA-IUU calls upon each flag State to maintain a record of fishing vessels entitled to fly its flag. This provision covers both vessels authorized to fish on the high seas and authorized to fish in its EEZ. The United States already records all information suggested in the IPOA-IUU for federally documented fishing vessels, with the exception of photographs of the vessel at time of documentation and history of non-compliance of the vessel. For instance, the National Vessel Documentation Center database tracks ownership and encumbrances (mortgages, liens, etc.) for all fishing vessels. However, the United States does not maintain a central database of fishing vessels registered by individual states of the United States.

For details concerning the U.S. Coast Guard's National Vessel Documentation Center, please refer to Section 4.1, above.

4.3 Authorization to Fish

The IPOA calls upon flag States to adopt measures to ensure that no vessel be allowed to fish unless authorized. Many provisions of the Magnuson-Stevens Act and other fishery laws of the United States prohibit unauthorized fishing by both U.S. and foreign flag vessels in waters under the jurisdiction of the United States and provide for the basis for imposing penalties for such fishing.

Although the United States requires permits for most major commercial fisheries, we do not require permits in all its fisheries. In those domestic, federal fisheries where permits are required, there is no unified permitting or authorization scheme for domestic vessels. The schemes often use a multitude of different processes and eligibility criteria and have varying durations, which can result in confusion in the application and renewal processes. Violation history is checked, but is not a disqualification for future permits unless past penalties have not been paid. In fisheries where permits are required, U.S. vessels are required to have their permits on board.

The IPOA-IUU calls upon flag States to ensure that each of the vessels entitled to fly its flag fishing in waters outside its sovereignty or jurisdiction holds a valid authorization to fish issued by that flag State. Where a coastal State issues an authorization to fish to a vessel, that coastal State should ensure that no fishing in its waters occurs without an authorization to fish issued by the flag State of the vessel.

The United States has limited foreign fishing in its waters. Although the United States does not require flag-state authorization for foreign vessels fishing in waters under the jurisdiction of the United States, we do require observers and other measures to ensure

compliance. However, while the U.S. Government asks for a compliance history of foreign fishing vessels, responses are not investigated.

As noted above, the United States has implemented the FAO Compliance Agreement, requiring all U.S. vessels fishing on the high seas to possess a permit and conditioning such permits on observation of all internationally agreed conservation and management measures recognized by the United States. Permit holders are required to fish in accordance with the provisions of these agreements and U.S. regulations.[14]

The IPOA also calls upon flag States to ensure that their fishing, transport and support vessels do not support or engage in IUU fishing. Flag States should ensure that, to the greatest extent possible, all of their fishing, transport and support vessels involved in transshipment at sea have a prior authorization to transship issued by the Flag State, and report to them a variety of information relating to transshipments.

The IPOA calls upon coastal States to ensure that at-sea transshipment and processing of fish and fish products in coastal State waters are authorized by that coastal State, or conducted in conformity with appropriate management regulations.

The Magnuson-Stevens Act lays out a process for, and various prohibitions on, transshipment activities by both U.S. and foreign vessels. NMFS, however, does not completely regulate transport and support vessels. Transshipments between U.S. fisheries go largely unchecked, and are prohibited only in a few isolated fisheries.

In waters off Alaska, for example, U.S. catcher-processor vessels transship thousands of tons of processed fisheries products to foreign-flagged cargo vessels each year. Although these transshipments are limited to certain locations in internal waters, and must be reported afterwards, there is no prior authorization or notification required.

ICCAT rules allow at-sea transshipments to take place only between ICCAT members themselves or between ICCAT members and cooperating non-parties. U.S. regulations of highly migratory species do not allow U.S. vessels to participate in at-sea transshipments.

U.S. law generally prohibits foreign fishing vessels and carrier vessels that act as “mother ships” to fishing vessels at sea from landing their catch in U.S. ports. American Samoa, Guam, and the U.S. Virgin Islands are exempt from this law, so foreign cargo vessels that accept at-sea transshipments of fish species and foreign flagged fishing vessels can land product in these U.S. ports.

[14] 50 Code of Federal Regulations 300.

Recommendations:

- Examine the possibility of linkages between the U.S. Coast Guard's registration process and NMFS's fishery permit process.
- Consider withholding issuance of documentation, registration and/or fishing permits to vessels that have a history of IUU fishing, unless change in ownership and control of the vessel has been verified**.**
- Consider establishment of a national registration process for small fishing vessels, less than five tons.
- Consider establishing a database of photographs for documented fishing vessels.
- Consider consolidating information on state-registered fishing vessels into a national database.
- Consider developing unified permitting and renewal scheme for U.S. vessels. Permits are issued differently in each of six different regional NMFS offices.
- More thoroughly investigate compliance history of foreign vessels applying to fish in waters under the jurisdiction of the United States.
- Improve logbook data requirements in accordance with paragraph 47.2 of the IPOA-IUU.
- Develop a mechanism to share violation histories on IUU vessels with other States.
- Review the existing process on transshipment activities and determine where improvements are possible, e.g., prior notification.

5 COASTAL STATE MEASURES

The IPOA calls upon coastal States to take measures to prevent, deter, and eliminate IUU fishing in waters under their national jurisdiction. Most issues relating to U.S. measures in this regard are covered in previous sections.

As part of its MCS program for regulating fishing activity in the U.S. EEZ, the United States requires VMS in a number of fisheries and is considering VMS requirements for additional fisheries. The U.S. Coast Guard and state enforcement officials routinely patrol the U.S. EEZ as well to monitor fishing activity, and the U.S. Coast Guard is the lead federal agency responsible for at-sea fisheries enforcement. Specially trained NMFS special agents and officers are also engaged in the detection of fishing violations.

No vessel may participate in a federally managed, commercial permitted fishery in waters under the jurisdiction of the United States without a valid authorization to fish. However, vessels may participate in some other fisheries in the United States without express

authorization, including certain open access fisheries and others that do not fall under the umbrella of a Federal or state fishery management plan.

U.S. law requires vessel operators to maintain logbooks for some but not all fisheries. In light of the fact that logbooks can offer important evidence relating to IUU fishing, consideration should be given to expanding the range of fisheries in which logbooks are required.

The IPOA calls upon coastal States to avoid licensing a vessel to fish in its waters with a history of IUU fishing.

As noted above, the United States requires express authorization to fish in most, but not all, federally managed fisheries. The existence of prior convictions for illegal fishing does not preclude an applicant from obtaining a permit. However, if a prior fine for such a violation is unpaid or if a permit sanction exists, the new permit will be denied until the prior penalty is paid or the permit sanction is served. Under the Magnuson-Stevens Act, the transfer of a vessel to a new owner does not extinguish the prior or existing permit sanctions, although the change in ownership may be taken into account in considering whether to issue a new permit.

U.S. vessels wishing to fish on the high seas must obtain a NMFS permit. NMFS checks for prior U.S. fisheries violations before issuing such permits. The existence of such violations is taken into account in determining whether to issue a permit, but is not an absolute bar.

5.1 Cooperation with Neighboring Coastal States

The United States is party to a number of bilateral and multilateral agreements designed to foster cooperation in fisheries enforcement. A U.S.-Canadian bilateral enforcement agreement, for example, calls for the imposition of equivalent penalties to be imposed on vessels of either State that fish illegally in waters of the other State. This has eliminated the need for "hot pursuit" and lengthy at-sea enforcement incidents along maritime boundaries on both the Atlantic and Pacific coasts of the U.S. and Canada. Annual meetings held pursuant to this agreement provide opportunities to share information about specific cases that have arisen and to discuss ways to improve coordination overall. U.S. and Canadian fisheries enforcement officials also meet regularly on a more informal basis to consider specific situations, including the handling of fisheries enforcement matters in sensitive boundary areas.

In general, the United States believes that its cooperation with Canada in combating IUU fishing in our respective waters has been quite successful. The one way in which such cooperation could and should be improved would be to resolve disputes involving the location of maritime boundaries in areas where fishing takes place, including in Dixon Entrance (between Southeast Alaska and British Columbia) and near Machias Seal Island (between Maine and New Brunswick).

The United States and Mexico also cooperate on fisheries enforcement matters, but do not yet have a formal agreement in this field. Fisheries enforcement officials share information regularly on an informal basis, particularly with respect to pending investigations concerning

alleged illegal fishing by vessels of one State in waters of the other State. The two States have also been attempting to make more routine the handling of cases involving small Mexican vessels (*lanchas*) operating in the Gulf of Mexico that cross into waters under the jurisdiction of the United States and fish illegally. An effort is also underway to develop a U.S.-Mexico fisheries enforcement agreement modeled on the U.S.-Canada and U.S.-Russia agreements.

The United States has engaged in ad hoc efforts to cooperate with neighboring coastal States in the Caribbean region on fisheries enforcement matters. Such efforts could be expanded and made more regular.

The United States and Russia have developed a broad and growing cooperative relationship on fisheries enforcement matters in the Bering Sea and North Pacific Ocean, under the umbrella of a 1988 Agreement on Mutual Fisheries Relations. Particular attention has focused in recent years in deterring and penalizing incursions by Russian and third-party vessels across the U.S.-Russia maritime boundary line in this region. Since 2002, two meetings of fisheries law experts have taken place between Russia and the United States. The United States is continuing to explore ways to strengthen this relationship even further.

5.2 Fishing by Foreign Vessels in Waters under the Jurisdiction of the United States

The Magnuson-Stevens Act provides the legal framework under which foreign fishing vessels may operate in the U.S. EEZ. Generally speaking, no foreign vessel may fish in the U.S. EEZ unless the flag State has concluded a "Governing International Fishery Agreement" (GIFA) with the United States.[15] At the present time, only a small number of States have GIFAs in force with the United States.

Vessels of flag States that have GIFAs in force are eligible to receive allocations of surplus fish stocks for direct harvesting in the U.S. EEZ. Those vessels may also participate in certain types of "joint venture" fishing operations in partnership with U.S. companies. With the exception of 2001, there have been no surplus stocks available for direct harvesting by foreign vessels since the early 1990s. A small amount of "joint venture" fishing does take place each year.

GIFAs contain a number of provisions designed to prevent IUU fishing by foreign vessels operating in the U.S. EEZ, including mandatory reporting, use of observers and VMS in certain situations and a number of other controls. Given the low level of foreign fishing in the U.S. EEZ in recent years, and the high level of U.S. monitoring required of those operations, the United States is confident that no IUU fishing is taking place by foreign vessels authorized to fish in waters under the jurisdiction of the United States.

If unauthorized foreign fishing in waters under the jurisdiction of the United States is detected, the vessel will typically be seized and brought into a U.S. port where prosecution will

[15] The Magnuson-Stevens Act contains a few limited exceptions to this rule. For example, a 1981 treaty between the United States and Canada permits vessels of each State fishing for albacore tuna to operate in the EEZ of the other State (Pacific Coast Albacore Tuna Vessels and Port Privileges, May 26, 1981, U.S.-Canada, 33 U.S.T. 615).

occur, including high monetary fines and possible vessel and catch seizure. In certain instances, the evidence of the violation will be given to the vessel's flag state so that it may prosecute the offense rather than U.S. authorities.

Recommendations:

- Pursue a fisheries enforcement agreement with Mexico.
- Consider expanding advance notice of arrival requirements to foreign fishing vessels seeking access to U.S. ports.

6 PORT STATE MEASURES

The IPOA calls upon States to regulate access to their ports in such a way as to prevent, deter and eliminate IUU fishing. [16] U.S. law generally prohibits foreign vessels from landing or transshipping fish in U.S. ports. The primary exception to this rule concerns ports in U.S. territories in the Pacific Ocean.[17] With respect to those ports, at least, the provisions of the IPOA are relevant to the United States.

The IPOA calls upon port States to require vessels seeking access to their ports to provide advance notice of entry into port, a copy of their authorization to fish and details of their fishing trip, in order to determine whether the vessel may have engaged in or supported IUU fishing.

The U.S. Coast Guard requires an Advanced Notice of Arrival (ANOA) 96 hours prior to entry into U.S. ports for all vessels greater than 300 gross tons. This requirement does not presently capture most fishing vessels, as they are usually less than 300 gross tons. It would be desirable to extend this requirement to cover fishing vessels, or at least to cover foreign fishing vessels seeking access to U.S. ports. Given that at least some foreign fishing vessels below 300 gross tons land or transship fish in U.S. ports, it would also be desirable to extend the ANOA system to cover them as well. Finally, it would be desirable to require all foreign fishing vessels seeking access to U.S. ports to provide a copy of their authorization to fish, details of their fishing trip and quantities of fish on board.

The United States does not currently require foreign fishing vessels seeking access to U.S. ports to have a logbook on board. A logbook helps establish where the vessel has been, and where and when it was fishing. This sort of evidence is critical in certain types of cases involving IUU fishing, especially in the absence of universal VMS requirements. Accordingly,

[16] The IPOA generally considers "port access" to mean admission for foreign fishing vessels to ports or offshore terminals for the purpose of, *inter alia*, refueling, resupplying, transshipping and landing. The IPOA further notes that, in accordance with international law, a port State should grant port access to vessels for reasons of *force majeure* or distress or for rendering assistance to persons, ships or aircraft in danger or distress.

[17] The 1981 U.S.-Canada treaty on albacore fishing allows Canadian vessels to land albacore tuna in certain designated U.S. ports in Washington and Oregon (Pacific Coast Albacore Tuna Vessels and Port Privileges, Annex B, May 26, 1981, U.S.-Canada, 33 U.S.T. 615).

the United States should consider adopting this requirement, so that the absence or destruction of a logbook will be a violation.

The IPOA calls upon each port State, where it has clear evidence that a vessel granted access to one of its ports has engaged in IUU fishing, not to allow the vessel to land or transship fish in its ports. The port State should also report the matter to the flag State of the vessel. Similarly, if inspection of a foreign vessel in port gives reasonable grounds to suspect that the vessel has engaged in or supported IUU fishing in areas beyond the jurisdiction of the port State, the port State should report the matter to the flag State and, where appropriate, to the relevant RFMO. In such circumstances, the port State may take additional action against the vessel with the consent of, or upon the request of, the flag State.

If the United States has sufficient evidence of IUU fishing in waters *within U.S. jurisdiction* by a foreign flag vessel and the vessel evades apprehension initially, the vessel would be arrested if it subsequently entered a U.S. port. The United States would notify the flag State. If the fisheries violation involved a stock that is within the purview of a RFMO, the United States might also inform the RFMO as well, depending on the circumstances.

If a foreign vessel is suspected of IUU fishing in waters *beyond U.S. jurisdiction* and subsequently seeks access to a U.S. port, the United States would first determine whether the elements of the Lacey Act have been met.[18] If so, the United States would ask the other State(s) involved[19] to investigate the matter and to see if they would support a U.S. prosecution. International cooperation through various means, such as the MCS Network and Interpol, may also come into play, as United States works with other States in documenting and prosecuting cases against IUU fishers who cross jurisdictional lines.

The United States generally informs flag States of the outcome of U.S. prosecutions in such cases. This information is typically passed through diplomatic channels.

The IPOA encourages port States to inspect foreign fishing vessels in their ports, to collect certain information in the course of such inspections and to share that information with the flag State and, where appropriate, a relevant RFMO.

NMFS boards some foreign vessels in U.S. ports to examine and verify fish landings, but the number of such inspections could be increased and the system for determining which vessels to inspect could be improved. Both actions would require additional resources.

In the field of marine safety, the U.S. Coast Guard administers a program that could serve as a model for a more robust system of targeting and boarding foreign fishing vessels in U.S. ports for the purpose of determining compliance with fisheries conservation regulations. The

[18] As discussed above, the Lacey Act makes it unlawful for a person subject to U.S. jurisdiction (which would include a foreign fishing vessel in U.S. port) to have harvested or transported fish in violation of another State's law or in violation of a treaty.

[19] Those other States would include the flag State and could include one or more coastal States, if there is evidence that the vessel engaged in IUU fishing in waters subject to the jurisdiction of other coastal States.

Port State Control program, which covers commercial vessels greater than 300 gross tons, begins with the ANOA. Upon receipt of an ANOA, the U.S. Coast Guard assesses the vessel's owner, flag, classification society, vessel type and history to determine their boarding priority. Vessels are assigned points in each of these categories and are boarded and inspected for compliance with vessel safety standards according to their priority. NMFS could develop a similar targeting system to determine which foreign fishing vessels are likely to have engaged in IUU fishing and therefore which ones should be a higher priority for inspection.

The IPOA calls upon States to establish and publicize a national strategy and procedures for port State control of vessels involved in fishing and related activities.

As discussed above, there are very few U.S. ports in which foreign vessels can land or transship fish. Accordingly, it may not be necessary for the United States to establish a "national" strategy and procedures for port State control in this context. However, it may be desirable for the United States to develop a more coordinated approach to ensure that foreign vessels do not land or transship IUU-caught fish in those ports that are open to them. A more coordinated approach would include extension of the ANOA requirements to cover such vessels and strengthening of the scheme for inspecting such vessels upon arrival in port.

Coordination among Port States

The IPOA suggests a number of ways in which port States might better coordinate their activities to combat IUU fishing.

The United States would certainly support efforts by port States to coordinate their activities in combating IUU fishing. However, because so few U.S. ports are open to foreign vessels for landing or transshipping fish, the involvement of the United States in such efforts may not be very great. One exception to this might involve the Central and Western Pacific region. Foreign vessels are permitted to land or transship fish in several U.S. ports in this region. The United States should actively promote the development of coordinated port State controls to combat IUU fishing in this region, including through the Central and Western Pacific Fisheries Commission that is in the process of being established.

Although the United States is not a major port State for fisheries in other regions, we are interested in pursuing the possibility of developing agreements for those regions on port State measures. Ideally, such agreements would involve members of any RFMO as well as non-members whose ports are known to be used for landing or transshipping fish regulated by the RFMO.

The United States believes that RFMOs could also formalize their co-operation on this issue. Such cooperation would be essential in areas where IUU fishing is the concern of two or more RFMOs. For example, the conservation and management of fish resources in the Atlantic Ocean is the responsibility of several RFMOs, which are already cooperating and exchanging information regarding IUU fishing in their respective convention areas. A comprehensive port

State system would mean that IUU fishing within the area of responsibility of one RFMO should trigger action by port States that are members of other RFMOs.

A regional system of port State measures could also entail common procedures for inspection, qualification requirements for inspection officers and agreed consequences for vessels found to be in non-compliance. Possible common elements could also include, in addition to denial of port access and/or landing and transshipment of catch, denial of requests for fishing access to coastal State waters and denial of requests for vessel registration.

Recommendations:

- Consider adopting requirement for foreign fishing vessels seeking access to U.S. ports to have a logbook on board.
- Strengthen the scheme for inspecting foreign vessels landing or transshipping fish upon arrival in port.
- Consider requiring all foreign fishing vessels seeking access to U.S. ports to provide a copy of their authorization to fish, details of their fishing trip, and quantities of fish on board.
- Support continued work in FAO on the development of binding agreements on port State measures as contained in the report of the Expert Consultation to Review Port State Measures to Combat Illegal, Unreported and Unregulated Fishing held in Rome in November 2002.

7 INTERNATIONALLY AGREED MARKET-RELATED MEASURES

The IPOA recognizes that the denial of market access to products harvested by IUU fishers can be an effective tool in combating IUU fishing, provided that such measures are agreed internationally and are implemented in accordance rules relating to international trade, particularly rules of the World Trade Organization.

As a matter of policy, the United States considers the use of trade restrictive measures to be an extraordinary action. When considered necessary, the United States prefers measures that are developed and implemented multilaterally over those that are developed or used unilaterally. In some situations, however, it may be necessary for a State to adopt trade restrictive measures on a unilateral basis, in accordance with WTO rules.

The United States recognizes that the most effective trade measures to combat IUU fishing are likely to be those that are developed and implemented under the auspices of multilateral organizations with well-defined conservation goals articulated as first principles. The United States has actively participated in the establishment of such measures (including import prohibitions, landing restrictions, and catch certification and trade documentation schemes) through our membership in various RFMOs. As discussed more fully below, the

United States believes that RFMOs should expand the use of such measures to combat IUU fishing. In addition, the trade tracking and certification mechanisms under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) offer another effective means to deter IUU fishing involving endangered or threatened marine species.

7.1 Catch Documentation and Certification Schemes through RFMOs

The United States fully implements a range of measures adopted for this purpose by RFMOs. For example, we prohibit the importation of certain tuna and tuna-like species from specific States in accordance with recommendations adopted by ICCAT. We also require imports of certain fish and fish products to be accompanied by documents mandated by RFMOs such as ICCAT and CCAMLR.

The IPOA calls upon States to cooperate, including through relevant global and regional fisheries management organizations, to adopt appropriate multilaterally agreed trade-related measures, consistent with the WTO, that may be necessary to prevent, deter and eliminate IUU fishing for specific fish stocks or species. Such measures may include documentation schemes and certification requirements.

The United States has taken the lead in promoting the use of catch documentation and certification schemes in a number of RFMOS such as CCAMLR, ICCAT, and the IATTC. CCAMLR and IATTC have adopted catch certification programs and ICCAT has adopted statistical document programs for several species. These programs are under continuous review in an effort to improve their effectiveness.

The IPOA provides that certification and documentation requirements should be standardized to the extent feasible, and electronic schemes developed where possible, to ensure their effectiveness, reduce opportunities for fraud, and avoid unnecessary burdens on trade.

The United States actively supports this goal and has been working with FAO, certain RFMOs and other States to achieve it. The United States considers the implementation of harmonized electronic catch certification and documentation schemes tailored to fit the needs and requirements of each RFMO to be the most effective way to accomplish this objective. For example, the United States is working with other members of CCAMLR is moving towards converting its documentation scheme for toothfish to an electronic format. Meanwhile, CCAMLR is developing ways to make its forms more efficient and comprehensive.

7.2 Consideration of General U.S. Certification Program for Fish and Fish Products

To combat IUU fishing more broadly, the United States might consider a certification requirement crafted in such a way so as not to be excessively burdensome to industry. Under such a scheme, all imports of fish or fish products would be considered legal if the flag State could certify that the fish has been harvested in accordance with their own fisheries management regime/requirement; or from an area governed by a RFMO or other regional body; or on the high seas in accordance with international standards. If, however, it has been harvested outside of

existing regulations, then it should not be certified as legal and appropriate action should be taken.

The IPOA calls on States to take steps to improve the transparency of their markets to allow the traceability of fish and fish products.

The U.S. seafood market is among the most transparent in the world. However, given the size of that market, it is difficult to conceive of a workable system that would allow people to trace every fish and fish product from the moment of its harvest until the moment of final sale. Still, it may be possible to allow for the tracking of additional fish and fish products through the U.S. market, including through the development of additional catch documentation schemes. Where feasible, of course, such schemes should be standardized.

7.3 Post-Harvest Practices: Law Enforcement, Education, and Outreach

The IPOA calls upon States to take measures to ensure that their importers, transshippers, buyers, consumers, equipment suppliers, bankers, insurers, other services suppliers and the public are aware of the detrimental effects of doing business with vessels identified as engaged in IUU fishing and should consider measures to deter such business. Such measures could include, to the extent possible under national law, legislation that makes it a violation to conduct such business or to trade in fish or fish products derived from IUU fishing. Similarly, the IPOA calls upon States to ensure that their fishers are aware of the detrimental effects of doing business with importers, transshippers, buyers, consumers, equipment suppliers, bankers, insurers and other services suppliers identified as doing business with vessels identified as engaged in IUU fishing.

As noted above, the U.S. Lacey Act makes it unlawful for persons subject to U.S. jurisdiction (which would include many persons involved in the transactions covered by this provision of the IPOA) to engage in many of these transactions if the fish or fish product was harvested in violation of another State's law or in violation of a treaty.

The United States has not provided "administrative guidance" to its fisheries sector in the way that some countries have done and is not likely to do so in the future. Furthermore, the use of so-called "black lists," especially those created unilaterally, raises issues of due process. However, it may be possible to implement the sort of public education and business restrictions envisioned by the IPOA through multilateral lists compiled by RFMOs. "White lists" are less problematic.

The United States could do more in terms of outreach and education. Consideration should be given how best to publicize information on offenders and to share information on illegal activity. Fish trade shows may provide additional opportunities to raise awareness of relevant U.S. industry representatives of the problems of doing business with IUU fishers. The United States Government could also work in partnership with industry organizations and the environmental community to the same end.

7.4 Trade Data Collection and Standardization of Certification Schemes

The IPOA calls upon States to work towards using the Harmonized Commodity Description and Coding System for fish and fisheries products in order to help promote the implementation of the IPOA. The United States is currently using this system.

In a number of instances unregulated and unreported fisheries are also unidentified fisheries. In this regard, the Unites States joined with other States in March 2002 at the FAO in developing a draft Strategy for the Improvement of Reporting on Status and Trends in Commercial Fisheries. One element of this draft strategy is to expand the customs codes into products and fisheries not currently covered by codes and then to expand the depth and breadth of FAO's reporting on these fisheries, such as those for sharks or coral reef species, that currently operate without any tracking of volumes and movement of trade. The United States is a supporter of this strategy and will work for its adoption and implementation at FAO.

7.5 The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

CITES provides another potential tool to combat IUU fishing. The United States has been a leader in encouraging closer cooperation between the FAO and CITES to improve the applicability of CITES provisions to commercial fisheries and supports the early development of an MOU between the two organizations to formalize cooperation.

For species listed on Appendix II of CITES, international trade is regulated but not banned. Before a significant number of commercially harvested fish species could be successfully listed on CITES Appendix II, a number of technical issues need to be resolved. The United States nevertheless believes that the listing of some commercially harvested fish species on Appendix II could help to prevent IUU fishing for those species. One example is queen conch, a species for which there is no multilateral mechanism yet in place to regulate its harvest. With respect to species covered by RFMOs, an Appendix II listing has the possibility to complement RFMO efforts through addressing issues such as non-member fishing (CITES currently has 160 parties) and through its potential for multilateral trade action on States found out of compliance with CITES provisions. CITES also has the ability to address IUU fishing for non-listed species through resolutions and discussion papers.

This proposed MOU between FAO and CITES should result in FAO discussing a number of these Appendix II technical issues and providing advice to CITES on their resolution. FAO-CITES cooperation should also facilitate the transfer of fisheries expertise to CITES Parties as they consider listing proposals for commercially exploited aquatic species. The United States would also like to see greater cooperation between FAO and CITES lead to increased law enforcement capacity from both organizations in line with the MCS provisions of the IPOA. As a tool for tracking trade and as a legally binding instrument, CITES Appendix II can be useful in accurately cataloguing and deterring IUU fishing. The United States thinks that CITES could be used under certain circumstances as an effective adjunct to traditional fisheries management

regimes. CITES cannot replace fisheries management, but can be an effective tool to control and track and regulate trade.

7.6 Subsidies and IUU Fishing

The Johannesburg Plan of Implementation of the World Summit on Sustainable Development makes an explicit link between subsidies to the fishing sector and IUU fishing and calls upon States to eliminate those subsidies through the process currently underway in the WTO. A number of organizations including the WTO, OECD, FAO, and APEC are looking at subsidies, and the United States is actively participating within each of these to reduce harmful subsidies in the fisheries sector. In particular, the OECD Committee on Fisheries is initiating a new three-year work program that will look at the role of subsidies in IUU fishing.

Recommendations:

- RFMOs should expand the use of market-related measures to combat IUU fishing, including new import prohibitions, landing restrictions, and catch certification and trade documentation schemes.
- Consider whether other RFMOS might usefully adopt similar catch documentation or certification schemes similar to those in use in ICCAT, IATTC and CCAMLR.
- Work within RFMOs to ensure that any such new schemes are standardized, to the extent possible, to aid efficiency and transparency.
- Urge other governments, at the bilateral, regional and global levels, to take all steps necessary, consistent with international law, to prevent fish caught by IUU vessels being traded or imported into their territories.
- To fight IUU fishing more broadly, the United States might consider a general certification requirement for fish and fish products crafted in such a way so as not to be excessively burdensome
- Develop a plan, with the input of all stakeholders, on education and outreach to raise awareness with U.S. industry and the public on the consequences of doing business with IUU fishers.
- Consider expansion of specificity of customs codes used within the Harmonized Commodity Description and Coding System for stocks identified as being subject to significant IUU trade (e.g. sharks and coral reef fish species) and forwarding of any improved information on these stocks to FAO for inclusion in its reporting.
- Support adoption and implementation of the Draft Strategy for the Improvement of Reporting on Status and Trends in Commercial Fisheries at FAO as a tool to identify IUU fishing activities.

- Support the utilization of CITES as another vehicle to address IUU fishing, especially through the development of an MOU between FAO and CITES, and provide financial and technical assistance to its implementation.
- Urge the OECD, in its new three-year work program to follow up on the call in the WSSD Plan of Implementation to eliminate subsidies contributing to IUU fishing through identification of what subsidies are most likely to contribute to such activities.

8 IMPLEMENTATION OF IPOA THROUGH RFMOS

The IPOA calls upon States to ensure compliance with and enforcement of policies and measures having a bearing on IUU fishing that are adopted by any relevant RFMOs by which they are bound. States should cooperate in the establishment of such organizations in regions where none currently exist.

The United States is a member of numerous RFMOs and works actively to ensure that individuals and vessels subject to U.S. jurisdiction comply with measures adopted by those organizations. In addition, the United States was a leading force in the negotiation of new fisheries conservation and management agreements for highly migratory species in the central and western Pacific (WCPFC) and other fisheries resources in the Southeast Atlantic (SEAFO).

Some RFMOs have made great strides in recent years to address IUU fishing, several of which are discussed above. Other descriptions can be found on the websites of the various RFMOs or FAO publications.[20] The United States nevertheless believes that RFMOs can do more to combat IUU fishing. In the coming years, the United States will continue to pursue additional initiatives within the RFMOs of which it is a member to combat IUU more effectively. We believe that aggressive and appropriate guidelines have been set forth in the 1995 UN Fish Stocks Agreement. We believe that all RFMOs and their member nations should carefully consider the relevant provisions of this agreement and work towards prompt incorporation of these provisions into each of the world's RFMOs.

9 SPECIAL REQUIREMENTS OF DEVELOPING COUNTRIES

The United States strongly supports the call in the IPOA for States to cooperate to support training and capacity building to developing countries so that they can more fully meet their commitments under the IPOA and obligations under international law. The United States is involved in a number of multilateral programs designed to carry out this charge and will seek more opportunities in the future.

Working with FAO, the United States has been able to donate the initial funds for a project under FAO's FishCODE program, entitled "Support for the Implementation of the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated

[20] See, e.g., FAO Technical Guidelines for Responsible Fisheries, *Implementation of the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing* (2002).

Fishing (IUU Fishing)." FishCODE is a new approach to organizing extra-budgetary contributions to FAO designed to implement the 1995 FAO Code of Conduct for Responsible Fisheries and its associated international plans of action, including the IPOA on IUU fishing. Some of the initial funds provided by the United States have already been used to support the publication of FAO Guidelines on implementation of the IPOA. The remaining funds will be used to promote MCS capacity building activities, host a conference on flag of convenience and port of convenience issues, and promote regional cooperation in the Pacific through work with the Asia Pacific Economic Cooperation (APEC).

As a Party to the 1995 UN Fish Stocks Agreement, the United States is committed to meeting its obligations in Part VII of the Agreement to provide assistance to developing States. When fully implemented, Part VII provisions, calling for many of the same capacity building activities as those in the IPOA, will have a significant impact on IUU fishing activities in States Parties to the Agreement. To further implementation of Part VII, the United States joined with other States Parties, at an informal meeting held in New York, 30-31 July 2002, in calling for the establishment of a voluntary trust fund at the global level that will facilitate the implementation of the Agreement for developing States Parties. The 2003 UN General Assembly Resolution on the UN Fish Stocks Agreement commits the UN General Assembly to establish the fund and urges parties at their next informal consultations to develop detailed terms of reference for such a fund.

The United States has taken an active role in regional fora seeking to address the problem of IUU fishing and facilitate implementation of the IPOA. Meeting in Seoul, Korea in April 2002, Ministers of the 21 APEC economies jointly declared their intention to eliminate IUU fishing activities from the APEC region.

We are also working regionally and bilaterally to improve fisheries MCS activities. In April 2002, the United States conducted a fisheries enforcement workshop for States in the Western Indian Ocean Region. U.S. law enforcement officials conduct training activities on both a bilateral and regional basis that provide training on at sea enforcement, shore-based enforcement, and the development of legal regimes that contribute to capacity building in developing countries. For other activities undertaken by the United States specific to the recommendations in Paragraph 86, please see the relevant section of the NPOA.

One thing that has become clear in discussions in APEC, at the UN and elsewhere is that there are a number of activities underway to assist developing countries in meeting their global, regional, and bilateral fisheries obligations. These efforts can be duplicative and at the same time leave important activities unfinished. The United States commits to seek out opportunities to coordinate donor efforts to ensure the maximization of benefit from scarce assistance resources. Greater cooperation is needed if we are to effectively implement the ideas in paragraphs 85 and 86 of the IPOA.

In particular, the United States commits to work with the World Bank, the Global Environment Facility, other international financial institutions, and interested private sector donors, to increase donor funds in support of the IPOA. IUU fishers are a threat to the economic

development and food security of coastal communities. The United States believes that projects that include components for the reduction of IUU fishing activity will have direct consequences for long-term poverty alleviation in many developing countries.

Recommendations:

- Work with other States Parties to the UN Fish Stocks Agreement to establish a voluntary trust fund to support developing States Parties to the Agreement and provide a substantial initial contribution to the fund.

- Support efforts in RFMOs and on a bilateral basis to assist developing countries in meeting their fisheries obligations.

- Expand U.S. participation in regional and sub-regional fisheries organizations and arrangements based predominantly in developing countries (such as IOTC, WECAFC and CECAF) with the aim of identifying opportunities and synergies for new and ongoing cooperation activities.

- In support of the Seoul Oceans Declaration, the United States commits to develop a project proposal for the APEC Fisheries Working Group for funding in 2005 that will build capacity in developing economies.

- Conduct follow-up from East African Fisheries Enforcement Workshop and hold a second regional workshop for South East Asia and the Pacific Islands.

- Engage World Bank, Global Environment Facility, and other donor organizations to identify priority areas for new programs in fisheries and ensure that where projects are already in development, they will be developed according to sustainable fisheries practices.

- Within the context of zero nominal growth, seek a reallocation of FAO regular budgetary resources to the Fisheries Department to allow greater responsiveness and broader coverage from FAO in implementing the IPOA.

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Statutory Approach	Enforcement Authority	Regulated Species	Geographic Application	Scope of Liability	Penalty Levels	Sufficiency of Penalty	Comments	Recommendations
1. Agricultural Marketing Act of 1946 (7 U.S.C. § 1621 - 1627)								
Consumer marketing statute.	Secretary of Agriculture is authorized to inspect, grade and certify agricultural products. §1622(9h). Secretary may cooperate with other branches of government in carrying out his duties. §1624.	None specified	U.S. interstate commerce jurisdiction (no geographic limitation specified).	All persons, natural and juridical (individual, partnership, corporation, association or any other legal entity subject to the laws of the U.S.), for misrepresentation of inspection.	$1,000 or imprisonment for one year, or both.		Not clear how inspection under the Act relates to ability to deter/prevent IUU fishing under the IPOA.	It may be useful to apply a similar port inspection requirement to establish origin of all fish products being imported to/transported through the U.S., if such a requirement does not already exist under another statute.
2. American Fisheries Act of 1998 (Pub. Law 105 - 277)								
Fisheries regulation statute.	Forfeiture of all fish taken in violation of regulations. §212.	Pollock	Bering Sea and Aleutian Islands Management Area.	Owners of vessels holding an official fisheries endorsement (through agent or representative) for falsification or concealment of a material fact; false statement or representation with respect to the eligibility of the vessel.	$130,000 for each day of fishing.	Amount of monetary penalty seems sufficient.	Eligibility requirements for a fishery endorsement: at least 75% of the aggregate interest in owner entities must be owned and controlled by citizens of the U.S. Does not apply to vessels engaged in fisheries in the EEZ under the authority of the Western Pacific Management Council established under the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1852(a)(1)(H)) or to a purse seine vessel engaged in tuna fishing in the Pacific Ocean outside the U.S. EEZ or pursuant to the South Pacific Regional Fisheries Treaty. Particular attention shall be paid to enforcing the citizenship requirements for vessels measuring over 10 feet in registered length, especially in contexts of ownership/interest transfer and borrowing in all forms (specific exemptions addressed in the Act). 46 U.S.C. §	Consider non-monetary penalties, perhaps including loss or suspension of endorsement.

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							12102(c).	
3. Anadromous Fish Products Act (16 U.S.C. 1822 note, Section 801(f))								
Fish products import regulation statute.	Secretary of Treasury, pursuant to direction from the President and following certification by Secretary of Commerce, may direct that all unlawfully taken anadromous fish products brought into the U.S., or their monetary value be forfeited. §1978(e)(2). Secretary of Treasury is responsible for enforcement generally.	All anadromous stocks	U.S. interstate commerce jurisdiction (no geographic limitation specified).	All persons, natural or juridical engaging in unlawful import of illegally caught fish.	$12,000 for first violation; $27,000 for each subsequent violation.			It may be useful to incorporate port state provisions comparable to those contained in the IPOA (paras. 51-58) into the statute (requiring all vessels entering into a U.S. port to carry logs documenting where fish were caught), and appropriate enforcement authorization if such does not already exist.
4. Antarctic Marine Living Resources Convention Act of 1984 (16 U.S.C. 2431 - 2444)								
Treaty implementation statute (Convention for the Conservation of Antarctic Marine Living Resources).	Authorized officer may search any person, place, vehicle, vessel, etc. reasonably suspected of involvement in harvesting of marine living resources in violation of the Convention. Evidence, marine living resources, equipment and vessels so engaged may be seized and are subject to forfeiture. Enforcement rests jointly with the Secretary of Commerce and the Secretary of the Department in which the Coast Guard is operating.	All Antarctic marine living resources.	U.S. federal jurisdiction (over acts committed in Antarctic region).	Any person engaged in harvesting of marine living resources in Antarctica.	Civil: Up to $6,000 for acts prohibited by §2435, and up to $12,000 for acts knowingly committed. Criminal: Only for non-harvest violations – $50,000 or imprisonment for up to 10 years, or both, for each "offense" committed - defined as violation of §2435 (4), (5), (6) or (7).	Monetary penalties seem too low.	The Secretary of State, with the concurrence of the Secretary of Commerce and the Director of the National Science Foundation, is authorized to decide on behalf of the U.S. whether to accept a conservation measure adopted by the commission and to notify the Commission of any such decision. 16 U.S.C. § 2434(a)(1). The Secretary of State, with the concurrence of the Secretary, the Director of the National Science Foundation and the Secretary of the department in which the Coast Guard is operating, is authorized to the establishment of a system of observation/inspection, and to interim arrangements pending establishment of such	Consider increasing monetary penalties from $6K/$12K to an amount that would have greater impact. Because few U.S. flag vessels are engaged in harvest of species regulated under the Act, the vast majority of species are imported into the U.S. Importers are permitted. Permit sanction should be considered for importers who import illegally-caught. Maximum penalty should be increased to $200,000 if maximum penalty is increased under Magnuson-Stevens Act.

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							a system. 16 U.S.C. § 2434(b).	
6. Atlantic Coastal Fisheries Cooperative Management Act (16 U.S.C. 5103(b))								
Fisheries conservation and management statute.	In the absence of an approved and implemented fisheries management plan under the Magnuson-Stevens Act, Secretary of Commerce may issue and enforce regulations to govern fishing in the EEZ in a manner consistent with a national coastal fisheries management plan and § 301 of the Magnuson Act.	All fisheries resources potentially within scope of Secretary's authority.	U.S. EEZ defined in the statute as extending from 3NM (extending from the seaward boundary of each of the coastal states) to 200NM from the baseline from which the territorial sea is measured. 16 U.S.C. § 5102(6).	All persons subject to liability provisions of Magnuson-Stevens Act.	Follows the regime in Sections 307-311 of the Magnuson-Stevens Act (16 U.S.C. §1857-61) regarding prohibited acts, civil penalties, criminal offenses, civil forfeitures, and enforcement.		Statute empowers the executive to comply with the IPOA in the U.S. EEZ.	Enforcement of the Atlantic Coastal Fisheries Cooperative Management Act follows the regime established by the Magnuson-Stevens Act.
7. Atlantic Salmon Convention Act of 1982 (16 U.S.C. 3601 - 3608)								
Treaty implementation statute (Convention for the Conservation of Salmon in the North Atlantic Ocean).	Any vessel used, and any fish (or the value thereof) taken or retained in any manner, in connection with or as the result of the commission of an act which is unlawful under this shall be subject to civil forfeiture under §310 of the Magnuson-Stevens Act (16 U.S.C. §1860). Enforcement rests with Secretary of Commerce, in cooperation with the Secretary of the Treasury and the Secretary of the Department in which the USCG is operating.	North Atlantic Salmon	U.S. federal jurisdiction (over acts committed in the Atlantic Ocean north of 36 degrees north latitude).	Any person, or any vessel, subject to the jurisdiction of the U.S. that conducts directed fishing for salmon in waters seaward of twelve miles from the baselines from which the breadths of territorial seas are measured in waters of the Atlantic Ocean north of 36 degrees north latitude; or violates any provision of the Convention or this chapter, or any regulation promulgated thereunder. § 3606(a).	Follows the civil penalty regime under §308 and §309 of the Magnuson-Stevens Act (16 U.S.C. § 1858 - 1859).			Effectively implements treaty provisions. Not clear, however, why additional restrictions on directed North Atlantic salmon fisheries within the U.S. territorial sea are not regulated.
8. Atlantic Striped Bass Conservation Act (16 U.S.C. 1851 note)								
Fisheries	Moratorium on fishing	Atlantic	U.S. federal	All persons subject to the	Violators of the		Atlantic Striped Bass	Moratorium applies only to

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conservation and management statute.	of Atlantic Striped Bass within state coastal waters if that state has failed to implement the conservation plan adopted by the Marine Fisheries Commission. This moratorium may be enforced through the use of all powers available to authorized officers under §311 (b) of the Magnuson-Stevens Act (16 U.S.C. § 1861(b)). Enforcement authority rests jointly with Secretaries of Commerce and Interior.	Striped Bass.	jurisdiction (Atlantic states, territories and possessions).	jurisdiction of the United States.	moratorium shall be subject to penalties set out under §308 of the Magnuson-Stevens Act (16 U.S.C. §1858) (The civil penalty shall not exceed $130,000 for each violation. Each day of a continuing violation shall constitute a separate offense. The Secretary or his designee shall assess the amount of the penalty by written notice).		Conservation Act, formerly set out as a note here, was subsequently reclassified to sections 5151 to 5158 of this title (16 U.S.C. § 1851 note). This statute is implemented under the Atlantic Coastal Fisheries Cooperative Management Act.	waters subject to state jurisdiction (3NM). Not clear whether measures protecting Atlantic Striped bass within federal jurisdiction exist. Enforcement of the Atlantic Coastal Fisheries Cooperative Management Act follows the regime established by the Magnuson-Stevens Act.
9. Atlantic Tunas Convention Act of 1975 (16 U.S.C. 971 - 971k)								
Fisheries and import regulation statute; Treaty implemen-tation statute (International Convention for the Conservation of Atlantic Tunas 1966).	Any person authorized to enforce the provisions of this chapter and the regulations issued thereunder may board any vessel subject to the jurisdiction of the U.S. and inspect such vessel and its catch. If such inspection results in the reasonable belief that the vessel or any person on board is engaging in operations in violation of this chapter, such person may be arrested.	Atlantic highly migratory species (defined by regulation or Magnuson Act §1802(20).		Any person in charge of a fishing vessel or any fishing vessel subject to the jurisdiction of the U.S. engaging in fishing in violation of any regulation adopted pursuant to section 971d of this title; or any person engaging in shipping, transport, purchase, sale, offer for sale, import, export, or having possession or control of any fish which he should have known were taken or retained contrary to the recommendation of the Commission made pursuant to article VIII of the Convention and adopted as regulations pursuant to § 971d.	Civil penalty up to $130,000. Each day of a continuing violation shall constitute a separate offense. All fish taken or retained in violation of the Statute or regulations thereunder may be seized and disposed of pursuant to an order of a court of competent jurisdiction, or, if perishable, in a manner prescribed by regulation of the Secretary.		Enforcement may be reciprocal with other treaty parties except that, where any agreement provides for arrest or seizure of persons or vessels under U.S. jurisdiction, it shall also provide that the person or vessel arrested or seized shall be promptly handed over to a U.S. enforcement officer or another authorized U.S. official. § 971f(a).	Regulations implemented pursuant to the statute will determine effectiveness.

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10. Authorized Law Enforcement Activities (14 U.S.C. 89)								
Authorizes the USCG to go on board any vessel subject to the jurisdiction or operation of any law of the U.S.	Authorizes the USCG to make inquiries, examinations, inspections, searches, seizures, and arrests for the prevention, detection, and suppression of violations of laws of the U.S.	N/A	High seas and waters subject to the jurisdiction of the United States.					Continuing enforcement will have the effect of deterring IUU fishing.
11. Certificate of Legal Origin for Anadromous Fish Products (16 U.S.C. 1822 note)								
Use of "certificates of legal origin" by multilateral or bilateral agreement to ensure lawful harvest	Secretary of Commerce issues regulations to implement agreements with nations that import or export anadromous fish or fish products to prohibit international trade in anadromous fish or fish products unless they are accompanied by a valid certificate of legal origin attesting that the fish or fish product was lawfully harvested.	Anadromous Fish	Fish harvested within the waters of any nation having anadromous fish populations or on the high seas	Any nation trading in unlawfully taken anadromous fish; fisherman on U.S. vessels harvesting anadromous fish	Certification under the Pelly Amendment (22 U.S.C. § 1978) that can result in import prohibitions on States trading in unlawfully taken anadromous fish or anadromous fish products.	No provision for penalty to US fishers who harvest without certificates.	It is unclear from the face of the statute whether any agreements have been negotiated under the Act or whether the agencies have issued regulations implementing its provisions. Other and different penalty provisions or enforcement authorities may be part of the regulations or treaty provisions.	Para. 66 of the IPOA specifies that unilateral trade-related measures should be avoided and sanctions should be used only in exceptional circumstances. It may be preferable to establish in agreements negotiated under the Act a multilateral tribunal or other means of adjudicating trade in non-certified fish.
12. Civil Asset Forfeiture Reform Act of 2000 (Pub. L. 106-185, 114 Stat. 202 (2000)								
Reforms civil forfeitures and puts in place greater protections for personal property.	Investigation reports must be completed and forwarded to NOAA General Counsel for Enforcement (GCEL) within 30 days from the date of seizure. In any case in which is not forwarded within 30 days from the seizure date, an explanation for the delay must be provided GCEL. After 50 days, the money *may* be returned to the respondent(s) if there is no reasonable explanation for the	N/A	N/A	N/A	N/A			To resolve outstanding issue regarding innocent owner defense, knowledge should be imputed to owners in violations involving possession under the doctrine of respondeat superior.

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	delay. Seized property or money *will* be returned in cases that are forwarded after 60 days. A claimant may file a claim at any time before the deadline set forth by the Agency.							
13. Communications Assistance for Law Enforcement Act (103 P.L. 414, 108 Stat. 4279, 47 U.S.C. 1001)								
Requires the cooperation of telecom-munications carriers in the interception of wire, oral, or electronic communi-cations.	Enforcement is by the federal court issuing the surveillance order under 18 U.S.C. §2516.	N/A	None specified.	Any telecommunications common carrier (47 U.S.C. §153) subject to the jurisdiction of the U.S. as well as any supplier of services or equipment (subject to the jurisdiction of the U.S.) that may be required to enable the compliance of the carrier.	Civil penalty up to $10K per day or violation.	The civil penalty amounts provided seem sufficient.	Amends title 18 to make clear a telecommunications carrier's responsibility to cooperate in the interception of communications for law enforcement purposes.	U.S. law currently is sufficient in this area.
14. Crimes and Criminal Procedure, Wire and Electronic Communications and Interception of Oral Communications (18 U.S.C. 2510)								
Establishes procedure for obtaining judicial authorization to intercept wire, oral or electronic communica-tions and establishes conditions on the use of such intercepted communica-tions.	Authorizes the Attorney General or his/her designee to authorize application by a federal enforcement agency to a federal judge for authorization to conduct interception pursuant to a federal investigation.	N/A	Applies to all interstate or foreign communications as well as all communications affecting interstate or foreign commerce.	N/A	N/A			U.S. law currently is sufficient in this area.
15. Dolphin Protection Consumer Information Act (16 U.S.C. 1385)								
Consumer product labeling statute	Civil penalties, equitable relief	Tuna and Dolphins	The Eastern Tropical Pacific Ocean and other tuna fisheries in which an association between dolphins and tuna exists	Any producer, importer, exporter, distributor, or seller of any tuna product exported from or offered for sale in the U.S. Vessel captains, Designees of the Secretary,	1) up to $10,000 per violation (according to 15 U.S.C. § 45); 2) Civil penalties not to exceed	$10,000 penalty for first set of liable parties may not be sufficient to effectively prevent, deter	This Act appears to involve IUU fishing only to the extent that the liable parties are involved in internationally-banned activities, such as driftnet fishing on the	The Act could more fully provide for publicity of fishers, and associated corporate interests, that violate its provisions. See, IPOA, Para. 32. Statute does a good job of making liable parties throughout the

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				representatives of the Inter-American Tropical Tuna Commission, and authorized representatives of participating nations.	$120,000.	and eliminate IUU fishing.	high seas, or fishing into contravention of the international Dolphin Conservation Program.	production and distribution chain.
16. Driftnet Impact Monitoring, Assessment and Control Act (16 U.S.C. 1822 note (Section 4001 et seq.))								
Research, exchange of information, and cooperative enforcement	Through the Secretary of State and in consultation with the Secretary of the Department in which the Coast Guard is operating, the Secretary of Commerce negotiates with foreign governments conducting, or authorizing its nationals to conduct, driftnet fishing that results in the taking of US marine resources in the high seas of the North Pacific Ocean, for the purpose of entering into agreements for effective enforcement of laws, regulations, and agreements applicable to the location, season, and other aspects of the operations of the foreign government's driftnet fishing vessels.	Fish, shellfish, marine mammals, seabirds, and other forms of marine life or waterfowl found in, or which breed within, areas subject to the jurisdiction of the U.S., including fish that spawn in the fresh or estuarine waters of the U.S.	The North Pacific Ocean, including the Bering Sea, outside the EEZ of any nation.	Driftnet fishers operating in the North Pacific.	If negotiations do not result in a satisfactory agreement, certification under the Pelly Amendment (22 U.S.C. § 1978) that can result in import prohibitions of fish products from the offending country for such duration as the President determines appropriate.	No specific provision for penalty to U.S. fishers who use driftnets irresponsibly.	It is unclear from the face of the statute whether any agreements have been negotiated under the Act or whether the agencies have issued regulations implementing its provisions. Other and different penalty provisions or enforcement authorities may be part of the regulations or treaty provisions.	Para. 66 of the IPOA specifies that unilateral trade-related measures should be avoided and sanctions should be used only in exceptional circumstances. It would be preferable to establish in agreements negotiated under the Act a multilateral tribunal or other means of adjudicating disputes involving the use of driftnets.
17. Eastern Pacific Tuna Licensing Act of 1984 (16 U.S.C. 972 - 972h)								
Domestic implementa-tion of multilateral conservation agreements	Civil penalties, search warrants, power of search without a warrant, arrest, seizure, forfeiture.	Certain “designated species of tuna,” as defined at 16 U.S.C. § 972.	The "Agreement Area" of the Eastern Pacific, as defined at 16 U.S.C. § 972(2) (creating a perimeter using a set of longitudinal coordinates).	Any person subject to the jurisdiction of the U.S., or any vessel subject to the jurisdiction of the U.S. Any person in possession of the regulated species if taken in violation of the Act.	Civil monetary penalties up to $130,000.	Penalty of $6,000 seems unlikely to deter violations and seems low in view of the fundamental obstruction to effective	The Act provides that a fisher whose harvest has been seized may provide a bond or other stipulation for the value of the harvest so that he may sell the harvest on the market. The bond or stipulation must be approved by a	A loophole in the statute appears to be the ability of a fisher to refuse boarding by U.S. enforcement agents. The fisher may know that the on-board harvest is in violation of the Act and would carry a penalty of up to $30,000. Not allowing the agents to board carries only

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						enforcement of refusal to allow an inspection of a vessel.	judge of the district court.	a $6,000 penalty, and the penalty is not increased for subsequent violations.
18. Electronic Signatures in Global and National Commerce Act (106 P.L. 229, 114 Stat. 264)								
Facilitates the use of electronic records and signatures in foreign commerce.	N/A	N/A	None specified.	N/A	N/A		It is difficult to see the direct relevance of this Act on IUU fishing except inasmuch as it might require the Secretary to accept reports in electronic form.	U.S. law currently is sufficient in this area.
19. Endangered Species Act of 1973 (16 U.S.C. 1531 - 1544)								
Conservation and protection of endangered and threatened species and their ecosystems; treaty implementa-tion statute (Convention on International Trade in Endangered Species of Wild Fauna and Flora).	Enforcement tools include: reward for information leading to enforcement action; search and arrest warrants; power to inspect items during importation or exportation; power to arrest upon reasonable grounds if violation committed within presence or view; seizure; forfeiture of fish, wildlife, and plants possessed in violation of Act, forfeiture of equipment upon conviction (16 U.S.C. § 1540). Regulation of international trade in protected species pursuant to CITES.	Any threatened or endangered species, as defined at 16 U.S.C. §1532.	No geographic limitation (prohibitions on taking apply to the "territorial sea" and the "high seas," 16 U.S.C. § 1538(B-C).	Any person subject to the jurisdiction of the U.S. who trades in, possesses or distributes protected species Exceptions by permit for Alaska natives; provisions for re-introduction of protected species.	Civil Penalties: up to $30,000. Criminal violations: up to $100,000 or up to one year imprisonment (maximum not available for all violations). Revocation of permits, licenses and agreements also available.	Penalties may be insufficient to deter illegal taking of protected species unless coupled with other statutes.	The agencies are authorized to charge reasonable fees for permits, certificates, and the costs of seizing and holding fish forfeited under the chapter. This seems as though it should also be included under the other authorities. Also, the Act contains a provision allowing more strict provisions of the MMPA to take precedence. Such provisions might be useful in other statutes in which there are overlapping jurisdictions.	One hole may be that takings are prohibited on only the “territorial sea” and on the “high seas.” This may exclude the area of the coastal sea between the end of the territorial sea, which UNCLOS establishes at 12 nm, and the boundary of the EEZ at 200 nm.
20. Fur Seal Act Amendments of 1983 (16 U.S.C. 1151 - 1175)								
Treaty implementa-tion statute (Interim Convention on the Conservation of North Pacific Fur	Boarding and inspection authority in U.S. waters or the high seas; arrest, search, and seizure authority with reasonable cause to believe violation is occurring; extradition of seized vessel and	Northern Pacific Fur Seal	Northern Pacific Ocean, including the Bering, Okhotsk, and Japan Seas.	Any person or vessel subject to the jurisdiction of the U.S. for the taking, or activities connected with such taking, of fur seals in violation of the Act; also, for refusal to allow boarding and inspection by authorized	Criminal fines and imprisonment for knowing violations of the Act: up to $20,000 and/or imprisonment	Penalties may be insufficient to deter illegal taking of protected species.	The Act authorizes Commerce, the Treasury, the Coast Guard, and even state officers to enforce its provision as federal law enforcement agents.	Consider increasing penalty amounts.

APPENDIX: TABLE OF U.S. ENFORCEMENT AUTHORITIES

Statutory Approach	Enforcement Authority	Regulated Species	Geographic Application	Scope of Liability	Penalty Levels	Sufficiency of Penalty	Comments	Recommendations
Seals, as amended).	arrested person; authority for enforcement agents to testify against violators in foreign judicial proceedings at the request of foreign authorities; forfeiture of U.S. vessel and fur seals if used or taken in violation of the Act; authorization to issue warrants for probable cause.			officials. Exceptions by permit for Alaska natives.	for up to one year. Civil penalties for violations: up to $11,000 per violation.			
21. High Seas Driftnet Fisheries Enforcement Act (16 U.S.C. 1362, 1371, 1852, 1862, 1826a-c, 1861 note, 46 U.S.C. app. 1707a, 2110 note)								
Implementation of multilateral moratorium through denial of port privileges and trade sanctions levied on non-conforming nations	Secretary of Commerce Denial of port privileges, denial of entry to U.S. waters, and imposition of trade sanctions.	All species affected by large-scale high seas driftnet fishing. All fish and wildlife, or products of these species, exported by nations that engage in such fishing.	The high seas (area beyond the EEZ of any nation).	Large-scale driftnet fishers with vessels under the jurisdiction of the U.S. or fishers with vessels under the jurisdiction of nations found to be using large-scale driftnets on the high seas. The nationals of non-conforming nations may also be made unable to export fish and wildlife to the U.S.	Penalties include the denial of port privileges and the denial of entry into U.S. waters. Possibility of trade sanctions on non-conforming nations.	Neither civil nor criminal penalties can be imposed on foreign vessels that are denied entry into U.S. waters. Thus, under the current law, it appears difficult to conceive of how the penalties could be made harsher.	Title IV of the Act includes amendments to the Magnuson Act and the MMPA. Summaries of those provisions are not included here; they have been left for discussion in the context of those Acts. Title V of the Act involves the repeal of a recreational boat tax and the creation of an automated tariff filing and information system. These statutes appear unrelated to fisheries conservation and have not been summarized here.	16 U.S.C. § 1826a authorizes "additional sanctions" to be used if the first sanctions provoke retaliation or are insufficient. It is unclear how the additional sanctions provide any different/more penalty than those at § 1826a. A more effective penalty might authorize the seizure and forfeiture of large-scale, foreign driftnet boats that enter U.S. waters or ports. No such provision is currently included in this Act.
22. High Seas Fishing Compliance Act (16 U.S.C. 5501 - 5509)								
Treaty Implementation statute (Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on	Enforcement tools include: rebuttable presumption that all living marine resources found on board a seized vessel were taken or retained violation of the Act; coordination with other agencies; grant of exclusive jurisdiction to U.S. district courts; authority to arrest with	All living marine resources commercially exploited on the high seas.	The high seas (area beyond the EEZ of any nation).	Any person subject to the jurisdiction of the U.S. for fishing without a permit, fishing in contravention of conservation measures or permit conditions, obstructing justice, or possessing or trading any living marine resource taken in violation of the Act. The owner or operator of a vessel that has been used in the	Civil Penalties: A) Not to exceed $115,000 per violation (with the vessel used in commission of the offense liable in rem); B) Revocation, suspension, denial, or imposition of	The penalty provisions seem entirely adequate as long as they are not circumvented through the discretionary issuance of "citations," which apparently	Permit sanctions attach to the vessel so that they continue in force even after sale. § 5507(b)(3). The Secretary is granted the authority to conduct hearings, including issue subpoenas, and provision is made for judicial review and the collection of penalties.	Care should be taken to ensure that, in the interest of expediency, citations do not come to replace monetary penalties.

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the High Seas)	reasonable cause with or, under certain circumstances, without a warrant; authority to board, search, and inspect any high seas fishing vessel; authority to sell any seized marine living resource as long as proceeds are deposited with the court; authority to execute any warrant; authority to exercise "any other lawful authority;" discretion to issue citations in lieu of other actions.			commission of the above acts, or any person who has not paid assessed penalties, fines, or fees for any permit issued under any U.S. fisheries resource statute. Prohibitions apply to stateless vessels assimilated to U.S. nationality.	additional conditions or restrictions of a permit under the Act; Criminal penalties available for violations involving obstruction of justice, and threatening or assaulting an officer.	carry no monetary penalty, under § 5506(d).		
23. Lacey Act Amendments of 1981 (16 U.S.C. 3371 - 3378)								
Use of trade and possession prohibitions to hamper black markets in protected species	Civil penalties; criminal fines; imprisonment; revocation of permit; forfeiture and seizure of vessel, including its fishing gear, furniture, appurtenances, stores, and cargo if possessed, retained, or used in violation of Act (other than an act for which a citation is a sufficient sanction); rebuttable presumption that all living marine resources found on board a seized vessel are taken or retained violation of the Act; provision for sharing of enforcement tools between agencies; grant of exclusive jurisdiction to the U.S. district courts; authority to arrest with reasonable cause; authority to board, search, and inspect any high seas fishing vessel ; authority to sell any seized marine living resource as long as	Any fish or wildlife species regulated under any U.S. law, treaty, or regulation, or any Indian tribal law, or any State or foreign law. Exceptions for fisheries in U.S. waters subject to a Fishery Management Plan under the Magnuson-Stevens Act.	No geographic limitation (but specifically including the high seas and other areas of the "special maritime and territorial jurisdiction of the U.S." as defined at 18 U.S.C. § 7).	Any natural or juridical person subject to the jurisdiction of the U.S. for: 1) trade (including the offer or provision, or acceptance of guiding, outfitting, or other services or a hunting or fishing license for consideration) in any subject species taken, possessed, transported, or sold in violation of federal law, Indian tribal law, or state laws if in interstate or foreign commerce; 2) to possess within the special maritime and territorial jurisdiction of the U.S. any fish, wildlife, or plant taken in violation of the same laws; 3) to import or export or transport in interstate commerce fish or wildlife unless the container has been properly marked; 4) to falsely identify any fish, wildlife, or plant traded in foreign or interstate commerce	Civil Penalties: For knowing violations of Sec. 1 or Sec. 4: Up to $12,000 for each violation. Criminal Sanctions: up to $20,000 and/or imprisonment for not more than 5 years. Suspension or revocation of license or permit also available.	Civil and criminal penalties available may be insufficient to deter IUU fishing, depending on the type of violation.		The Lacey Act may be underutilized at this time. Increased enforcement would have the effect of deterring IUU fishing.

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Statutory Approach	Enforcement Authority	Regulated Species	Geographic Application	Scope of Liability	Penalty Levels	Sufficiency of Penalty	Comments	Recommendations
	proceeds are deposited with the court; authority to execute any warrant; authority to exercise "any other lawful authority;" discretion to issue citations in lieu of other actions.							
24. Law Enforcement as a Primary Duty (14 U.S.C. 2)								
Requires the USCG to enforce or assist in the enforcement of all applicable federal laws of the U.S.		N/A	High seas and waters subject to the jurisdiction of the United States.		N/A			Continuing enforcement will have the effect of deterring IUU fishing.
25. Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 - 1882)								
Fisheries conservation and management statute	The Secretary of Commerce is authorized to promulgate regulations implementing the Act and enforce the Act and any implementing regulations. The U.S. shall cooperate directly or through appropriate international organizations with those nations involved in fisheries for highly migratory species.	The fish off the coasts of the United States, the highly migratory species of the high seas, the species which dwell on or in the Continental Shelf, and the anadromous species which spawn in United States rivers or estuaries.	Within the EEZ and beyond the EEZ as to anadromous fish stocks and the fishery resources on the continental shelf.	There is a very broad range of prohibitions under the Act and any person subject to the laws of the U.S. comes within the scope of liability.	Civil penalties up to $130,000.	Monetary penalties seem too low considering the depleted condition of many of the species managed under the Act. Higher monetary penalties are needed to serve as a more effective deterrent.		Consider increase of civil penalties to $200,000.
26. Marine Mammal Protection Act of 1972 (16 U.S.C. 1361 - 1407								
Marine mammal and marine mammal products conservation.	The Secretary may, by agreement, use the resources of another federal agency to enforce the Act and may also designate officers and employees of a state or U.S. possession to enforce the Act,	Marine mammals, and marine mammal products.	The territorial sea of the U.S. Also areas referred to as Eastern Special Areas, in the article of agreement between the U.S. and the Union of the Soviet Socialist Republics on the	Any person or vessel subject, to the jurisdiction of the U.S. on high seas, or on lands. (Including any port or harbor) To take or import marine mammals or marine mammal products. Also any transport, purchase, sell, export, or offer to do	Civil penalty: $11,000 - $12,000. Criminal penalty (knowing violations): up to $20,000 and/or imprisonment for not more	Civil monetary penalties are insufficient.		Increased penalties are necessary for the Act to serve as an effective deterrent.

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Statutory Approach	Enforcement Authority	Regulated Species	Geographic Application	Scope of Liability	Penalty Levels	Sufficiency of Penalty	Comments	Recommendations
	allowing them to function as federal law enforcement agents for this purpose.		maritime boundary. U.S.C. 1362(15).	so of any marine mammal or marine mammal products.	than one year. Any person involved in unlawful importation may be made to abandon the mammal or product. 16 U.S.C. 13759(a)(1).			
27. National Marine Sanctuaries Act (16 U.S.C. 1431 - 1439)								
Regulation and conservation of national sanctuaries.	Secretary of Commerce must conduct enforcement activities to carry out the Act. A person authorized to enforce the Act may board, search, inspect or seize a vessel, equipment, stores and cargo suspected of being used to violate the Act, and seize unlawfully taken sanctuary resources.	Species that depend upon these marine areas to survive and propagate.	Those areas of coastal and ocean waters, the Great Lakes and their connecting waters, and submerged lands over which the U.S exercises jurisdiction, including the EEZ.	Any person who destroys, causes the loss of, or injures any sanctuary resource is liable to the U.S. for an amount equal to the sum of: 1. The amount of response costs and damages resulting from the destruction, loss, or injury and, 2. Interest on that amount calculated in the manner described under section 2705 of title 33. Also any vessel used to destroy, cause loss, or injure any sanctuary, shall be liable for response costs and damages.	Any person who violates will receive a civil penalty between $109,000 - $119,000. 16 U.S.C 1437(c)(1)	Civil monetary penalties seem sufficient.		Presumably patrolling and monitoring for illegal activity within the sanctuaries has the effect of deterring IUU fishing, at least within those areas.
28. National Security Act of 1947 (50 U.S.C. 401)								
Provides a comprehen-sive, coordinated program for national security.	Authorizes intelligence agencies to assist federal enforcement agencies with the collection of information outside the U.S. regarding individuals who are non-U.S. persons.	N/A	Outside U.S.	N/A	N/A			U.S. law currently is sufficient in this area.
29. North Pacific Anadromous Stocks Act of 1992 (16 U.S.C. 5001 - 5012)								
Treaty implementa-tion statute (Convention for the Con-servation of Anadromous	The Secretary of Commerce is responsible for admin-istering provisions of the convention, the Act and any regulations issued. With the	Fish of the particular Anadromous Stock of the North Pacific Ocean.	The waters of the North Pacific Ocean and its adjacent seas, north of 33 degrees North Latitude, beyond the EEZ.	Any person or fishing vessel subject to the jurisdiction of the U.S. to: fish for anadromous fish in the convention area; retain on board or fail to return immediately to the	Civil penalty: $108,000-$120,000. Each day of a continuing violation shall constitute a			Continuing enforcement of the Act will have the effect of deterring IUU fishing.

APPENDIX: TABLE OF U.S. ENFORCEMENT AUTHORITIES

Statutory Approach	Enforcement Authority	Regulated Species	Geographic Application	Scope of Liability	Penalty Levels	Sufficiency of Penalty	Comments	Recommendations
Stocks in the North Pacific Ocean).	Secretary of Transportation, the Secretary is responsible for coordinating the participation of the U.S. in the commission.			sea any anadromous fish taken incidentally in a fishery directed at non-anadromous fish in the convention area. Ship, transport, offer for sale, sell, purchase etc, of any anadromous fish taken or retained in violation of the convention.	separate offense. Criminal penalty: a fine under title 18, or imprisonment for up to 10 year (for injury to an officer) months, or both.			
30. Northern Pacific Halibut Act of 1982 (16 U.S.C. 773 - 773k)								
Treaty implementa-tion statute (Convention for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and the Bering Sea).	Any fishing vessel used and any fish taken in connection with the commission of a prohibited act are subject to forfeiture to the U.S. upon application to the Attorney General. The Act is enforceable by the Secretary of Commerce and the Secretary of the department in which the Coast Guard is operating.	Halibut	The maritime areas off the West coast of the U.S. and Canada described in Article I of the convention, and the EEZ.	It is unlawful for a person to violate the convention or the act and regulations or to resist or interfere with an enforcement officer in the conduct of a search, inspection or lawful detention. It is also unlawful for a foreign fishing vessel to fish for halibut in the EEZ or special areas, unless authorized. Any vessel engaged in catching, processing or transporting fish in convention waters, or a vessel outfitted to engage in an activity described above, and a vessel in normal support of a vessel described above.	Civil penalty between $27,500 - $30,000. Each day of a continuing violation shall constitute a separate offense. Criminal penalty of not more than $50,000 or imprisonment for not more than 6 months, or both. Other criminal penalties available for non-fishing violations.	Civil monetary penalties seem a bit low.		Consider increase in penalty amounts.
31. Northwest Atlantic Fisheries Convention Act of 1995 (16 U.S.C. 5601 - 5612)								
Treaty implementa-tion statute (Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries)	The Secretary appoints up to three members of the general council and the commission. The Secretary of State and the Secretary must jointly establish a consultative committee to advise on issues related to the convention.	N/A	Northwest Atlantic Fisheries	Any person or vessel to: Violate a regulation under the act or a measure binding on the U.S. under the convention; refuse to permit an officer to board a vessel to conduct a search or inspection etc, which interfere with, or delay an arrest for violation of the Act.	Civil penalty: $108,000 - $120,000, and/or permit sanction. Violations of paragraph 2-4, or 6 of subsection (a) of 16 U.S.C. §5606 shall be punishable under 16 U.S.C. §1859(b).	Civil monetary penalties seem sufficient.		Continuing enforcement of the Act will have the effect of deterring IUU fishing.

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Statutory Approach	Enforcement Authority	Regulated Species	Geographic Application	Scope of Liability	Penalty Levels	Sufficiency of Penalty	Comments	Recommendations
32. Pacific Salmon Treaty Act of 1985 (16 U.S.C. 3631 - 3644)								
Treaty implementation statute (Treaty between the Government of the United States of America and the Government of Canada Concerning Pacific Salmon).	The U.S. Secretary of State is authorized to: receive and transmit reports and other communications of and, to the commission panel. The Secretary of Commerce shall inform the state.	Pacific Salmon	Between the U.S. and Canada, the U.S. and the EEZ.	Any person or vessel subject to the jurisdiction of the U.S. who violates the Act, its implementing regulations, or a Fraser River panel regulation. A vessel used in the commission of a prohibited act shall be subject to forfeiture.	Civil penalty up to $130,000. Criminal penalties of up to $200,000 or imprisonment of up to 10 years.	Civil monetary penalties seem sufficient.		Continuing enforcement of the Act will have the effect of deterring IUU fishing.
33. Pelly Amendment to the Fisherman's Protective Act of 1967 (22 U.S.C. 1978)								
Implementation of bilateral and multilateral conservation programs through certification and trade sanctions on offending nations.	Secretary of Commerce monitors and investigates fishing activity by foreign nationals and certifies countries whose nationals' fisheries activities diminish the effectiveness of an international fishery conservation program. Secretary of the Treasury enforces compliance with import bans by U.S. nationals.	All stocks subject to an international fisheries conservation program.	All waters subject to an international fisheries conservation program.	President may direct the Secretary of the Treasury to prohibit importation into the United States of any products from the offending country for any duration as the President determines appropriate and to the extent that such prohibition is sanctioned by the WTO or multilateral trade agreements. It shall be unlawful for any person subject to the jurisdiction of the United States knowingly to bring or import into, or cause to be imported into, the United States any products prohibited by the Secretary of the Treasury pursuant to this section.	Trade sanctions on certified nations. Any person violating the provisions of this section shall be fined not more than $10,000 for the first violation, and not more than $25,000 for each subsequent violation. All products brought or imported into the United States in violation of this section, or the monetary value thereof, may be forfeited.	Unilateral trade sanction authority used only as a last resort. Civil penalties seem sufficient.		Para. 66 of the IPOA specifies that unilateral trade-related measures should be avoided and sanctions should be used only in exceptional circumstances. A first step is to establish and untilize multilateral trade-based compliance regimes within each of the international fisheries conservation organizations and arrangements.
34. South Pacific Tuna Act of 1988 (16 U.S.C. 973-973r)								
Treaty implementation statute (Treaty on Fisheries between the Governments	An officer authorized by the secretary, or the secretary of the department in which the Coast Guard operates.	Tuna	All waters in the treaty area except, waters subject to U.S. jurisdiction in accordance with international law, waters within	Any person or vessel to violate the Act or any of its regulations; use a vessel for fishing in violation of an applicable national law; violate terms and conditions of a fishing	Civil penalties: $290,000-$325,000. Criminal penalties: $50,000-$100,000 and	Civil monetary penalties seem sufficient.		Continuing enforcement of the Act will have the effect of deterring IUU fishing.

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Statutory Approach	Enforcement Authority	Regulated Species	Geographic Application	Scope of Liability	Penalty Levels	Sufficiency of Penalty	Comments	Recommendations
of Certain Pacific Island States and the United States of America).			closed areas, and waters within limited areas closed to fishing.	arrangement entered into under the treaty.	imprisonment from 6 months to 10 years.			
35. Sponge Act (16 U.S.C. 781 et seq.)								
Conservation of commercial sea sponges (Inactive)	The Secretary and/or his or her designee is authorized to make arrests and seize vessels and sponges.	Sponges	Gulf of Mexico or the Straits of Florida outside of State territorial limits	Any citizen of the U.S., or person owing duty of obedience to the laws of the United States, or any boat or vessel of the United States, or person belonging to or on any such boat or vessel.	Monetary fine of not more than $500. Such fine shall be a lien against the vessel or boat on which the offense is committed.	Penalty amounts seem too low to serve as effective deterrent.		Increased penalties should be considered if illegal harvest is adversely impacting the species.
36. Stopping Vessels (14 U.S.C. 637)								
Guidance on use of force	Authorizes the USCG to stop vessels, including the firing of a warning signal and disabling fire at a vessel that does not stop, from a CG vessel or aircraft, or a DoD vessel with CG LEDET personnel embarked.	N/A	High seas and waters subject to the jurisdiction of the U.S.		N/A			Continuing enforcement will have the effect of deterring IUU fishing.
37. Tuna Conventions Act of 1950 (16 U.S.C. 951 - 961)								
Treaty implementa-tion statute (Convention for the Establishment of an Inter-American Tropical Tuna Com-mission and Convention for the Estab-lishment of an International Commission for the Scientific	The joint responsibility of the U.S. Coast Guard, the Department of the Interior and the Bureau of Customs.	Tuna and related species	N/A – No specific location.	Any person who knowingly ships, transports, purchases, sells,... etc. fish taken or retained in violation of the Act; fails to make, keep, or furnish catch returns, or other reports as required.	Civil penalty up to $130,000 (16 U.S.C. §957)	Monetary penalties seem sufficient.		Continuing enforcement of the Act will have the effect of deterring IUU fishing.

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Statutory Approach	Enforcement Authority	Regulated Species	Geographic Application	Scope of Liability	Penalty Levels	Sufficiency of Penalty	Comments	Recommendations
Investigation of Tuna).								
38. Whaling Convention Act of 1949 (16 U.S.C. 916 - 916l)								
Treaty Implementa-tion statute (International Convention for the Regulation of Whaling).	Authorized enforcement officer or employee of the Dept. of Commerce, Coast Guard, U.S. Marshall, etc.	Whales	None specified.	Any person, subject to U.S. jurisdiction to engage in whaling in violation of the convention.	Except as to violations of Sec. 916c(a)(3), fines up to $10,000 or imprisonment of not more than one year or both.	Monetary penalty amounts may be too low.	Not sure how big of a problem IUU fishing is with regard to whales. Whaling is among the most highly regulated activities involving harvest of living marine resources. The greatest threat to many whale species may be accidental takes (e.g., vessel strikes) .	If illegal whaling is a problem, penalty amounts should be increased. If most illegal taking of whales is inadvertent, higher penalties might encourage greater care.

APPENDIX B

BACKGROUND PAPER ON IUU FISHING

Background Paper on IUU Fishing[1]

For NOAA Fisheries, Office of International Affairs
December 2007

This paper reviews United States and international law and policy regarding illegal, unreported, unregulated fishing.

The United States and other members of the international community have become increasingly concerned about fishing activity that does not respect national or international laws and regulations. Whether fishing in closed areas, exceeding catch limits, failing or misreporting catches, or reflagging fishing vessels to evade rules of responsible fishing, these operations undermine the efforts of compliant nations to foster sustainable fishing.

The United States has contributed both to the development of international tools to combat IUU fishing and to measures adopted by various regional fisheries management organizations (RFMOs) on this topic. At the national level, U.S. laws and regulations to combat IUU fishing are among the strongest, most comprehensive, and best enforced in the world.

What is IUU Fishing?

In general, illegal, unreported, unregulated (IUU) fishing is fishing that does not comply with national, regional, or global fisheries conservation and management obligations. The term covers a wide variety of illicit fishing conduct within national jurisdictions, areas governed by international agreements, and regional or subregional areas subject to conservation and management measures promulgated by RFMOs. Unregulated fishing may occur in international waters where no management authority or conservation measures are in place.

The United Nations General Assembly has described IUU as "one of the greatest threats to marine ecosystems [which] continues to have serious and major implications for the conservation and management of ocean resources."[2] The U.S. Congress has declared that IUU fishing "may harm the sustainability of living marine resources and disadvantage the United States fishing industry."[3]

The term "IUU" was first coined during sessions at Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) in 1997 because of fishing activities in the convention area that were not compliant with the convention, namely toothfish catches.[4] Discussions referred to both illegal and

[1] Portions of this appendix were drawn from a chapter written by S. Iudicello on international fisheries in *Ocean and Coastal Law*, in press, and from a background paper on the IPOA-IUU prepared by E.C. Bricklemyer, Aquatic Resources Conservation Group. Both documents are on file with the author.
[2] General Assembly A/RES/60/31 ¶33 (2006).
[3] 16 U.S.C. § 1801(a)(12).
[4] *See infra* notes x-y and accompanying text (discussing CCAMLR).

unreported fishing by parties to the agreement and illegal and unregulated fishing by non-parties.[5]

The United Nations Food and Agriculture Organization (FAO) developed a definition of IUU fishing for its International Plan of Action to Combat IUU Fishing (IPOA) that includes three parts: illegal, unreported, unregulated. The three activities are distinguished in the definition:

> 3.1 Illegal fishing refers to activities:
>
> 3.1.1 conducted by national or foreign vessels in waters under the jurisdiction of a State, without the permission of that State, or in contravention of its laws and regulations;
>
> 3.1.2 conducted by vessels flying the flag of States that are parties to a relevant regional fisheries management organization but operate in contravention of the conservation and management measures adopted by that organization and by which the States are bound, or relevant provisions of the applicable international law; or
>
> 3.1.3 in violation of national laws or international obligations, including those undertaken by cooperating States to a relevant regional fisheries management organization.
>
> 3.2 Unreported fishing refers to fishing activities:
>
> 3.2.1 which have not been reported, or have been misreported, to the relevant national authority, in contravention of national laws and regulations; or
>
> 3.2.2 undertaken in the area of competence of a relevant regional fisheries management organization which have not been reported or have been misreported, in contravention of the reporting procedures of that organization.
>
> 3.3 Unregulated fishing refers to fishing activities:
>
> 3.3.1 in the area of application of a relevant regional fisheries management organization that are conducted by vessels without nationality, or by those flying the flag of a State not party to that organization, or by a fishing entity, in a manner that is not consistent with or contravenes the conservation and management measures of that organization; or
>
> 3.3.2 in areas or for fish stocks in relation to which there are no applicable conservation or management measures and where such fishing activities are conducted in a manner inconsistent with State

[5] *See* FAO, STATE OF WORLD FISHERIES AND AQUACULTURE, SELECTED ISSUES 58 (2000); D.J. Doulman Illegal, Unreported and Unregulated Fishing: Mandate for an International Plan of Action, FAO Doc AUS:IUU/2000/4, at 13 (2000).

responsibilities for the conservation of living marine resources under international law.

3.4 Notwithstanding paragraph 3.3, certain unregulated fishing may take place in a manner, which is not in violation of applicable international law, and may not require the application of measures envisaged under the International Plan of Action.[6]

In the FAO view, IUU fishing includes activities such as poaching; noncompliance with license terms; unreported, misreported, and underreported fishing within coastal state jurisdiction; illegal fishing because of noncompliance with conservation and management measures of regional fishery bodies; and noncompliance with measures of treaties to which a nation is party. IUU fishing may include noncompliance with conservation measures by nonparties under a broad reading of the Compliance Agreement, the Straddling Stocks Agreement, and UNCLOS Articles 64 and 116-119.[7]

According to the FAO, IUU fishing comprises "complex webs of actions and entities." It is not limited to illegal harvest, but includes shipment, processing, landing, sale and distribution of fish and fishery products, as well as support and provisioning of vessels, transport, financing, and a variety of transactions along the entirety of the supply chain.[8] Nor is IUU fishing restricted to the high seas or deepwater fisheries. It can occur in areas under national jurisdiction or in convention areas managed by RFMOs. It can be as blatant as the overfishing of toothfish in the CCAMLR area by orders of magnitude greater than the legal, regulated catches, or as subtle as encroachment of industrial fishing vessels into zones reserved for small-scale, artisanal fisheries.[9]

The U.S. adopted its National Plan of Action to Prevent, Deter, and Eliminate Illegal, Unregulated, and Unreported Fishing in 2004.[10] It follows the IPOA definitions and describes for each of the plan elements what the United States is doing or will do to implement the plan. The U.S. National Plan of Action is organized along the same lines as the IPOA, including sections on All State Responsibilities, Flag State Responsibilities, Coastal State Measures, Port State Measures, Internationally Agreed Market State Measures, Measures to be Implemented Through Regional Fisheries Management Organizations, and Special Requirements of Developing States. Although IUU fishing may occur in all fisheries, the U.S. plan focuses on marine fisheries. As envisioned in the IPOA, the United States intends to review the implementation of this National Plan of Action at least every four years after its adoption.

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[6] U.N. Food and Agriculture Organization. International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing. Rome 2001 (FAO IPOA-IUU).
[7] *See* W. Edeson, "Tools to Address IUU Fishing: The Current Legal Situation," FAO, Rome, 2000, pp 14-15.
[8] FAO Committee on Fisheries. Combating illegal, unreported and unregulated fishing through monitoring, control and surveillance, port state measures and other means. COFI/2007/7
[9] COFI/2007/7at 2.
[10] U.S. Department of State, NOAA, NMFS, U.S. Coast Guard, U.S. Trade Representative, U.S. Fish and Wildlife Service, U.S. Customs Service, June 2004.

According to the National Plan of Action, "the United States has been – and will continue to be – among the leaders of the international community in efforts to address IUU fishing."

Congress, in passing the Magnuson Stevens Reauthorization Act in 2006, also described measures to enhance U.S. leadership. International provisions of the law are aimed at both improving compliance with international fishery management regimes and enhancing fairness for the U.S. fleet. According to the Senate Report, the U.S. fleet is disadvantaged when "other countries do not impose the same stringent regime on their fishing fleets, either within their EEZs or on the high seas. . . .Even when agreements exist, implementation is slow, and management requirements are weak or ineffective in the face of economic pressures."[11]

The MSRA defines IUU fishing in Section 609 as:

> Fishing activities that violate conservation and management measures required under an international fishery management agreement to which the United States is a party, including catch limits or quotas, capacity restrictions, and bycatch reduction requirements;
>
> Overfishing of fish stocks shared by the United States, for which there are no applicable international conservation or management measures or in areas with no applicable international fishery management organization or agreement, that has adverse impacts on such stocks; and
>
> Fishing activity that has an adverse impact on seamounts, hydrothermal vents, and cold water corals located beyond national jurisdiction, for which there are no applicable conservation or management measures or in areas with no applicable international fishery management organization or agreement.

Congress directed NMFS to publish a definition of IUU by April 12, 2007. The agency published a final rule articulating its decision to "publish the definition exactly as set forth in section 403 of MSRA (new section 609(e)(3) of the Driftnet Moratorium Protection Act."[12] NMFS has reserved the possibility of revising the definition as it proceeds with separate rulemaking for the IUU certification procedure.

Effects of IUU Fishing

The extent of the effects of IUU fishing is largely unknown because the activity itself is often clandestine. The FAO notes that while it is difficult to quantify the scale of the problem, for some important fisheries about 30 percent of the total

[11] S.Rpt. 109-229, Report of the Committee on Commerce, Science and Transportation on S. 2012, M-SFCMA Reauthorization Act of 2005. April 4, 2006.
[12] Illegal, Unreported, or Unregulated Fishing. NMFS/NOAA. Final Rule. 72 Fed. Reg. 18404 at 18405 (April 12, 2007).

catch is taken in IUU activities.[13] In the most notorious example, IUU catches of toothfish in the CCAMLR convention area exceed reported fishing by a factor several times over.[14] Based on reviews of IUU vessel lists and compliance reports of RFMOs that have measures to address IUU fishing, the activity occurs in numerous fisheries. Catches that exceed agreed limits, violate size requirements, gear restrictions or occur in closed areas have occurred in swordfish, tuna, pollock, salmon, squid, cod and whitefish fisheries, among others. Unreported catches occur in many fisheries, most notably tuna and toothfish. Unregulated catches are an emerging problem in high seas and deep sea fisheries where no regional body manages activity by distant water fleets.

The FAO reports that IUU fishing has widespread economic, social, and management consequences, not the least that it deprives legitimate fishers of potential catches. The activity undermines conservation and management, prevents rebuilding of depleted stocks, disadvantages and discriminates responsible fishers, and overall thwarts progress toward achieving goals of long-term sustainability.[15]

Those who engage in IUU fishing are also unlikely to observe other rules designed to protect the marine environment such as gear restrictions established to minimize waste and bycatch of non-target species, and prohibitions on fishing in known spawning areas. To avoid detection, IUU fishers often violate certain basic safety requirements, such as keeping navigation lights lit at night, putting other users of the oceans at risk.[16] Enforcement actions often result in lengthy, dramatic, and dangerous ocean chases.[17]

Operators of IUU vessels also tend to deny crew members fundamental rights concerning the terms and conditions of their labor, including those concerning wages, safety standards, and other living and working conditions. Other rules flouted by IUU fishers include those associated with food safety and aquatic animal health, potentially putting consumers and fish populations at risk.

In addition to its detrimental economic, social, environmental, and safety consequences, the unfairness of IUU fishing raises serious concerns. By definition, IUU fishing is either an expressly illegal activity or, at a minimum, an activity undertaken with little regard for applicable standards. IUU fishers gain an unjust advantage over legitimate fishers operating in accordance with those standards. In this sense, IUU fishers are “free riders” unfairly benefiting from the

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[13] Bray, K. A global review of illegal, unreported and unregulated (IUU) fishing. Available at http://www.oceansatlas.org/servlet/CDSServlet?status=ND1maWdp. Last accessed Oct. 4, 2007.
[14] Doulman, supra note 4 at 13.
[15] Bray, supra note 11.
[16] U.S. NPOA at 4.
[17] News accounts of a February 2007 apprehension by the U.S. Coast Guard include descriptions of the fleeing vessel taking evasive maneuvers, including throwing nets into the propellers of the enforcement boats. The Chatham House site devoted to IUU fishing features 900 news items regarding enforcement, including high seas chases. http://www.illegal-fishing.info/sub_approach.php?approach_id=13&subApproach_id=50#news_anchor

sacrifices made by others for the sake of proper fisheries conservation and management.

From a management perspective, IUU fishing strikes at the heart of the precautionary approach because it deprives managers of information critical to stock assessments. IUU fishing limits the availability of catch information and distorts and devalues information gathered from compliant fisheries, reducing confidence in stock assessments. "The consequent application of lowered limits to allowable catches, in order to minimize stock overexploitation risks, further reduces stock availability to legitimate participants."[18] Experts estimate that on an international scale, the degree of underreporting can be up to 75 percent and may be as high as 100 percent for high seas deepwater stocks.[19] When IUU fishing occurs in areas where coastal states license foreign vessels, the state is deprived of revenue.[20]

By frustrating fishery management objectives, IUU fishing can contribute to the overfishing of fish stocks, impair efforts to rebuild such stocks, and, in principle, even lead to the collapse of a fishery. This, in turn, may result in lost economic and social opportunities, both short-term and long-term, and may diminish food security.

Moreover, IUU fishing "may have exacerbated the problem of discards and bycatch," according to the FAO.[21] Because vessels engaged in illegal activity are likely to use unsustainable fishing practices and non-selective gear, their impacts on non-target species and marine biodiversity are assumed to be greater. Deliberate disposal of gear to evade sighting or inspection contributes to the problem of ghost fishing and increased mortality of fish, seabirds, and marine mammals.[22]

One disturbing trend reported by the FAO is the infiltration of "organized criminal enterprises into the fishing business. In addition, sophisticated syndicates of illegal fishers are engaged in the global trade, often designing and building vessels to their own requirements to avoid detection by surveillance."[23]

In passing the MSRA, the U.S. Congress noted that "unsustainable fishing practices of foreign fleets adversely impact fish stocks and undermine the effectiveness of the U.S. management measures."[24] Among other adverse effects of IUU fishing, the report noted competition with cheaper imports, economic disadvantage, falling seafood prices, and bycatch of protected species.

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[18] Evans, D.W. The consequences of illegal, unreported and unregulated fishing for fishery data and management, at 2. Document AUS:IUU/200/12. 2000. Available online at http://www.fao.org/docrep/005/Y3274E/y3274e0e.htm#bm14. Last accessed Oct. 4, 2007.
[19] Id.
[20] Doulman, supra note 4 at 4.
[21] Id. at 16.
[22] Id.
[23] COFI/2007/7 at 5.
[24] S.Rpt. 109-229, supra note 10 at 43.

Factors contributing to IUU fishing

Most of the factors that contribute to IUU fishing are economic. Noncompliant vessels and fleets can realize significant economic gains meeting the world demand for fish. As legal fishing is constrained as part of the international goal to reach long-term sustainability by reducing catches, IUU activity stands to be even more profitable. Excess capacity is believed to be a component of the economic motivation to fish illegally, compounded by payment of government subsidies.[25] Lack of flag state control over vessels on open registries, no supervision of their operations, transshipment at sea to freezer transports, isolated fishing areas, and lack of surveillance and enforcement all make IUU fishing worth the risk.

In a global review of trends in the use of flags of convenience (FOC),[26] the authors found that the implementation of the IPOA-IUU has had little effect in deterring FOC use. The review found that:

- It is no longer only aging vessels that operate under FOCs and open registries; new vessels appear to be constructed for the very purpose of IUU fishing under FOCs.
- Fourteen4 countries appear to have the greatest activity on open registries, with Belize, Panama, Honduras, and St. Vincent and the Grenadines at the top of the list of FOC countries for more than five years running.
- The number of large-scale vessels operating with “unknown” or convenience flags is growing.
- Owners and operators do not bother to hide behind fictitious residence or company names. They are often nationals of countries that are party to fishing agreements.
- The number of large-scale vessels, especially those equipped to fish for tuna exceeds the number of vessels authorized by various RFMOs to fish in their respective convention areas.

Enforcement issues that hamper efforts to deal with IUU fishing

Barriers to combating IUU fishing arise in the enforcement realm, but some are broader and stem from international legal issues. These include the status of states that are outside regional and global fisheries management instruments, and as such do not consider themselves bound by those obligations;[27] conflicting

[25] Doulman supra note 4 at 5.

[26] Gianni, M. and Simpson, W. (2005). The Changing Nature of High Seas Fishing: how flags of convenience provide cover for illegal, unreported and unregulated fishing. Australian Department of Agriculture, Fisheries and Forestry, International Transport Workers’ Federation, and WWF International.

[27] Edeson, supra n. 7, suggests that although states have limited authority to reach vessels on the high seas other than their own vessels or nationals, the FAO Compliance Agreement and the Straddling Stocks Agreement may provide additional authority because they impose an obligation on states: “A State whose vessels fish on the high seas shall take such measures as may be necessary to ensure that vessels flying its flag comply with subregional and regional conservation

policy objectives; and the "corporate veil" that cloaks the ownership of vessels engaged in IUU fishing.[28] When pending instruments enter into force, including the Code of Conduct, the Compliance Agreement, the Straddling Stocks Agreement, and the IPOAs on birds, sharks, and capacity, compliant states will have additional leverage to reach activity by nonmember states on the high seas.

Specific enforcement issues include ineffective fleet monitoring, control, and surveillance; gaps in vessel registries; flag state apathy; ineffective port state authority; and obstacles to product tracking. Even where cooperative efforts among states lead to enforcement action,[29] the actual chase and capture of IUU vessels is dangerous.[30]

Traceability of fish products is an effective trade-related measure to stop IUU fishing, as well as a barrier. These programs are expensive and require significant investment in enforcement resources and tracking protocols. However, in some cases a system may already be required for food safety and security, or public health purposes, as well as fishery management aims. Mandatory product certification and catch documentation are increasingly used in the course of monitoring and enforcement in fisheries, and as a means of excluding IUU products from consumer markets. The use of certification or catch document schemes is encouraged in the FAO's International Plan of Action on IUU Fishing. The United States has taken the lead in promoting the use of catch documentation and certification schemes in a number of RFMOs such as CCAMLR, ICCAT, and IATTC. RFMOs that prescribe tracking systems include CCAMLR's Catch Documentation Scheme for Toothfish, CCSBT's Trade Information Scheme for Southern Bluefin Tuna, and ICCAT's Bluefin Tuna Statistical Document Programme.

The United States has had country of origin labeling for many products for a number of years, including fish and seafood. Certification of Origin for tuna, and tuna tracking and verification systems developed in the context of tuna-dolphin programs, have been expanded to include bluefin tuna, swordfish, salmon, and other products.[31] Examples where product tracking and certificates of origin have led to enforcement include toothfish, swordfish, bluefin tuna, and dolphin-safe tuna.[32]

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and management measures and that such vessels do not engage in any activity which undermines the effectiveness of such measures." Article 18.1.

[28] *See supra* note 26 and accompanying text (discussing flags of convenience).

[29] Examples of cooperation include shared lists, regional vessel registers, VMS, joint surveillance, advance notice when IUU vessels are spotted, and joint at-sea operations. Many of these are detailed in COFI/2007/7, supra note x. pp. 3-6.

[30] See Chatham House website for news items on high profile chases and arrests in illegal fishing enforcement actions. Available at http://www.illegal-fishing.info/sub_approach.php?approach_id=13&subApproach_id=50&category_id=#news_anchor

[31] Department of Agriculture. Mandatory Country of Origin Labeling of Fish and Shellfish; Interim Rule, 69 Fed. Reg. 59708 (Oct. 5, 2004).

[32] Recent developments in traceability and labeling in fish trade are described in a 2006 report to COFI. COFI:FT/X/2006/6 p. 9. For a detailed description of Tuna Tracking and the Dolphin-Safe

Increased authority for port states, as suggested by the proposal for a binding instrument based on the Port State Model Scheme, may provide the mechanism to overcome numerous enforcement issues.

Domestic laws and regulations designed to end or reduce IUU fishing[33]

The 2006 amendments to the Magnuson-Stevens Act and the High Seas Driftnet Fisheries Enforcement Act were not the first attempt by the U.S. Congress to enact laws aimed at stopping fishing activity that compromised the effectiveness of domestic and international conservation regimes, though they differ from prior efforts in their emphasis on using multilateral approaches to address IUU fishing and bycatch. In the 1970s and 1980s, the U.S. used unilateral trade sanctions to push compliance with provisions of the International Whaling Commission. Also in the 1980s, the approach was tried to require shrimp trawlers in other nations to apply measures comparable to those required of U.S. shrimpers to pull turtle excluder devices (TEDs) as a means to release endangered marine turtles from trawl nets. By the 1990s, the unilateral trade sanction approach was used to exclude import of products caught in driftnets or in purse seine nets set on dolphins in order to catch tuna swimming beneath.

The existing statutory framework was employed in these earlier actions under the Lacey Act, the Pelly Amendment to the Fisherman's Protective Act of 1967, the Packwood Amendment to the Fishery Conservation and Management Act of 1982, and the Driftnet Impact, Monitoring, Assessment and Control Act of 1987. In contrast, in the 1970s and 1980s the United States sought to use unilateral trade sanctions to push compliance with provisions of the International Convention for the Regulation of Whaling. Also in the 1980s, the approach was tried to require shrimp trawlers in other nations to apply measures comparable to those required of U.S. shrimpers who used turtle excluder devices (TEDs) as a means to release endangered marine turtles from their trawl nets. By the 1990s, the unilateral trade sanction approach was used to exclude import of products caught in driftnets or in purse seine nets set on dolphins in order to catch tuna swimming beneath.

The earliest example of domestic law aimed at excluding imports of fishery products taken illegally is the Lacey Act of 1900. While not aimed specifically at fishery products, the purpose of the original Lacey Act was to strengthen state fish and wildlife laws by restricting commerce of illegal fish and wildlife. It was bolstered in 1926 by the Black Bass Act, which prohibited interstate shipment of species of bass when the fish were taken contrary to state law. The modern Lacey Act results from amendments in 1981 that repealed the earlier law and the Black Bass Act, and substituted new provisions that strengthen and expand the

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Label, *see* Report to Congress under Section 305 of the Marine Mammal Protection Act, August 2007. The program has a website at http://www.DolphinSafe.gov

[33] Related materials are provided in additional Appendices: complete listings of U.S. law related to IUU fishing (Appendix A), U.S. actions to reduce bycatch (Appendix C), and tools to reduce global bycatch of cetaceans (Appendix E).

provisions against importation of illegally taken fish and wildlife.[34] The Lacey Act Amendments of 1981 are considered “one of the United States’ primary laws directly targeting illicit interstate or foreign trade in illegally taken species.”[35] The act prohibits import, export, transport, sale, possession or transactions in interstate or foreign commerce of any fish or wildlife “taken, possessed, transported, or sold in violation of any law, treaty, or regulation of the United States or in violation of any Indian tribal law.”[36] It includes specifications on package marking and record keeping,[37] and provides for penalties including forfeiture of product and equipment in felony cases.[38] The two-part prohibition requires evidence of a violation of domestic or foreign law and of trafficking: import, export, sale and so forth.[39] The law has been used extensively in a variety of wildlife resource cases, and NOAA has used it to prosecute foreign fishing vessels that import catch such as tuna that was caught without authorization in another country’s EEZ.[40]

In 1971, Congress passed the Pelly Amendment to the Fisherman’s Protective Act of 1967. The amendment was in response to concerns regarding the inability of the International Whaling Commission to enforce its quotas. The Amendment directs the Secretary of Commerce to certify to the President if "nationals of a foreign country, directly or indirectly, are conducting fishing operations in a manner or under circumstances which diminish the effectiveness of an international fishery conservation program."[41] Although the President always retains the discretion to direct the Secretary of Treasury to impose trade sanctions, the Fisherman’s Protective Act specifies a prohibition on the importation of fish products from the certified country.[42] The Secretary of Commerce made five certifications under Pelly in the ensuing 10 years, but no sanctions or import bans were ever imposed.[43]

The Packwood Amendment to the Fishery Conservation and Management Act was passed in 1982, and added the additional sanction on certified nations of a 50 percent reduction in their allocation of fish from the U.S. EEZ.[44] The

[34] Pub. L. 97-79, 95 Stat 1073, 18 U.S.C. 3371 et seq. *See*, M. Bean. 1983. The Evolution of National Wildlife Law, rev’d edition, at 111.
[35] P. Ortiz. An overview of the U.S. Lacey Act Amendments of 1981 and a Proposal for a Model Port State Fisheries Enforcement Act. Prepared for Ministerially Led Task Force on IUU Fishing on the High Seas. November 2005, at 3.
[36] 18 U.S.C. 3372.
[37] 18 U.S.C. 3372 (b), (d).
[38] 18 U.S.C. 3374.
[39] Ortiz at 4.
[40] Ortiz provides a detailed description of the investigation, charge and trial aspects of the Lacey Act and uses the U.S. experience to develop a model enforcement law for port states.
[41] 22 U.S.C. 1978(a)(1).
[42] 22 U.S.C. 1978(a)(4).
[43] H. R. Rep. No. 95-1029, p. 9 (1978); 125 Cong. Rec. 22084 (1979) (remarks of Rep. Oberstar).
[44] 16 U.S.C. 1821(e)(2). At the time, foreign nations could receive an allocation in U.S. waters for fish not being harvested by U.S. fishermen. New language was added to in Section 201(d) in MSRA regarding the Total Allowable Level of Foreign Fishing (TALFF) as follows: “Allocations of the total allowable level of foreign fishing are discretionary, except that the total allowable level

amendment made the imposition of sanctions mandatory once a certification of "diminishing effectiveness" of the IWC was made.[45] It did not, however, change the standard for certification set out earlier in Pelly.[46]

The Marine Mammal Protection Act of 1972[47] provides another example of how Congress has asserted itself in international wildlife conservation policy. From the inception of the MMPA, the Congress placed a strong injunction on the Department of State to develop "new arrangements for protection of these animals [marine mammals] and of ocean ecosystems that are significant to their welfare."[48] Congress also acknowledged that "unilateral action by the U.S." affecting any species or subspecies of marine mammals could be fruitless unless other nations involved in the taking of marine mammals work with the U.S. to preserve and protect these creatures."[49]

The MMPA prohibits "taking" (harassment, hunting, capture, killing or attempt thereof) and importation into the U.S. of marine mammals, except where an exception is explicitly authorized. The act's stated goal is that the incidental kill or serious injury of marine mammals in the course of commercial fishing be reduced to insignificant levels approaching zero.[50] The U.S. Customs Service within the Department of Homeland Security enforces the provisions regarding importation.

Section 101(a)(2) of the MMPA authorizes limited incidental taking of marine mammals by U.S. fishermen in the course of commercial fishing pursuant to a permit issued by NMFS, in conformity with and governed by certain statutory criteria in sections 103, 104, and 118 and implementing regulations. Section 101(a)(2) of the MMPA states: "The Secretary of Treasury shall ban the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of U.S. standards." This prohibition is mandatory. Subparagraph (A) requires the Secretary to "insist on reasonable proof from the government of any nation from which fish or fish products will be exported to the U.S. of the effects on ocean mammals of the commercial fishing technology in use for such fish or fish products exported from such nation to the U.S."[51]

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shall be zero for fisheries determined by the Secretary to have adequate or excess domestic harvest capacity."

[45] 16 U.S.C. 1821 (e)(2)(B)(ii)

[46] Japan Whaling Assn v American Cetacean Society. 478 US 221 (1986) at 227. Court held that even though sanctions were mandatory once a certification was made, the Secretary had a range of discretion in making the finding whether a nation's fishing activity was sufficient to diminish the effectiveness of the IWC, citing "no reason to impose a mandatory obligation upon the Secretary to certify that every quota violation necessarily fails the standard." At 228.

[47] 16 U.S.C. 1371-1407

[48] Report 92-707 House of Representatives, 92d Congress, 1st Session page 18

[49] Report 92-863 Senate 92d Congress 2d Session page 10.

[50] 16 U.S.C 1372 (a)(2)

[51] 16 U.S.C 1372 (a)(2)(A)

The importation ban provisions have been used only used once outside the context of the "tuna-dolphin issue."[52] The history of U.S. action to reduce the number of dolphins killed in the course of tuna fishing operations in the Eastern Pacific Ocean is one of the most prominent examples of unilateral enforcement of conservation standards. The story is a lengthy one and will not be repeated here although the issue was one of the driving forces behind the enactment of MMPA.[53]

The MMPA creates a ban on "the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of U.S. standards."[54] In 1984 and 1988, Congress amended section 101(a)(2) of MMPA to require governments of nations that export yellowfin tuna harvested in the purse-seine fishery in the Eastern Tropical Pacific Ocean (ETP) to provide documentary evidence that the government has adopted a regulatory program governing the taking of marine mammals that is comparable to that of the U.S. and that the average rate of incidental taking of the harvesting nations is comparable to that of the U.S.
Subsequently, Mexico, an embargoed nation, and the EU, an embargoed intermediary nation, requested that a dispute-settlement panel be established pursuant to the General Agreement on Tariffs and Trade (GATT). The GATT panels issued decisions in favor of Mexico and the EU, but the GATT Council did not adopt either decision. This result precipitated, in 1992, enactment of the International Dolphin Conservation Act of 1992 (IDCA).[55] The IDCA amended the MMPA to (1) impose a five-year moratorium on the harvesting of tuna with purse seine nets deployed on or to encircle dolphins; and (2) lift the tuna embargo for those nations that made a declared commitment to implement the moratorium and take other steps to reduce dolphin mortality. No nation issued intent to honor the provisions of the IDCA.[56]

In October of 1995, the U.S. and eleven other nations signed the Panama Declaration. In this declaration these nations made commitments to strengthen the protection of dolphins and negotiate a new binding agreement to establish the IDCP, but only if the U.S. amended its laws to (1) lift the embargoes imposed under the MMPA; (2) permit the sale of both dolphin-safe and non-dolphin safe tuna in the U.S. market; and (3) change the definition of "dolphin safe tuna" to mean "tuna harvested without dolphin mortality." In 1997, Congress enacted the IDCPA,[57] which revised the criteria for banning imports by amending the MMPA.

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[52] Protecting marine mammals from direct takes for crab bait was the primary focus of discussions during the initiation of a bilateral agreement between the U.S. and Chile in the 1990s.
[53] See, e.g. Michael J. Bean and Melanie J. Rowland, The Evolution of National Wildlife Law (3d ed. 1997) at 116-136; C.J. Carr and H.N. Scheiber, Dealing with a Resource Crisis: regulatory regimes for managing the world's marine fisheries, in How Globalization affects national regulatory policies. Available at http://repositories.cdlib.org/uciaspubs/editedvolumes/1/3. 2002
[54] 16 U.S.C.A. § 1371(a)(2)
[55] Pub. L. No. 102–523, 106 Stat.3425 (1992).
[56] H.R. Rep. No. 105-74(I), at 14, 1997 U.S.C.C.A.N. at 1632.
[57] Pub. L. No. 105-42, 111 Stat. 1122 (1997).

Pursuant to this amendment, nations are permitted to export tuna to the U.S. if a nation provides documentary evidence that it (1) participates in the IDCP and is a member (or applicant member) of the Inter-American Tropical Tuna Commission; (2) is meeting its obligations under the IDCP and the Inter-American Tropical Tuna Commission; and (3) does not exceed certain dolphin mortality limits.[58]

As a result of amendments to the MMPA made by the IDCPA, the trade restrictions for intermediary countries were eliminated, and provisions were put in place to lift the embargoes on yellowfin tuna harvested by setting purse-seine nets on dolphins in the eastern Pacific Ocean. Since then, the embargoes were lifted for Ecuador, Mexico, and El Salvador. Spain also has been issued an affirmative finding and can export to the U.S. yellowfin tuna caught in the ETP using purse seines. To date the following nations remain embargoed: Belize, Bolivia, Colombia, Guatemala, Honduras, Nicaragua, Panama, Vanuatu, Venezuela, and Peru. Currently, there are no intermediary nations identified by NMFS subject to import prohibitions.[59]

A detailed discussion of the most recent progress in dolphin conservation, research, tuna tracking, labeling standards, and litigation can be found in the August 2007 NOAA Report to Congress.[60]

The Driftnet Impact Monitoring, Assessment and Control Act attempts to reduce the mortality of non-target marine animals in driftnets used by foreign fisheries operating in the North Pacific Ocean and Bering Sea.[61] It was passed in response to congressional findings that driftnets are "a fishing technique that may result in the entanglement and death of enormous numbers of target and non target marine resources in the waters of the North Pacific Ocean."[62] The Driftnet Act was intended to increase efforts "to monitor, assess, and reduce the adverse impacts of driftnets."[63]

The President signed Public Law 101-627, the Fishery Conservation Amendments of 1990, on 28 November 1990. Title I, Section 107, of the law amended Section 206 of the Magnuson-Stevens Fishery Conservation and Management Act (hereafter referred to as the Magnuson-Stevens Act) (16 USC 1826) to incorporate and expand upon provisions of the Driftnet Impact Monitoring, Assessment, and Control Act of 1987.

On 2 November 1992, the President signed Public Law 102-582, the High Seas Driftnet Fisheries Enforcement Act. Among other things, this Act is intended to enforce implementation of United Nations General Assembly Resolution 46/215,

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[58] Id. at § 4, 111 Stat. at 1123-1124 (codified at 16 U.S.C.A. 1371(a)(2)(B)).
[59] http://swr.nmfs.noaa.gov/psd/embargo2.htm
[60] Available online at http://www.nmfs.noaa.gov/ia/intlbycatch/mammals.htm.
[61] Driftnet Act §4002, 16 U.S.C. 1822. On February 6, 1990, the House of Representatives passed H.R. 2061 amending the Magnuson Fishery Conservation and Management Act to prohibit “large-scale driftnet fishing” in U.S. waters. 136 Cong. Rec. H231 (daily ed. Feb. 6, 1990). The bill also instructed the Secretary of State to seek an international ban on large-scale driftnet fishing. *Id.* at 230.
[62] *Id*. at §4002(1).
[63] *Id*. at § 4002(3).

which called for a worldwide driftnet moratorium beginning in December 1992.

Public Law 104-43, the Fisheries Act of 1995, was enacted on 3 November 1995. Title VI of this law, the High Seas Driftnet Fishing Moratorium Protection Act, prohibits the United States, or any agency or official acting on behalf of the United States, from entering into any international agreement with respect to the conservation and management of living marine resources or the use of the high seas by fishing vessels that would prevent full implementation of UNGA Resolution 46/215.

A description of efforts the U.S. has made to carry out the policy expressed in these provisions is available in the annual report to congress [link]. The most recent report was made to Congress in August 2007 and describes efforts the United States has made to implement its own driftnet ban as well as the United Nations General Assembly driftnet ban and the Wellington Convention in the North Pacific, Mediterranean, Antarctic and globally. Activities have included coordination with other fishing nations, U.S. Coast Guard enforcement actions, negotiation of bilateral agreements, coordination with other nations to track vessels with the potential for high seas drift net fishing and research on the impacts of driftnet fishing on marine resources.

Sea turtle conservation, particularly through reduction of bycatch in shrimp trawls, was set forth in a 1989 amendment to the Endangered Species Act,[64] requiring the United States to embargo shrimp harvested with commercial fishing technology that may adversely affect sea turtles. Currently, 16 nations have received positive certification under the law, 24 nations fish for shrimp in environmental conditions where sea turtles are unlikely to occur, so do not pose a threat, and 8 additional nations use small-scale technology that is determined not to pose a threat. [65] Any other nations catching shrimp are prohibited from importing it into the United States. The import ban has been applied to countries that failed to meet the requirements for positive certification, with mixed results.

In 1991, the United States issued guidelines for assessing the comparability of foreign sea turtle conservation programs with the U.S. program. The 1991 Guidelines also determined that the scope of Section 609 was limited to the wider Caribbean/western Atlantic region. In 1993, the United States issued revised guidelines providing that, to receive a certification in 1993, affected nations (those determined in 1991 Guidelines) had to maintain their commitment to require TEDs on all commercial shrimp trawl vessels.

The Earth Island Institute, a San Francisco-based environmental organization, filed suit in the U.S. Court of International Trade to force the Departments of State and Commerce to comply with certification procedures under federal law[66] for countries exporting to the United States shrimp caught in a manner that

[64] Sea Turtle Conservation Amendments to the Endangered Species Act, Pub. L. 101-162, sec. 609, 103 Stat. 988, 1037 (Nov. 21, 1989) (amending 16 U.S.C. § 1537 (1994)).
[65] Federal Register notice available online at: http://www.thefederalregister.com/d.p/2007-05-22-E7-9884.
[66] *See,* discussion of sea turtle conservation amendments to the ESA, supra n. 23.

harmed endangered sea turtles.[67] In December of 1995, the U.S. CIT found that the 1991 and 1993 Guidelines were contrary to law by limiting the geographic scope of the application of Section 609 to shrimp harvested in the wider Caribbean-Western Atlantic region. In April 1996, the U.S. Department of State published revised guidelines to comply with the CIT order of December 1995. The new guidelines extended Section 609 to shrimp harvested in all foreign nations, but confined positive certification to nations whose vessels used TEDs. In October 1996, the CIT ruled that the 1996 Guidelines were contrary to Section 609 because they allowed imports of shrimp from non-certified countries, if the shrimp was harvested with commercial fishing technology that did not adversely affect sea turtles. The CIT later clarified that shrimp harvested by manual methods, which did not harm sea turtles, could continue to be imported even from countries which had not been certified under Section 609, and refused to postpone the worldwide enforcement of Section 609.

Once application of the requirements expanded, several Asian nations were not able to obtain positive certification and import bans ensued.[68] In accordance with World Trade Organization (WTO) rules, the governments of Pakistan, Malaysia, India, and Thailand expressed their concerns to the WTO regarding the U.S. imposed embargo of shrimp imports. In 1996, they filed a complaint against the United States under WTO dispute settlement procedures, claiming that the U.S. law violated international trade law by barring the importation of their shrimp and shrimp products.[69] After pursuing informal consultations unsuccessfully, the complaining parties requested that a WTO Dispute Panel be convened and for the Panel to find that Section 609 of Public Law 101-162 and its implementing measures were contrary to the Governing Agreement on Tariffs and Trade (GATT). The dispute panel found the measure was inconsistent with the GATT, and the U.S. appealed. The WTO Appellate Body ruled in 1998 against the United States, finding that it had discriminated by giving Asian countries only four months to comply with the law, but giving Caribbean Basin nations three years. Even though the United States lost the case, the Appellate Body ruling recognized the validity of the U.S. Endangered Species Act and the rights of the United States to adopt environmental conservation measures as long as they are administered fairly.[70]

In response to the original Panel and Appellate Body decisions, the United States revised its guidelines on the importation of shrimp, changing both the method and the schedule by which it evaluated turtle protection measures. Under the original guidelines, countries were certified if they implemented regulation to require shrimps to use TEDs. Under the Revised Guidelines, other regulatory

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[67] Earth Island Institute vs. Christopher, 20 Ct. Int'l Trade 1221 (1996) vacated sub nom EII v Albright, 147 F2d 1352 (Fed Cir 1998).
[68] 61 Fed. Reg. 24998-24999 (May 17, 1996).
[69] United States— Import Prohibition of Certain Shrimp and Shrimp Products. WTO case Nos. 58 and 61. Ruling adopted on 6 November 1998. Available online at http://www.wto.org/english/tratop_e/envir_e/edis08_e.htm
[70] Report of the Appellate Body on U.S. Import Prohibitions of Certain Shrimp and Shrimp Products, Oct. 12, 1998, 38 I.L.M. 118 (1999)

approaches to the protection of sea turtles may substitute for TEDs, or a state may show that its shrimp fishing does not threaten sea turtles and on that basis obtain certification. Malaysia took the action back to the WTO in 2001, but the WTO Appellate Body held that the implementation steps had remedied any unfair discrimination and provided due process to exporting nations.[71]

Binding and nonbinding international instruments to address IUU fishing

UNCLOS

The 1982 U.N. Convention on the Law of the Sea (UNCLOS)[72] is the overarching body of law covering every aspect of marine endeavours, from transportation to pollution to military issues to scientific research. In its sections addressing the protection of living marine resources, UNCLOS sets out the rights and responsibilities of coastal states and flag states with regard to fishing. While UNCLOS conferred economic rights over resources to coastal states, it preserved the traditional notion of freedom of fishing on the high seas. Although it only entered into force in 1994, "by the time UNCLOS was signed its provisions already constituted customary international law in the eyes of most countries."[73]

UNCLOS gives coastal states sovereign rights over resources out to 200 miles for the purpose of "exploring and exploiting, conserving and managing the natural resources, whether living or nonliving."[74] A coastal nation must ensure, using the best scientific information available and conservation and management measures, that the living resources of its EEZ are not threatened by overexploitation.[75] UNCLOS adopts the concept of maximum sustainable yield (MSY) as the goal for maintaining or restoring exploited populations.[76] The costal state is to collect, contribute, and exchange scientific information, as well as catch and effort statistics with other concerned states.[77] Access to the EEZ by foreign fleets is solely within coastal state discretion and subject to its laws and

[71] USTR. U.S. Wins WTO Case on Sea Turtle Conservation. Available online at http://www.ustr.gov/Document_Library/Press_Releases/2001/October

[72] The Third United Nations Convention on the Law of the Sea, Dec. 10, 1982, 21 I.L.M. 1245. (Entered into force 16 November 1994) (hereinafter UNCLOS).

[73] David Hunter, James Salzman and Durwood Zaelke, "International Environmental Law and Policy," Foundation Press (2002) at 659.

[74] UNCLOS, supra note 1 at Art. 56.

[75] Id. at Art. 61(2).

[76] Id. at Art. 61(3). "The concept of maximum sustainable yield recognizes that fisheries must be managed so that fish stocks can be sustainably caught year after year without causing the population of fish stocks to decline. 50 CFR 602.11(d)(1)…. Scientists assume that population levels at 40% of unfished abundance (or biomass) are close to MSY, and that populations are overfished when levels fall below half the MSY level, roughly 20% of unfished abundance." However, MSY does not necessarily signify healthy fish populations, and should be viewed as a minimum target used in conjunction with precautionary and ecosystem management approaches. See Tim Eichenberg and Mitchell Shapson, "The Promise of Johannesburg: Fisheries and the World Summit on Sustainable Development, 34 Golden Gate University Law Review 587 at 624-626.

[77] UNCLOS, supra note 32, at Art. 61(5).

regulations, including requirements for licensing, observers, and other conservation measures. Compliance with conservation and management measures is also required.[78] UNCLOS directs states to seek coordinated measures necessary to conserve stocks that occur within the EEZs of two or more coastal states, or adjacent to their zones.[79]

With regard to highly migratory species, UNCLOS calls for cooperation through international organizations and, where none exist, for the establishment of such organizations "with a view to ensuring conservation and promoting the objective of optimum utilization of such species throughout the region, both within and beyond the exclusive economic zone."[80] UNCLOS even imposes new obligations on high seas fishing states. While freedom of fishing on the high seas continues in principle, UNCLOS can be read as imposing a dual responsibility on fishing nations: conservation and cooperation with coastal states.[81]

Even though UNCLOS provided a new framework for better fisheries management, extending coastal state jurisdiction to 200 miles has been insufficient to protect ocean fisheries. As fleets, technology, and the demand for fish and fishery products grew, it became clear by the late 1980s that the world's fish populations could not withstand continuing rapid and often uncontrolled exploitation and development.[82] Reports of violence, confrontations between fishing nations, uncontrolled fishing on the high seas, and—for the first time in history—several consecutive years of declines in world catches led to a series of meetings and conferences where fishery experts called for action to control high seas fishing. In 1991, the Committee on Fisheries (COFI)[83] called for the

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[78] Id. at Art. 62.
[79] Id. at Art. 63.
[80] Id. at Art. 64.
[81] Louis B. Sohn and Kristen Gustafson, The Law of the Sea 115 (1984). UNCLOS imposes duties on all states to take "such measures for their respective nationals as may be necessary for the conservation of the living resources of the high seas," Article 117; to cooperate "in the conservation and management of living resources" of the high seas, Article 118; and to "maintain or restore populations of harvested species at levels which can produce maximum sustainable yield," Article 119.
[82] FAO. The State of World Fisheries and Aquaculture 2004. Available at http://www.fao.org/sof/sofia/index_en.htm. Last accessed 9 May 2006. *See also,* Reg Watson and Daniel Pauly, "Systematic Distortions in World Fisheries Catch Trends," *Nature,* Nov. 29, 2001 at 534-536. China remains the largest producer by far and in 2002 produced 16.6 and 27.7 million tones from capture fisheries and aquaculture respectively. The top ten countries producing supply from capture fisheries in 2002 (in addition to China) were Peru, the United States, Indonesia, Japan, Chile, India, Russian Federation, Thailand and Norway. This group has not changed since 1992.
[83] "The Committee on Fisheries (COFI), a subsidiary body of the FAO Council, was established by the FAO Conference at its Thirteenth Session in 1965. The Committee presently constitutes the only global inter-governmental forum where major international fisheries and aquaculture problems and issues are examined and recommendations addressed to governments, regional fishery bodies, NGOs, fishworkers, FAO and international community, periodically on a world-wide basis. COFI has also been used as a forum in which global agreements and non-binding instruments were negotiated." Available at http://www.fao.org/fi/body/cofi/cofi.asp. Last accessed 3 Oct. 2007.

development of new concepts to foster responsible, sustained fisheries. This was followed in 1992 by an International Conference on Responsible Fishing in Cancun, Mexico, where participants adopted a Declaration stating that "States should cooperate...to establish, reinforce and implement effective means and mechanisms to ensure responsible fishing on the high seas."[84] These efforts culminated in the 1992 U.N. Conference on Environment and Development in Rio de Janeiro (UNCED).[85]

UNCED, or the "Earth Summit," adopted a list of recommendations, including a chapter on the marine environment. Specifically, Chapter 17.C of Agenda 21 called for the U.N. to find ways to conserve fish populations and prevent international conflicts over fishing on the high seas, consistent with the provisions of the Law of the Sea.[86] Ten years later, at the World Summit on Sustainable Development, 191 nations agreed to a series of targets and timetables to restore depleted fish stocks, manage fishing capacity prevent IUU fishing, and create marine protected areas.[87]

FAO Code of Conduct for Responsible Fisheries

The U.N. Food and Agricultural Organization (FAO) recognized the need for norms for international fisheries and in 1995 unanimously recommended "the formulation of a global Code of Conduct for Responsible Fisheries which would...establish principles and standards applicable to the conservation, management and development of all fisheries."[88] In its 12 Articles, the Code of Conduct covers both policy and technical matters, including fisheries management, fishing operations, aquaculture, coastal area development, research, and trade.

The Code is voluntary, but some provisions are binding because of their relation to other legal instruments.[89] The Code is directed toward all persons concerned with conservation, management or development of fisheries, processing,

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[84] International Conference on Responsible Fishing. Declaration of Cancun. Done at Cancun, Mexico 8 May 1992.
[85] United Nations Conference on Environment and Development (1992) (hereinafter UNCED)
[86] Agenda 21 (UN Doc. A/CONF.151/26 (Vol. I-III)).
[87] See generally, www.johannesburgsummit.org, and "Report of the World Summit on Sustainable Development, available at http://ods-dds-ny.un.org/UNDOC/GEN/N02/636/93/PDF/No263693.prf. Although the WSSD set a number of ambitious fishery timetables, it generally fell short of expectations and mechanisms to ensure the timetables are met. See Eichenberg and Shapson, supra note 36 at 588 and 624-636.
[88] United Nations Food and Agriculture Organization. Code of Conduct for Responsible Fisheries. Rome. 1995 (hereinafter FAO Code of Conduct), available at http://www.fao.org/DOCREP/005/v9878e/v9878e00.htm last visited Dec. 6, 2007, at Preface. For more detail on the Code of Conduct, See United Nations Food and Agriculture Organization, Fisheries Report No. 809. Report of the FAO Regional Workshop on the Elaboration of the National Plans of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing – South Asian Subregion, Bangkok 19-23 June 2006, Appendix E, David Doulman, 1995 FAO Code of Conduct for Responsible Fisheries: development considerations and implementation challenges, available at ftp://ftp.fao.org/docrep/fao/009/a0717e/a0717e00.pdf last visited Dec.6 , 2007.
[89] Id. at Art. I,1.

marketing, or any "users of the aquatic environment in relation to fisheries."[90] It provides principles and standards for every aspect of fisheries, from aquaculture to capture, from research to fishing operations, and from processing to trade.[91]

The Code attaches an obligation to the freedom to fish and calls for users of living marine resources to use them "in a responsible manner so as to ensure effective conservation and management."[92] Intergenerational equity appears in the fishery context for the first time as well, with the call for maintaining the diversity of fishery resources for "present and future generations" as well as for "food security, poverty alleviation and sustainable development."[93] The Code urges effort controls, ecosystem management, the precautionary approach, selective fishing gear, habitat protection, and use of the best scientific information.[94] It calls not only for monitoring and control of flag state vessels, but also cooperation at all levels and among jurisdictions, as well as cooperation to prevent disputes.[95]

States are urged to conduct transparent decision-making processes, education, and training, provide safe and fair working conditions, and recognize and protect the rights of subsistence, small-scale, and artisanal fishers.[96] Articles 7 through 12 provide specific guidance to states and interested parties on operational and technical matters. These have been further elaborated by a series of technical guidelines from the FAO. Many of the provisions supply further detail on the principles by setting out how, for example, application of the precautionary approach would occur in fishery management measures.[97]

Management objectives include maintaining or restoring stocks to maximum sustainable yield,[98] avoiding excess fishing capacity, protecting biodiversity and endangered species, assessing and mitigating adverse impacts from human activities, and minimizing pollution, waste, discards, ghost fishing,[99] and bycatch.[100] The Code recommends assessment of whole ecosystems and

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[90] Id. at Art. II, 2.
[91] Id. at Art. I, 3.
[92] Id. at Art. VI,1.
[93] Id. at Art. VI, 2.
[94] Id. at Art. VI, 3-8
[95] Id. at Arts. VI, 10-12; VI,15.
[96] Id. at Arts. VI, 13; VI, 16-18
[97] Id. at Art. VI, 5. See infra note 72 and accompanying text for further explanation of the precautionary approach.
[98] For an explanation of MSY see supra note 36.
[99] Capture of fish in the water by lost or abandoned fishing gear. Angela Somma for the National Marine Fisheries Service. "The Environmental Consequences and Economic Costs of Depleting the World's Oceans." 2003. Available at http://usinfo.state.gov/journals/ites/0103/ijee/somma.htm. Last visited 3 May 2007.
[100] Fish or other fauna (e.g. birds or marine mammals) that are caught during fishing, but which are not sold or kept for personal use. In commercial fishing these include both fish discarded for economic reasons (economic discards) and because regulations require it (regulatory discards). Organisation for Economic Co-operation and Development Glossary of Statistical Terms, 2001. Available at http://stats.oecd.org/glossary/detail.asp?ID=252. Last visited 3 October 2007.

interrelationships, and directs states to consider the whole stock unit over its entire area of distribution.[101]

At the same time the FAO was developing the Code of Conduct for Responsible Fisheries, it was responding to growing concerns, highlighted during the Earth Summit, about incursions on coastal states' EEZs, confrontations between distant water fleets and coastal states, violations of fishing agreements, reflagging to avoid compliance with applicable rules, and general dissatisfaction with increasing fishing pressure on the high seas that was likely to affect stocks or fishing fleets in adjacent EEZs. In November 1993, the parties to the FAO Conference 27th Session adopted the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (Compliance Agreement).[102] The parties made clear that the provisions of the agreement were to be made part of the Code, where the Compliance Agreement is referenced as one of the exceptions to the voluntary nature of the Code.[103]

Compliance Agreement

The Compliance Agreement applies to all fishing vessels on the high seas, with a few exceptions for small vessels. Flag States are called upon to ensure that vessels flying their flag do not engage in activity that undermines the effectiveness of international conservation and management measures. The Agreement requires a state to authorize the use of its flag by fishing vessels, and states may not authorize vessels unless they can exercise control over them, nor may they authorize vessels with previous compliance problems. Significantly, the authorization to fly the flag constitutes an authorization to fish on the high seas and can be withdrawn: "Where a fishing vessel that has been authorized to be used for fishing on the high seas by a Party ceases to be entitled to fly the flag of that Party, the authorization to fish on the high seas shall be deemed to have been cancelled."[104] Parties are required to ensure that vessels are clearly marked, that they can be identified, and that they fulfil recordkeeping and information-sharing obligations. Parties are required to take enforcement measures against vessels acting in contravention to the Agreement, and are urged to use serious sanctions "of sufficient gravity as to be effective in securing compliance...and to deprive offenders of the benefits accruing from their illegal activities."[105] Parties are also directed to urge non-parties to adopt consistent measures and to exchange information about non-parties whose activities undermine the effectiveness of international conservation and management measures.[106]

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[101] FAO Code of Conduct, supra note 48 at Arts II, VIII.
[102] Food and Agriculture Organization of the United Nations. Agreement To Promote Compliance with International Conservation and Management Measure by Fishing Vessels on the High Seas. 1993. (hereinafter Compliance Agreement)
[103] FAO Code of Conduct, supra note 48 at Article I, 1.
[104] Compliance Agreement, supra note 62 at Art. III, 4.
[105] Id. at Art. III, 8.
[106] Id. at Art. V, 1.

U.N. Convention on Straddling and Highly Migratory Fish Stocks

The most significant outcome of the fishery management directives of Agenda 21 at the Earth Summit was the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish (Fish Stocks Agreement).[107] The Fish Stocks Agreement, which prescribes, "generally recommended international minimum standards" for conservation,[108] has been called a "sea change" in international fishery management.[109]

Following a conference to address the problems of high seas fishing convened on April 19, 1993, delegates met six times in negotiating sessions over the next two years, concluding a document that was open for signing on 4 December 1995. As of April 2007, 66 states and the European Community had become parties.[110]

The Fish Stocks Agreement establishes detailed minimum international standards for the conservation and management of straddling fish stocks and highly migratory fish stocks.[111] It calls for compatible measures and effective high seas compliance and enforcement. It was the first time an international fishing agreement shifted focus from producing maximum food for humans to sustainable fishing, ecosystem protection, conservation of biodiversity, and the precautionary approach to fishery management.[112] It also is the first agreement to produce an actual methodology for the precautionary approach, setting up

[107] The Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks. U.N. Doc. A/Conf./164/37 (hereinafter Fish Stocks Agreement). Fish Stocks Agreement.
[108] Id. at Art. V(b).
[109] David Freestone. "International Fisheries Law: Who is Leading Whom?" The Magnuson Stevens Act: Sustainable Fisheries for the 21st Century? Tulane Law School Symposium, 7-9 Sept 1997. New Orleans, LA.
[110] UN, Chronological List of Ratifications. April 2007. Available at http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm. Last visited 3 May 2007.
[111] In general, highly migratory species (HMS) have a "wide geographic distribution, both inside and outside the 200-mile zone, and … undertake migrations on significant but variable distances across oceans for feeding or reproduction. They are pelagic species (do not live on the sea floor)…" UNCLOS Annex I "includes 11 tuna, 12 billfish species, pomfrets, 4 species of sauries, dolphinfish (*Coryphaena spp*.), oceanic sharks and cetaceans (both small and large)." FAO, Fisheries and Aquaculture Department. Highly Migratory Species Fact Sheet. Available at http://www.fao.org/fi/website/FIRetrieveAction.do?dom=topic&fid=13686. Last visited 3 May 2007. See also UNCLOS, supra note 1 at Annex 1 and Art. 64.
[112] The precautionary approach includes these general features: identifying precautionary reference points for each stock, identifying in advance what measures will be adopted if reference points are exceeded, adopting cautious management for developing fisheries, monitoring impact on non-target species, and adopting emergency measures if continued fishing would increase the risk of depletion caused by a natural event. Freestone, supra note 69.

reference points, targets, and limits.[113] Most significantly, it denies (for party nations) unqualified access to fish on the high seas.[114]

The Fish Stocks Agreement does all this without creating a new international structure, relying instead on existing regional agreements and organizations, and calling for mechanisms to strengthen them. Where such agreements or organizations do not exist, it directs states to create them.[115] It also elaborates on the fundamental principle, established in UNCLOS, that states should cooperate to ensure conservation and promote the objective of the optimum utilization of fisheries resources both within and beyond the exclusive economic zone.[116]

The Fish Stocks Agreement provided for subsequent conferences to assess the adequacy of the provisions and propose ways to strengthen its implementation. These conferences have resulted in declaration of additional objectives such as considering the regional, subregional and global implementation. Informal consultations of state parties have met annually to continue review and oversight of the implementation of the Fish Stocks Agreement.[117]

UN Resolution Prohibiting Large-Scale Pelagic Driftnet Fishing

Large-scale high seas driftnets were recognized in the 1980s as a significant cause of incidental take of marine mammals, birds, turtles, and non-target fish species. This gear was finally banned internationally by U.N. resolution in 1990.[118]

Until they were outlawed, driftnets were used in the North Pacific and on the high seas where single vessels were capable of deploying driftnets up to 40 miles in length. In the North Pacific, 2 million miles (3.2 million km) of net were set per season between 1976 and 1989.[119] With more than enough netting set each night to encircle the earth, not only were target fish caught (squid, tuna, and billfish) but approximately 100,000 dolphins and porpoises, as well as hundreds of thousands of seabirds, sharks, sea turtles, and salmon.

Although the driftnet fleet operated under requirements set by a multinational agreement relating to salmon fishing, that agreement did not address incidental

[113] Fish Stocks Agreement, supra note 67 at Article 6, Annex II.
[114] Id. at Article VVIII.
[115] Id. at Art. VIII, 5
[116]United Nations website. Available at http://www.un.org/Depts/los/convention_agreements/convention_overview_fish_stocks.htm. Last accessed 3 October 2007. Despite its many innovations, the Fish Stocks Agreement still suffers some of the limitations similar to other international fishery agreements such as the absence of major fishing nations and reliance on flag state enforcement. Eichenberg and Shapson, supra note 28 at 610.
[117] See, e.g. resolutions, report of 2006 conference, ICSP5/UNFSA/REP/INF.1. 26 April 2006. Available at http://www.un.org/Depts/los/convention_agreements/fishstocksmeetings/icsp5report.pdf
[118] UN Resolution A/RES/45/197, 21 December 1990. See also, UN Resolution A/RES/44/225, 22 December 1989.
[119] Simon P. Northridge with the United Nations Environment Programme. “Driftnet fisheries and their impacts on non-target species; a worldwide review.” FAO 1991.

take of birds and marine mammals.[120] Additionally, the fleets were frequently found by U.S. enforcement to be catching salmon and steelhead in violation of the provisions of the governing treaty. In 1987, due to continued compliance problems with the Japanese, Korean, and Taiwanese fishers, the U.S. Congress passed the Driftnet Impact Monitoring, Assessment, and Control Act (Driftnet Act), calling for negotiations with nations driftnetting in the North Pacific to establish monitoring and enforcement agreements by June 29, 1989.[121] If these nations refused to come to the bargaining table, they risked trade sanctions.[122] The Driftnet Act required further research into the nature and extent of driftnet fishing to facilitate the development of effective solutions to the problem.[123]

Driftnetting had also become a major concern in the South Pacific. After several nations had banned driftnet fishing in their waters, 20 nations in the South Pacific negotiated and signed the Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific (The Wellington Convention).[124] The Wellington Convention endorsed a ban on driftnets commencing in May 1991, prevented violators from crossing signatory nations' waters, and denied access to food, fuel, and facilities in these nations. The Wellington Convention set the stage for international efforts to end driftnetting.

On December 22, 1989, the United Nations General Assembly passed Resolution 44/225, promoted by the U.S. and New Zealand, calling for an end to driftnetting by June 30, 1992, and an end to it in the South Pacific by 1991.[125] Although Resolution 44/225 is nonbinding under international law, its strength lies in the fact that it demonstrates a global consensus on the issue. Its weakness, however, is that South Korea and Taiwan are not Member States of the U.N. and use driftnets frequently. Moreover, the Resolution carries neither sanctions nor any mechanisms for monitoring driftnet operations.

Conflicts continued between driftnet fishing nations and nations opposed to the practice. Reports surfaced of the introduction of driftnets into new areas such as the Caribbean, and in 1990, the U.N. passed Resolution 45/197 restating concern about the practice of driftnetting and calling for a report on driftnetting.[126]

In June 1991, observer data from two previous years of driftnetting were compiled, and experts met in British Columbia to discuss the results. The numbers confirmed fears of massive numbers of marine mammals, sea birds, and non-target fish being killed by the driftnet fishery. Armed with the new data, the United States submitted a report to the U.N. condemning the use of large-scale pelagic driftnets and soon thereafter introduced a resolution mandating a

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[120] Pacific Salmon Treaty, March 18, 1985, U.S.-Can., 99 Stat. 7.
[121] 16 U.S.C.A. § 1822.
[122] 16 U.S.C.A. § 1826 (f) relating to 22 U.S.C.A. § 1978 authorizing, *inter alia*, the banning of the import of fish products from offending nations.
[123] 16 U.S.C.A. § 1826 (b)(3), (4).
[124] The Wellington Convention done at Wellington, New Zealand. 17 May 1991. Available at http://www.oceanlaw.net/texts/summaries/wellington.htm. Last visited 3 May 2007.
[125] UN Resolution A/RES/44/225, 22 December 1989.
[126] UN Resolution A/RES/45/197, 21 December 1990.

ban on their use by June 1992. Japan introduced a resolution to study the problem further, again suggesting that there may be "effective management measures" available to continue the fishery. However, the U.N. General Assembly passed Resolution 46/215, which stated, without exceptions, that large-scale high seas driftnetting must end by December 31,1992.[127] The deadline affects the high seas. But it should be noted that much driftnetting continues within the EEZs of many nations, including the U.S., with only slightly smaller nets.

The UN reaffirmed its stance on driftnets in 1995, particularly in the context of unauthorized fishing in national zones, the effects of driftnets on bycatch mortality, and the adoption of the FAO Code of Conduct for Responsible Fisheries. The General Assembly resolution reaffirms the global moratorium on high seas driftnet fishing, urges nations to take greater enforcement responsibility and to impose sanctions, refers to the Compliance Agreement and states' responsibilities under that convention, and makes a high priority of improvement of monitoring and enforcement.[128] (See Appendix D for a description of U.S. efforts to implement the UNGA Resolution and domestic law prohibiting use of high seas driftnets.)

The International Plan of Action to Prevent, Deter and Eliminate on Illegal, Unreported and Unregulated Fishing

In 2001, the FAO adopted the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU).[129] The aim of this voluntary instrument is to prevent, deter, and eliminate IUU fishing by providing all states with comprehensive, effective, and transparent measures by which to act, including through appropriate regional fisheries management organizations established in accordance with international law.

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[127] UN Resolution A/RES/46/215, 31 December 1992

[128] UN Resolution A/RES/50/25, 4 Jan 1996.

[129] United Nations Food and Agriculture Organization. International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing. Rome 2001 (hereinafter FAO IPOA-IUU). Available at http://www.fao.org/docrep/005/y3536e/y3536e04.htm last visited Dec.6, 2007. Other fishing-related IPOAs include those for Management of Fishing Capacity; Conservation and Management of Sharks; and Reduction of Incidental Catch of Seabirds in Longline Fisheries. All four international plans of action (IPOAs) are voluntary instruments, apply to all States and all fisheries, and elaborate the general Code of Conduct for Responsible Fisheries (CCRF) The latter three IPOAs were developed when in 1997 the COFI Members found it necessary to have some form of international agreement in order to manage these issues arising in implementation/compliance of/with the CCRF. The most suitable instrument for each of the three texts was developed in the course of two intergovernmental meetings, open to all FAO Members, held in 1998. The IPOAs were adopted by the twenty-third Session of the FAO Committee on Fisheries in February 1999 and endorsed by the FAO Council at the session it held in November 2000.There is also an FAO Strategy on Improving Information on the Status and Trends of Capture Fisheries, endorsed in 2003. FAO, Fisheries and Aquaculture Department, Implementation of the 1995 FAO Code of Conduct for Responsible Fisheries, available at http://www.fao.org/fi/website/FIRetrieveAction.do?dom=org&xml=CCRF_prog.xml&xp_nav=2,3 last visited Dec 6, 2007.

History

This effort must first be considered within the context of earlier international instruments that involved fisheries management and conservation. These include instruments discussed above: UNCLOS, the 1993 FAO Compliance Agreement, the U.N. Fish Stocks Agreement, and the FAO Code of Conduct. This last document, if fully implemented, "would...establish principles and standards applicable to the conservation, management and development of all fisheries."[130] Thus, like UNCLOS, it establishes a limitation on the freedom to fish in a way that could ensure effective conservation and management. The IPOA-IUU is considered an incorporated part of the Code of Conduct.

FAO had earlier formalized its concern with IUU fishing through the adoption of the 1999 Rome Declaration on the Implementation of the Code of Conduct for Responsible Fisheries at its Ministerial Meeting on Fisheries. Although mounting alarm was being voiced in many quarters about IUU fishing, states appeared to be unable or unwilling to meet their obligations under international law regarding flag state control. With FAO assistance, states would develop a global plan of action to effectively address the issue. This would include recognizing the problems associated with vessels flying "flags of convenience." This declaration set the stage and provided both impetus and a basic framework for what resulted: an IPOA-IUU.[131] By 2001, FAO Committee on Fisheries (COFI) had formulated and adopted the IPOA and the FAO Council endorsed it in June of that year.

The Instrument

The IPOA-IUU attempts to address this issue in a holistic, integrated fashion, mindful that IUU fishing occurs in violation, or disregard, of national, regional and international fishery laws.[132] It is intended "to provide all States with comprehensive, effective and transparent measures" through which to act including through regional fisheries management organizations.[133] Such comprehensive and integrated measures should look at all capture fisheries and all States should "embrace measures building on the primary responsibility of the flag State to prevent IUU fishing."[134] As with the Code of Compliance into which framework the IPOA is elaborated, the IPOA is voluntary.[135] It is viewed as a

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[130] FAO Code, supra note 48, Art. VI, 1, available at http://www.fao.org/DOCREP/005/v9878e/v9878e00.htm last visited Dec. 6, 2007.

[131] United Nations Food and Agriculture Organization Fisheries Report No. 809. Report of the FAO Regional Workshop on the Elaboration of the National Plans of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing – South Asian Subregion, Bangkok 19-23 June 2006, Appendix F, David Doulman, 2001 FAO International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing: background and progress toward implementation (hereinafter Doulman Appendix F), 35-37 available at ftp://ftp.fao.org/docrep/fao/009/a0717e/a0717e00.pdf last visited Dec.6 , 2007.

[132] Id.

[133] FAO IPOA-IUU Par. 8

[134] Id. at Par 9.3

[135] Id. at Par. 4. Though voluntary, because of relationship with other international instruments, some provisions may be binding. Iudicello, ABA Chapter in press.

toolkit, a place where provisions can be mixed and matched in order to arrive at the most desirable plan.

In its 93 paragraphs, divided into seven sections, the IPOA has actions that can be utilized by all states and includes international instruments, national legislation, national plans of action (NPOA), cooperation with other states, publicity, and increasing the technical capacity and resources devoted to the task.[136] Flag states can act on vessel registration, reporting, records and data, and authorizations to fish.[137] There are also sections for coastal[138] and port[139] states and for internationally agreed market measures;[140] research;[141] regional fisheries management organizations;[142] special regulations for developing countries;[143] reporting;[144] and defining the role of the FAO.[145]

All states were encouraged to ratify, accept, or accede to UNCLOS, the 1995 U.N. Fish Stocks Agreement, and the FAO Compliance Agreement,[146] as well as to fully and effectively implement the Code of Conduct and all of its accompanying IPOAs.[147] Importantly, all States were to have developed and implemented their NPOA within three years of the adoption of the IPOA-IUU or by June 2004; should review them every 4 years thereafter; and should ensure that their internal national efforts to prevent IUU fishing are coordinated.[148]

The section on RFMOs asserts that States should comply and cooperate with RFMO management even if they choose not to become parties.[149] There is a long list of items deemed necessary "to strengthen and develop innovative ways" to deal effectively with IUU fishing.[150] These range from developing compliance measures and comprehensive arrangements for mandatory reporting to developing definitions for when a vessel will be presumed to have engaged in or supported IUU fishing.[151] The RFMOs would become clearing houses for all State efforts to combat IUU fishing, sharing the collected information with all other RFMOs and the FAO.[152] RFMOs are indirectly charged with tasks throughout the IPOA-IUU including in the objectives and principles section,[153] in

[136] FAO IPOA-IUU supra, n. 89, Pars. 10-33.
[137] Id. at Pars 34-50.
[138] Id. at Par 51.
[139] Id. at Pars 52-64
[140] Id. at Pars 65-76
[141] Id. at Par 77
[142] Id. at Pars 78-84.
[143] Id. at Par 85-86.
[144] Id. at Par 87.
[145] Id. at Pars. 88-93.
[146] Id. at Par. 11.
[147] Id. at Par. 14.
[148] Id. at Pars. 25-27.
[149] Id. at Pars. 77-78.
[150] Id. at Par 80.
[151] Id. at Pars 80.2, 80.3, 80.11
[152] Id. at Par.81
[153] Id. at Pars. 8,9.

paragraphs on NPOA,[154] on cooperation between States,[155] in-port State measures,[156] market measures,[157] and reporting.[158]

FAO's role is delineated in the final section to provide data, support development of the NPOAs, hold an expert consultation on the issue of certain internationally agreed market-related measures, and to biannually evaluate the IPOA-IUU implementation progress.[159] In the section on special requirements for developing countries, FAO is to provide financial support, along with other relevant financial institutions and mechanisms, for various types of training and capacity building to enable those states to meet their tasks under the IPOA-IUU.[160]

FAO and its COFI continue to take a leading role on the issue of illegal fishing. At its latest annual session, its 27th, COFI discussed and took action on a number of IUU-related concerns.[161] This included reaffirming that fishing capacity (over-capacity) must be addressed by states that wish to control IUU fishing by attempting to match allowed capacity to sustainable harvest levels.[162] It has recognized that there needs to be a comprehensive suite of port state measures on monitoring, control, and surveillance and thus has endorsed a process and timetable to develop a legally-binding instrument based on widespread support for the 2005 Model Scheme on Port State Measures to Combat IUU Fishing and the IPOA–IUU.[163] COFI also has supported convening an Experts Consultation with a goal of creating an accurate global record of fishing vessels,[164] data that is absolutely necessary if IUU fishing is to be successfully controlled. Irresponsible flag States were discussed and many Members suggested that the performance of flag States must be judged based on a derived set of criteria that could then be used as well as to examine possible actions against vessels flying the flags of States not meeting such criteria. An expert consultation on this will be considered by COFI.[165] Finally, and importantly in this regard, the session analyzed methods to strengthen RFMOs[166], which, after individual states, constitute an important line of defense in combating IUU fishing.

Following this meeting, in September 2007, FAO held an Expert Consultation in Washington, D.C., to draft a legally binding instrument on port state measures to prevent, deter, and eliminate IUU fishing. This draft document will be the basis

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[154] Id. at Par. 25.
[155] Id. at Pars. 28, 51.2.
[156] Id. at Pars 58.5, 62-64.
[157] Id. at Pars. 68, 73.
[158] Id. at Par. 87.
[159] Id. at Pars 88-93.
[160] Id. at Pars. 85-86.
[161] United Nations Food and Agriculture Organization, FAO Fisheries Report No. 830 (Rome 2007) available at ftp://ftp.fao.org/docrep/fao/010/a1160e/a1160e00.pdf last visited Dec. 6, 2007.
[162] Id. at 3.
[163] Id. at 11. See text accompanying footnote 127, infra.
[164] Id. at 11.
[165] Id. at 11.
[166] Id. at 14.

for a Technical Consultation on Port State Measures to be held in Rome, June 23-27, 2008, and then will be presented as a formal document to the 28th session of COFI in March 2009 for further consideration and action.[167]

Implementation of IPOA-IUU

The year following adoption of the IPOA-IUU, FAO Fisheries Department published its Technical Guidelines for Responsible Fisheries No. 9, Implementation of International Plan of Action on Illegal, Unreported and Unregulated Fishing.[168] These are intended to be practical, flexible and subject to modification as better ideas come along.[169] In general, they provide guidance as to how IUU actions can be put in place, with organization and content suggestions for NPOAs. They encourage RFMOs to integrate their IUU efforts into other ongoing RFMO missions such as conservation, catch and effort control, reduction of capacity and catch, scientific research and data collection, and dissemination. Importantly, Guidelines urge removal of any and all economic support for IUU.

In addition to publishing the Guidelines, between 2002 and 2006 the FAO has held 14 workshops on the issue, attended by up to 300 representatives of more than 100 countries; conducted a pilot workshop in the Pacific Islands in cooperation with the South Pacific Forum Fisheries Agency and the Western and Central Pacific Fisheries Commission; and developed a Model Plan For A Pacific Island Country: A National Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing.[170] Considering the link between fishing fleet overcapacity and IUU, it held a Technical Consultation in 2004 to look at the progress and implore that states undertake the full implementation of the IPOA on Fishing Capacity and the IPOA-IUU.[171]

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[167] FAO, Report of the Expert Consultation to Draft a Legally-binding Instrument on Port State Measures, Fisheries Report No 846, FIEL/R846 (En) available at ftp://ftp.fao.org/docrep/fao/010/a1375e/a1375e00.pdf last visited Dec 6, 2007. This still incomplete draft (no preamble or final clauses or annexes) sets out minimal standards which would be a uniform basis for even stricter controls. See also FAO, COFI/2007/7 Combating IUU Fishing through Monitoring, Control and Surveillance, Port Measures and Other Means, Dec. 2006, prepared for 27th Meeting of COFI, and available at ftp://ftp.fao.org/docrep/fao/meeting/011/j8989e.pdf last visited Dec. 6, 2007. The FAO Model Scheme on Port State Measures to Combat IUU Fishing is available at ftp://ftp.fao.org/docrep/fao/010/a0985t/a0985t00.pdf last visited Dec 6, 2007. An interesting analysis of some of these measures appears in M. Lack, Catching On: Trade-Related Measures as a Fisheries Management Tool, 27-31, a 2007 TRAFFIC Report available at http://www.traffic.org/content/850.pdf last visited Dec 6, 2007.

[168] United Nations Food and Agriculture Organization, Technical Guidelines for Responsible Fisheries, No. 9, Implementation of International Plan of Action on Illegal, Unreported and Unregulated Fishing. Rome 2002 (hereinafter Technical Guideline No 9) available at ftp://ftp.fao.org/docrep/fao/005/y3536e/y3536e00.pdf last visited Dec. 6, 2007.

[169] Id. at iii.

[170] David Doulman, Implementing the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing at the National Level: A View from FAO, a Power Point presentation, FAO Fisheries, Rome (May 2006).

[171] FAO Report of the Technical Consultation to Review Progress and Promote Full Implementation of the International Plan of Action to Prevent, Deter and Eliminate Illegal,

The adoption of NPOAs has been mixed. As the call for national plans originates from a non-binding action, there is no formal signatory/acceptance process and thus numbers are based upon informal reporting. As of December 2007, an informal survey indicates that 32 had been elaborated, many of these with FAO technical assistance, and include: Australia, New Zealand, Tonga, Cook Islands, Niue, Palau, New Zealand, Samoa, Tonga, Tuvalu, Federated States of Micronesia, Angola, Zambia, Cameroon, Gambia, Mauritania, Namibia, Benin, Ghana, Seychelles, Tanzania, Oman; Japan, Republic of Korea, European Community, Spain, United Kingdom, Canada, United States, Mexico, Panama, Colombia, Chile and Peru. Others, developed to some extent but not yet published include Malaysia and two Regional RFMOs, one for countries of South East Asia and the other adopted by the Lake Victoria Fisheries Organization.[172]

Regional Fisheries Bodies, Regional Fisheries Management Organizations and Arrangements, and Regional Fisheries Advisory and Scientific Bodies

Although regional fishery management organizations (RFMOs) have existed since the 1940s and earlier, their importance has increased significantly with the adoption of treaties such as the Fish Stocks Agreement, which call for creation of such bodies. In its Oceans Atlas, FAO editors point out that "under existing international law, and within the current paradigm for the governance of high seas fisheries to regulate straddling, highly migratory and high seas fish stocks, [Regional Fishery Management Organizations] provide the only realistic mechanism for the enhanced international cooperation."[173]

As of 2006, there were 44 regional fishery bodies including RFMOs, advisory bodies, and scientific bodies. These organizations, among other responsibilities, collect and distribute fishery statistics, conduct stock assessments, set catch quotas, limit vessels allowed in the fishery, regulate gear and allocation, and are responsible for research oversight, monitoring, and enforcement.[174]

Unreported and Unregulated Fishing and the International Plan of Action for the Management of Fishing Capacity. FAO Fisheries Report No. 753, FAO, Rome, available at ftp://ftp.fao.org/docrep/fao/007/y5681s/y5681s00.pdf last visited Dec. 6, 2007.

[172] E-mails from David Doulman, FAO, (Dec. 13, 2007, 5:54 AM PST; Dec. 17, 2007, 12:15 AM PST; and Dec. 18, 2007, 3:05 AM PST) on file with author Suzanne Iudicello; and David Doulman, Implementing the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing at the National Level: A View from FAO. FAO Fisheries, Rome (May 2006), a Power Point presentation. Countries with a completed (or other status) NPOA in May 2006 included Africa: Angola, Gambia, Ghana, Namibia, Seychelles, Tanzania; Asia and Pacific: Australia; Federated States of Micronesia, Japan, Republic of Korea, New Zealand, Tonga, Tuvalu: Near East: Oman (in preparation); Latin America: Chile, Mexico, Panama, Columbia (in preparation), Peru (in preparation); North America; Canada, USA; Europe: EC, Spain, UK (in preparation). The NPOA-IUU done by the USA is discussed in this paper supra note 10 and accompanying text.

[173] Regional Fishery Organizations, Oceans Atlas USES: Fisheries and Aquaculture. http://www.oceansatlas.com/servlet/CDSServlet?status=ND0yOTQ, updated 25 Aug. 2000, last visited 8 October 2006.

[174] P.L. Devaney, Regional Fisheries Management Organizations: Bringing Order to Disorder, in, Papers on International Environmental Negotiation Vol. XIV, L.E. Susskind and W.R. Moomaw,

Although the implementation of many of the regional agreements hinges upon the effectiveness of the relevant RFMO, the success of these organizations has been the exception rather than the rule. RFMOs are only as strong as their members and rely upon flag state enforcement of their provisions. Criticisms and shortcomings of these bodies include: inconsistent authority; failure by key fishing interests to join the RFMO or follow its rules; illegal, unreported, and unregulated fishing; lack of equity and disparate interests between developed states and developing states; conflicts of interest among parties; lack of funding; and lack of political will.[175] A number of innovations have been suggested to make RFMOs more effective, including audits, performance review, improvements through neutral bodies such as the FAO, a stronger role for port state enforcement, the use of technology such as vessel monitoring systems to track fishing, and modifying incentives for membership to ensure participation by all interested parties.[176]

RFMOs reside under the general heading of Regional Fishery Bodies (RFBs). RFMOs are inter-governmental fisheries organizations, established by a treaty, designed to formulate and implement fisheries conservation and management measures. They are perceived as the most effective forum for international cooperation, enabling States to agree on measures to conserve species that do not recognize national boundaries. Some have existed since the middle of the 20th century, such as the North Atlantic Fisheries Organization (NAFO), which was formed under a different name in 1949. The International Pacific Halibut (IPHC), formed in 1923, may be the oldest, continuously operating RFMO. Others came into existence as late as the 1990s, and new ones are still being formed, such as the Western and Central Pacific Fisheries Commission (WCPFC) formed in 2004.

RFMOs also can include an entity that has come together under an arrangement. These organizations manage resources through an agreement, but less formally.[177] They must comply with the rules of international law, both formal and customary, but do not have to be based upon a treaty. Compared to RFMOs, arrangements may have significant advantages in terms of expeditiousness, flexibility, and costs. Existing RFMOs can function as a forum within which new

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eds. Harvard, 2005 at 4. See also, FAO Oceans Atlas, Regional Fishery Organizations. http://www.oceansatlas.com/servlet/CDSServlet?status=ND0yOTQ. Last visited 8 October 2006.

[175] Id. at 5-6. See also, Eichenberg and Shapson, supra note 36 at 611-616.

[176] Id. at 7-12.

[177] The term "arrangement" is defined in Article 1(1)(d) of the Fish Stocks Agreement as:
a cooperative mechanism established in accordance with the [LOS] Convention and this Agreement by two or more States for the purpose, *inter alia*, of establishing conservation and management measures in a subregion or region for one or more straddling fish stocks or highly migratory fish stocks. In the case of the Fish Stocks Agreement, arrangement requisites are: consistency with international law and a purpose within the scope of the Fish Stocks Agreement. However, this does not prevent States from establishing an arrangement with a purpose that does not fall within the scope of the Fish Stocks Agreement, for instance because it deals with discrete high seas fish stocks. Molenaar, Erik, Addressing Regulatory Gaps in High Seas Fisheries, 20 Intl. Journal of Marine and Coastal Law 533, 545(NILOS, 2005) (hereinafter, Molenaar).

arrangements can arise.[178] An example of a management arrangement is the South Indian Ocean Fisheries Agreement (SIOFA), established in July 2006 (but not yet entered into force). This document includes arrangements when discussing international fishery management organizations.

Advisory RFBs provide members with science and management advice, and Scientific RFBs provide science and information advice. Figure 1 shows the general geographic area of jurisdiction of current organizations of all types.

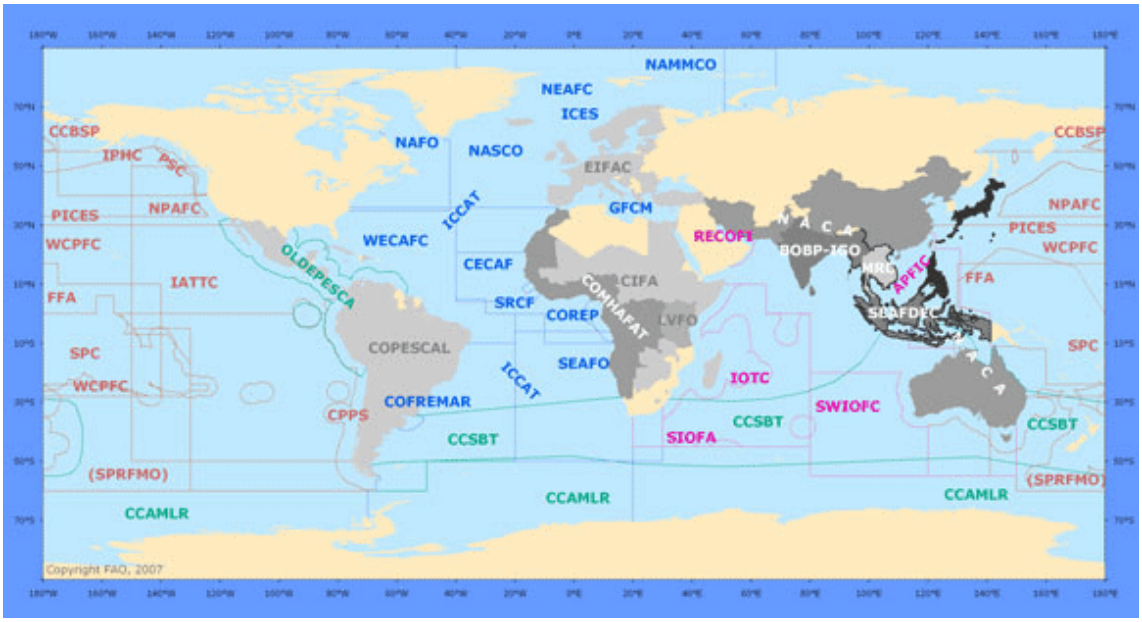

Figure 1. Map of general areas of regional fishery bodies. Source: FAO. An interactive version is available online at http://www.fao.org/fi/website/FISearch.do?dom=rfb#rfb_map

[178] Molenaar, Erik, Addressing Regulatory Gaps in High Seas Fisheries, 20 Intl. Journal of Marine and Coastal Law 533, 545(NILOS, 2005).

The list below is based upon FAO tabulation of RFBs.[179] It provides the names of RFMOs and those of Advisory and Scientific Bodies, as well as a link to several Internet resources (Internet Guide to International Fisheries Law and the FAO RFB page) containing further information. Table 1 shows a subset of this list: those that include IUU provisions, those that list IUU vessels, the bodies to which the United States is a party, and those under which the United States has taken action as a contracting party.

FAO Compilation of Regional Fishery Bodies

CCAMLR

CCBSP CCBSP Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea (Arrangement)

CCSBT CCSBT Commission for the Conservation of Southern Bluefin Tuna

GFCM General Fisheries Commission for the Mediterranean

IATTC Inter-American Tropical Tuna Commission

IBSFC International Baltic Sea Fishery Commission

ICCAT International Commission for the Conservation of Atlantic Tunas

IOTC Indian Ocean Tuna Commission

IPHC International Pacific Halibut Commission

IWC International Whaling Commission www.iwcoffice

NAFO Northwest Atlantic Fisheries Organization

NASCO North Atlantic Salmon Conservation Organization

NEAFC North East Atlantic Fisheries Commission

NPAFC North Pacific Anadromous Fish Commission

PSC Pacific Salmon Commission

SEAFO South East Atlantic Fisheries Organization

SIOFA Southern Indian Ocean Fisheries Agreement (Arrangement not in force.) (Six countries—the Comoros, France, Kenya, Mozambique, New Zealand and Seychelles—and the European Community have signed a multilateral agreement on the management of fishing in a vast area of the high seas in the South Indian Ocean. It will enter into force once FAO, which is its legal depositary, receives the fourth instrument of ratification, including at least two from coastal states *from:* http://www.fao.org/newsroom/en/news/2006/1000360/index.html.)
(SPRFMO) South Pacific RFMO (In Process of forming as Management Body w/ 4th meeting held Sept. 10-14, 2007)

WCPFC Western and Central Pacific Fisheries Commission

[179] FAO Regional Fishery Bodies, http://www.fao.org/fi/body/rfb/chooseman_type.htm (last visited Oct. 3, 2007).

WIOTO Western Indian Ocean Tuna Organization (Inoperative since 1994)

Advisory Bodies

APFIC Asia-Pacific Fisheries Commission

BOBP-IGO Bay of Bengal Programme – Intergovernmental Organisation

CARPAS Regional Fisheries Advisory Committee for the South Atlantic

ATLAFCO African Atlantic Fisheries Conference GO

CRFM Caribbean Regional Fisheries Mechanism GO

CECAF Committee for the Eastern Central Atlantic Fisheries

CIFA Committee for Inland Fisheries of Africa

COMHAFAT Conference on Fisheries Cooperation among African States Bordering the Atlantic Ocean

COPESCAL Commission for Inland Fisheries of Latin America

COFREMAR Joint Technical Commission for the Argentina/Uruguay Maritime Front

COREP Regional Fisheries Committee for the Gulf of Guinea

CPPS Permanent Commission for the South Pacific

EIFAC European Inland Fisheries Advisory Commission

FFA South Pacific Forum Fisheries Agency

LVFO Lake Victoria Fisheries Organization

MRC Mekong River Commission

NAMMCO North Atlantic Marine Mammal Commission

OLDEPESCA Latin American Organization for Fisheries Development

RECOFI Regional Commission for Fisheries

SEAFDEC Southeast Asian Fisheries Development Center

SRCF Sub-Regional Commission on Fisheries

SWIOFC South West Indian Ocean Fisheries Commission

WECAFC Western Central Atlantic Fisheries Commission

Scientific Bodies:

ACFR Advisory Committee on Fisheries Research

CWP Coordinating Working Body on Fisheries Statistics

ICES International Council for the Exploration of the Sea

NACA Network of Aquaculture Centres in Asia-Pacific

PICES North Pacific Marine Science Organization

SPC Secretariat of the Pacific Community

Table 1. RFBs with measures related to IUU Fishing				
Organization	**U.S. party**	**FAO Statistical Areas**	**IUU vessel list**	**U.S. action**
AIDPC		**77**		
APFIC		**71**		
CCAMLR		**48, 58, 88**		
CCBSP		**61, 67**		
CCSBT		**41, 51, 81**		
GMFC		**37**		
IATTC		**77, 87**		
ICCAT		**21, 27 31, 37, 41, 47, 48**		
IOTC		**51, 57**		
IPHC		**67**		
IWC		**Global**		
NAFO		**21**		
NASCO		**27, 37**		
NEAFC		**27**		
NPAFC		**61, 67, 77**		
PSC		**67**		
SEAFO		**31, 41**		
SPTT		**77**		
WCPFC		**67, 71**		

RFBs and IUU Fishing

While no RFB was or is designed to deal solely with IUU fishing, "a widely held view [is] that RFMOs are the only realistic option for the conservation and management of shared stocks, or high seas stocks."[180] Certainly, that means they must deal effectively with illegal fishing. In the five-year period between

[180] FAO, Judith Swan, International Action and Responses by Regional Fishery Bodies or Arrangements to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, FAO Fisheries Circular C 996, p.11, 2004 (hereinafter FAO Swan 2004) available at **ftp://ftp.fao.org/docrep/fao/006/y5361e/y5361e00.pdf** last visited Dec. 6, 2007.

2000 and 2005, 29 resolutions passed by RFBs dealt directly with IUU fishing.[181] And that was before the issue was considered fully mature.

As noted in the earlier analysis of the IPOA-IUU, the important role of RFMOs in combating IUU fishing is reflected in the section devoted to them, paragraphs 78 through 84 of that instrument. These, briefed below, encourage States to take measures and actions through their RFMOs, in conformity with international law and obligations. (While they appear directed at regional bodies with management authority, they have also sometimes been applied by advisory or scientific RFBs.[182])

- States should ensure compliance with and enforcement of policies and measures having a bearing on IUU fishing that are adopted by any relevant RFMO and by which they are bound, and cooperate to establish such organizations where none exist.[183]
- [As non-members are not discharged from requirement to cooperate with RFMOs] … States should give effect to their duty to cooperate by agreeing to apply the conservation and management measures established by that regional fishery management organization, or by adopting measures consistent with those …, and should ensure that vessels entitled to fly their flag do not undermine such measures.[184]

States, acting through the relevant RFMO, should act to strengthen and develop innovative ways to deal with IUU fishing. Measures intended to achieve this objective include[185] institutional strengthening;[186] compliance measures;[187] mandatory reporting arrangements;[188] information exchange on vessels engaged in or supporting IUU fishing;[189] development and maintenance of records of authorized and IUU vessels in the area of competence;[190] "development of methods of compiling and using trade information to monitor IUU fishing;"[191] development of a range of specified MCS measures;[192] development of boarding and inspection regimes and[193] observer programs;[194]; use of market-related measures;[195] development of criteria for making presumptions concerning IUU

[181] Id., p.12
[182] Id., p.12
[183] IPOA-IUU, supra n. 89, Par. 78
[184] Id. Par. 79
[185] Id. Par. 80
[186] Id. Par 80.1
[187] Id. Par. 80.2
[188] Id. Par. 80.3
[189] Id. Par. 80.4
[190] Id. Par. 80.5
[191] Id. Par. 80.6
[192] Id. Par. 80.7
[193] Id. Par. 80.8
[194] Id. Par. 80.9
[195] Id. Par. 80.10

fishing;[196] use of education and public awareness programs;[197] development of action plans;[198] and "… examination of chartering arrangements, if there is concern that these may result in IUU fishing."[199]

States should compile and make available annually to other RFMOs and FAO information relevant to combating IUU fishing, including[200] estimates of the extent, magnitude and character of IUU activities;[201] details of measures to combat IUU fishing;[202] records of authorized fishing vessels;[203] and records of vessels engaged in IUU fishing.[204]

Objectives of institutional and policy strengthening in RFMOs in relation to IUU fishing should include enabling RFMOs to:[205]

- determine policy objectives, both for internal purposes and for coordination with other RFMOs;[206]
- "strengthen institutional mechanisms, including mandate, functions, finance, decision-making, reporting or information requirements and enforcement schemes, for the optimum implementation of policies in relation to IUU fishing;"[207]
- "regularize coordination with institutional mechanisms of other regional fishery management organizations as far as possible in relation to IUU fishing, in particular information, enforcement and trade aspects;"[208]
- "ensure timely and effective implementation of policies and measures internally, and in cooperation with other regional fishery management organizations and relevant regional and international organizations."[209]

"States should … encourage non-contracting parties with a real interest in the fishery concerned to join the regional fishery management organizations and participate fully in their work." Where this is not possible, noncontracting parties should be encouraged to participate in the RFMO and apply its conservation and management measures. RFMOs should address access to the resource to foster cooperation and sustainability.[210] And finally:

[196] Id. Par. 80.11
[197] Id. Par. 80.12
[198] Id. Par. 80.13
[199] Id. Par. 80.14
[200] Id. Par. 81
[201] Id. Par. 81.1
[202] Id. Par. 81.2
[203] ID. Par. 81.3
[204] Id. Par. 81.4
[205] Id. Par. 82
[206] Id. Par. 82.1
[207] Id. Par. 82.2
[208] Id. Par. 82.3
[209] Id. Par. 82.4
[210] Id. Par. 83

> When a State fails to ensure that fishing vessels entitled to fly its flag, or, to the greatest extent possible, its nationals, do not engage in IUU fishing activities that affect the fish stocks covered by a relevant regional fisheries management organization, the member States, acting through the organization, should draw the problem to the attention of that State. If the problem is not rectified, members of the organization may agree to adopt appropriate measures, through agreed procedures, in accordance with international law.[211]

Numerous other recent reports and studies have evaluated the success of this process and recommended ways to strengthen the roles of Regional Fishery Management Bodies in international fisheries conservation. These include a FAO contract with Judith Swan to survey RFBs and describe numerous initiatives taken to implement the IPOA-IUU[212] and *Recommended Best Practices for Regional Fisheries Management Organizations*, released by Chatham House in August 2007 to develop a model toward better governance by RFMOs. A major impetus for this work was to seek better ways to address IUU fishing.[213]

In addition, TRAFFIC completed a review of the use of trade as an effective management device in February 2007 entitled *Catching On? Trade-Related Measures as A Fisheries Management Tool*.[214] Further attention to the role of RFBs in controlling IUU fishing is indicated by the establishment of a RFB Secretariat, and emphasis on it in the Report on the First Meeting of the RFB Secretariat, March 12-13, 2007, in Rome.[215] The role of RFMOs and the potential for the United States to foster capacity to address IUU fishing is the subject of a NOAA Fisheries report that will be submitted to Congress in early 2008.

Detailed Analysis of Three RFBs

The following discussion examines the IUU measures of three regional fishery bodies: CCAMLR, NAFO and WCPFC. Although NAFO predates CCAMLR, the Antarctic treaty was the first to take action against IUU fishing. WCPFC is a more recent instrument and its IUU measures are among the most newly adopted. Unless otherwise noted or supplemented, initial address and factual summary for each RFB is derived from the Internet Guide to International Fisheries Law, http://www.intfish.net/orgs/index-1.htm, and FAO's Fisheries RFB Homepage, http://www.fao.org/fi/body/rfb/index.htm.

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[211] Id. Par. 84

[212] FAO Swan, supra n. 140.

[213] Chatham House, Recommended Best Practices for Regional Fisheries Management Organizations (hereinafter Chatham House, Recommended Best Practices), vii, available at http://www.chathamhouse.org.uk/files/10301_rfmo0807.pdf last visited Dec. 7, 2007.

[214] M. Lack, Catching On? Trade-Related Measures as A Fisheries Management Tool, A TRAFFIC Report (2007) available at http://www.traffic.org/content/850.pdf last visited Dec. 7, 2007.

[215] FAO Fisheries Report 837, Report of the First Meeting of Regional Fishery Body Secretariats Network available at ftp://ftp.fao.org/docrep/fao/010/a1184e/a1184e00.pdf last visited Dec. 7, 2007.

CCAMLR Commission for the Conservation of Antarctic Marine Living Resources

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Official website: **www.ccamlr.org**

Establishment: 1980 Convention for the Conservation of Antarctic Marine Living Resources, Canberra, Adopted, May 20 1980; Entered into force, April 7, 1982.

Members as of November 31, 2007: Argentina, Australia, Belgium, Brazil, Chile, China, European Community, France, Germany, India, Italy, Japan, Korea (Rep. of), Namibia, New Zealand, Norway, Poland, Russia, South Africa, Spain, Sweden, Ukraine, United Kingdom, United States, Uruguay.

Geographic Scope: The Antarctic.
(For an exact definition, see Article I of the **Convention**).
(Note also: the area coincides exactly with FAO statistical areas 48, 58 and 88).
[**Map**]

Material Scope: The Commission covers all Antarctic marine living resources found south of the Antarctic Convergence in the Convention area, meaning the populations of fin fish, mollusks, crustaceans and all other species of living organisms, including birds.[216]

Main Objectives: To conserve marine life of the Southern Ocean without excluding harvesting carried out in a rational manner. The convention was developed in response to concerns that an increase in krill catches in the Southern Ocean could have a serious effect on populations of krill and other marine life; particularly on birds, seals and fish, which mainly depend on krill for food.[217]

Organizationally, CCAMLR has a Secretariat, a Commission of members that sets and implements management policy and regulations, a Scientific Committee (SC-CCAMLR) which advises the Commission based upon information from the Working Group on Ecosystem Monitoring and Management (WG-EMM) and the Working Group on Fish Stock Assessment (WG-FSA).[218] Its management precept is ecosystemic, using a precautionary approach that considers the lack of complete knowledge available when setting take allowances in order to minimize the risks of long-term adverse affects. It thus considers the effects of any harvesting on dependant and associated species, not just the target species, in order that ecological relationships are maintained.[219]

CCAMLR has been in the forefront on IUU Fishing, having been the first RFMO to use the term.[220] Swan succinctly details this history:

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[216] Internet Guide to International Fisheries Law, http://www.intfish.net/orgs/fisheries/ccamlr.htm last visited Dec. 6, 2007.
[217] CCAMLR website http://www.ccamlr.org/pu/e/gen-intro.htm last visited Dec. 6, 2007
[218] Id.
[219] CCMLAR Web Site http://www.ccamlr.org/pu/e/gen-intro.htm. last visited Dec. 3, 2007.
[220] FAO Swan 2004 supra n. 140, p.1

> Reference to IUU fishing was included as an agenda item for the Sixteenth Meeting of the Commission in 1997, perhaps the first formal use of the term. It also appeared in an Annex to the Report of that Meeting, setting out a communication policy with non-Contracting Parties relating to IUU fishing in the CCAMLR Convention Area. In 1998, the Report of the Seventeenth Meeting of the Commission, in relation to IUU fishing, recorded discussion on the following measures aimed at better controlling IUU fishing in the Convention Area: catch certification scheme; trade statistics for *Dissostichus* spp.; marking of fishing vessels and fishing gear; automated satellite-linked vessel monitoring system (VMS); application of VMS in areas adjacent to the Convention Area; licensing and inspection regime of Contracting Parties; cooperation between Contracting Parties to ensure compliance; CCAMLR vessel register; action plan; and actions in respect to companies and nationals of flag States.[221]

The Convention is a textbook case on how to address IUU fishing, actions developed because of the magnitude of illegal fishing -- in the past it is thought to have been more than twice that of regulated take.[222] CCAMLR's response was a suite of measures, lead by its Catch Documentation Scheme for *Dissostichus spp.* (CDS). The CDS, formally named Conservation Measure 10-05, became mandatory on all Convention members in 2000 (then similarly named CDS although numerically identified as Conservation Measure 170/XIX; in 2001, CM 170/XX; and gaining its current designation CM 10-05 in 2002).[223] It is designed to track the landings and trade flows of toothfish caught in the Convention Area and in adjacent waters, where possible. It will allow identification of all toothfish entering the markets of all parties to the CDS and aids in determining if the fish are captured consistent with CCAMLR conservation rules. The CDS invites non-Convention members whose vessels fish for toothfish to participate[224] The scheme includes the basic document, three annexes, five resolutions and a policy statement.[225]

In addressing IUU fishing, the CDS works in conjunction with other conservation measures (CM) discussed later.

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[221] Id.

[222] NOAA/NMFS FINAL PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT on Codified Regulations at 50 CFR Part 300 Subparts A and G Implementing Conservation and Management Measures Adopted by the Commission for the Conservation of Antarctic Marine Living Resources CCAMLR Vol. 2, p 165 (2006) available at http://www.nmfs.noaa.gov/sfa/domes_fish/Volume2_CCAMLR.pdf last visited Dec. 6, 2007; see also text with fn infra 186.

[223] CCAMLR, Conservation Measure 10-05, Catch Documentation Scheme for *Dissostichus spp.* (hereinafter CCAMLR CM 10-05) http://www.ccamlr.org/pu/e/e_pubs/cm/06-07/10-05.pdf; see also, CCAMLR website for operation of the Catch Documentation Scheme http://www.ccamlr.org/pu/e/cds/cds-ops.htm last visited Dec. 3, 2007.

[224] CCAMLR websites http://www.ccamlr.org/pu/e/cds/intro.htm and http://www.ccamlr.org/pu/E/e_pubs/cm/06-07/10-05.pdf last visited Nov 18, 2007.

[225] CCAMLR CM 10-05 supra n. 183.

The success, but not outright victory, of the efforts over time can be illustrated by reading annual meeting reports. At the 19th meeting of CCMLR in 2000, the Standing Committee on Observation and Inspection (SCOI) reported that the illegal catch of toothfish for the years 1996 -1999 was unsustainable, at approximately 90,000 tons, more than twice the regulated take from the convention area. It also noted that the bycatch of seabirds in the longline fishery, mostly albatross and petrel species, was also unsustainable and had resulted in their decline.[226] By the 25th meeting in 2006, it was estimated that the IUU fishery for toothfish resulted in approximately 3080 tons in the 2005-06 season, showing an overall decline over the past three years. But it was also noted that IUU fishing was up in selected divisions, take there accounting for almost 90 percent of the total and most likely by approximately 13 vessels that consistently fish in violation.[227]

In summary, the current CDS requires each Contracting Party:

- To take steps to identify the origin of toothfish when it enters or leaves a CP's port;[228]
- To assure that each vessel flying its flag complete a Dissostichus Catch Document (DCD) before landing or transferring toothfish, the elements of which are set out in Annex 10-05/A and any landing without one is prohibited[229] (and a NCP may allow its vessels to participate in the toothfish fishery if it issues each vessel that wishes to fish a DCD and follows the procedure set out in Annex 10-05/C.); [230]
- To assure that each landing at any of its ports shall have a DCD -- no DCD, landing is pro forma illegal;[231]
- To specifically authorize each of its flagged ships if it is to catch toothfish, even if the take will be outside the Convention area;[232]

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[226] CCMLAR, Report of the Nineteenth Meeting of the Commission 2000, Annex 5, SCOI Explanatory Memorandum on the Introduction Catch Documentation Scheme (CDS) for Toothfish (Dissostichus spp.), available at http://www.ccamlr.org/pu/e/e_pubs/cr/00/toc.htm last visited Nov.18, 2007. Other commentators say that the IUU harvest in the late 1990s was three to five times that legally caught under CCAMLR conservation measures. Liza D. Fallon and Elaine Stratford, Issues of Sustainability in the Southern Ocean Fisheries – the Case of the Patagonian Toothfish (Dissostichus eleginoides), 34 School of Geography and Environmental Studies, University of Tasmania, (2003), available at http://alternative-solution.org/fileadmin/LHF/PDF/pat-toothfish.pdf last visited Dec 6, 2007.

[227] CCMLAR, Report of the Twenty-fifth Meeting of the Commission 2006, Item 9.1, available at http://www.ccamlr.org/pu/e/e_pubs/cr/06/toc.htm last visited Dec. 15, 2007. Note that the 26th meeting [2007] has occurred but the report is not officially available at the time according to CCAMLR Secretariat.

[228] CCAMLR CM 10-05 (2006), supra note 183, para. 2.

[229] Id. para 3.

[230] Id. para 6, 7.

[231] Id. para 4.

[232] Id. para 5.

- To assure that each shipment of toothfish imported into or exported from its territory be accompanied by an export-validated DCD and, if appropriate, a validated re-export document sufficient to account for all the Dissostichus spp. in the shipment -- otherwise any such activity is illegal;[233]
- To assure that as to each shipment of toothfish customs officials request and examine the required documentation;[234]
- To transfer by the most rapid electronic means a copy of such toothfish documentation to the CCAMLR Secretariat and submit an annual summary of all toothfish related activities;[235] and
- To provide the Secretariat with the name addresses etc. of all official that have authority to issue DCDs (and the same is true for NCPs that are issuing DCDs).[236]

CPs, and NCPs participating in the CDS, may require further verification of catch documents using *inter alia*, VMS, if the origin of catch is on the high seas outside the Convention area.[237] If the catch document is invalid under this or other provisions where one is required, then there can be no import, export, or re-export of the catch.[238] There are provisions for special sale of fish confiscated due to failures set out above and for the proceeds to be transferred into a Convention or national fund that is used to prevent IUU fishing.[239]

As noted, further conservation measures buttress this scheme, specifically 10-02, which requires CPs to license and inspect those vessels that fly their flag and fish in Convention waters.[240] Conservation measure 10-03 establishes requirements for CPs to inspect all vessels that land toothfish at their ports. If there is evidence that the fish were caught in contravention of CCAMLR conservation measures, the vessel is prohibited from landing the fish.[241] Measure 10-04 is a sophisticated Vessel Monitoring System (VMS) instituted in large part to work in conjunction with the CDS and to help verify the DCD.[242]

There are also schemes to promote compliance by CP vessels with conservation measures, numbered CM 10-06, the IUU Vessel List procedure for contracting

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[233] Id. para 10, 11.
[234] Id. para 12.
[235] Id. para 14
[236] Id. para 15.
[237] Id. para 16.
[238] Id. para 17.
[239] Id. para 18, 19.
[240] CCAMLR Conservation Measure 10-02 (2006) available at http://www.ccamlr.org/pu/e/e_pubs/cm/06-07/toc.htm last visited Nov 29 2007.
[241] CCAMLR Conservation Measure 10-03 (2005) http://www.ccamlr.org/pu/e/e_pubs/cm/06-07/toc.htm last visited Nov 29 2007.
[242] CCAMLR Conservation Measure 10-04 (2006) http://www.ccamlr.org/pu/e/e_pubs/cm/06-07/toc.htm last visited Nov 29 2007.

member vessels that offend,[243] as well as those relating to NCP vessels, numbered CM 10-07, the IUU Vessel List procedure for non-contracting member vessels.[244] Among the changes made at the 2006 meeting were several that significantly affected these final two measures. Conservation measure 10-06 was modified to further and more clearly restrict access to ports and facilities by vessels on the CP-IUU Vessel List and to extend actions that CPs can take relative to those vessels.[245] Similarly, CM 10-07 was amended to restrict access to ports and facilities by vessels on the NCP-IUU Vessel List and to extend actions that CPs can take relative to those vessels.[246]

Finally, CM 10-08, promotes compliance by CP nationals with CCAMLR conservation measures by requiring CPs to take appropriate action if a national is discovered to be on ships on either IUU Fishing Vessel List that will become mandatory in July 2008.[247]

CCAMLR is now closer to adopting the full panoply of measures that COFI endorsed in the FAO Model Scheme on Port State Measures in 2005 and the recent draft of a legally binding agreement on port state measures.[248] These and the other measures discussed make it much more unlikely that rouge vessels will get a warm welcome at any CP port that has both implemented and has sufficient port personnel to enforce conservation provisions, and more likely that the IUU fishing for toothfish will continue to drop.

NAFO Northwest Atlantic Fisheries Organization

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Establishment: **1978 Convention on Future Multilateral Cooperation in Northwest Atlantic Fisheries,** Ottawa, Adopted, October 24 1978; Entered into force, January 1, 1979

Members as of November 31, 2007: Canada, Cuba, Denmark (in respect of Faroe Islands and Greenland), European Community, France (in respect of St.

[243] CCAMLR Conservation Measure 10-06 (2006) available at http://www.ccamlr.org/pu/e/e_pubs/cm/06-07/toc.htm last visited Nov 29 2007.
[244] CCAMLR Conservation Measure 10-07 (2006) available at http://www.ccamlr.org/pu/e/e_pubs/cm/06-07/toc.htm last visited Nov 29 2007.
[245] CCAMLR Conservation Measure 10-06 (2006) available at http://www.ccamlr.org/pu/e/e_pubs/cm/06-07/toc.htm last visited Nov 29 2007
[246] CCAMLR Conservation Measure 10-07 (2006) available at http://www.ccamlr.org/pu/e/e_pubs/cm/06-07/toc.htm last visited Nov 29 2007.
[247] CCAMLR Conservation Measure 10-07 (2006) available at http://www.ccamlr.org/pu/E/e_pubs/cm/06-07/10-08.pdf last visited Dec. 3, 2007.
[248] FAO Model Scheme on Port State Measures to Combat IUU Fishing 2007, available at ftp://ftp.fao.org/docrep/fao/010/a0985t/a0985t00.pdf last visited Nov. 29, 2007; FAO, Report of the Expert Consultation to Draft a Legally-binding Instrument on Port State Measures, Fisheries Report No 846, available at ftp://ftp.fao.org/docrep/fao/010/a1375e/a1375e00.pdf last visited Dec. 6, 2007.

Pierre and Miquelon), Iceland, Japan, Korea (Rep. of), Norway, Russian Federation, Ukraine, and the United States.

Geographic Scope: Northwest Atlantic Ocean, approximately north of 35°N latitude and west of 42°W longitude. (For an exact definition, see Art. 1(1) of the Convention). It has regulatory competence only in the parts of the Convention Area beyond the limits of national jurisdiction. (This area is known as the Regulatory Area).
[**Map**]

Material Scope: All fishery resources of the Convention area with the exception of sea mammals, sedentary species, and, in so far as they are dealt with by other international agreements, highly migratory species and anadromous stocks.

Main Objectives: To contribute to the optimum utilization and rational management and conservation of Northwest Atlantic fishery resources.[249]

NAFO regulates 19 stocks of 11 migratory, high seas fisheries. It is structured with a Secretariat providing administrative services; a General Council responsible for supervising and coordinating the organizational, administrative, financial and other internal affairs of the Organization; a Scientific Council providing a forum for consultation and cooperation among the Contracting Parties with respect to the study, appraisal and exchange of scientific information and views relating to the fisheries of the Convention Area; and a Fisheries Commission responsible for the management and conservation of the fishery resources of the Regulatory Area. There are committees under each of the latter three bodies including the Fisheries Commission's Standing Committee on International Control (STACTIC), which reviews and evaluates conservation and enforcement measures including those relating to IUU fishing and IUU List matters.[250]

In earlier decades the organization experienced management problems, including, notoriously, significant illegalities in the Turbot fishery, and in 1990-1992, a major collapse of many of the regulated fisheries.[251] In May 2005, a report identified a number of the major problems with NAFO, including its decision-making, and a lack of serious enforcement and dispute settlement procedure. In September 2005, Canada proposed a working group to consider amendments to the Convention. This working group's September 2006 report

[249] Internet Guide to International Fisheries Law, http://www.intfish.net/orgs/fisheries/nafo.htm last visited Nov. 29, 2007; NAFO web site, available at http://www.nafo.int/about/frames/about.html last visited Dec. 7, 2007.
[250] NAFO website, available at http://www.nafo.int/about/frames/about.html last visited Dec.7, 2007.
[251] Saunders, Phillip, *Recent Developments in NAFO: 'Reforming' an RFMO?* in Chatham House, Illegal, Unreported and Unregulated Fishing, 2nd Chatham House Update and Stakeholder Consultation Meeting, 16 (Nov. 2006), available at http://www.illegal-fishing.info/item_single.php?item=event&item_id=4&approach_id= last visited Dec. 7, 2007.

made a series of recommendations based in part on the U.N. Fish Stocks Agreement's implementation.[252]

This marked the beginning of a campaign of substantial reform,[253] including substantial changes to NAFO's Conservation and Enforcement Measures (CEM), most recently revised in 2007.[254] They now include seven chapters, with 57 articles and 26 annexes and specifically address IUU fishing, which can result in placement of vessels on an IUU List.[255] This list was first compiled in 2006.[256] Access to it appears at the top of the NAFO website with a colorful "New Feature" button announcing the "IUU List." Once that button is selected, not only does information about these boats appear (including a cross listing to show which of those vessels appear on the NEAFC IUU List), but also a link to the IUU Lists of CCAMLR, IATTC, ICCAT, IOTC, and NEAFC.

Perhaps most notable is that the recently concluded 29th Annual Meeting, which adopted an amendment to the Convention changing its formal name to the Convention on Cooperation in Northwest Atlantic Fisheries, formally added an article to the Convention that specifically commits the Commission to take action for the "prevention, deterrence and elimination" of IUU fishing.[257] It also changed the purpose of the organization to a more sustainable one, as Article II now states the purpose as being:

> …to ensure the long-term conservation and sustainable use of the fishery resources in the Convention Area and, in so doing, to safeguard the marine ecosystems in which these resources occur.[258]

The CEM provisions directly addressing IUU fishing fall under Chapter VI: "Scheme to Promote Compliance by Non-contracting party Vessels with Recommendations Established by NAFO," with some of the more notable methods detailed below.

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[252] Id.
[253] NAFO, Report of the General Council, 29th Annual Meeting, 24-28 Sept. 2007 (Serial No. N5478, NAFO/GC Doc. 07/5) (Hereinafter NAFO 29th Meeting), Annex 16, *Press Release and Backgrounder*, 34 available at http://www.nafo.int/publications/frames/general.html last visited Dec. 4, 2007.
[254] NAFO, Conservation and Enforcement Measures, Serial # N5335 NAFO/FC, Doc 07/1 available at http://www.nafo.int/fisheries/frames/regulations.html last visited Dec. 4, 2007.
[255] Id., Chpt. VI, Scheme to Promote Compliance by Non-contracting party Vessels with Recommendations Established by NAFO, Articles 43-51.
[256] NAFO 29th Meeting supra, note 213, p.35.
[257] NAFO 29th Meeting supra, note 213, Annex 17 wherein the new convention, as amended, is reproduced at 40-59. The amendment, totaling eight articles and two annexes, is given Serial # N.5453, NAFO/GC Doc. 07/4 and within the adopted new convention, Article VI, giving the responsibilities of the Commission, section 9(d), deals with IUU. Under the terms of the current convention, Article XXI, to take effect the adopted amendment must be ratified by ¾ of the contracting parties.
[258] Id. Art. II, p.41.

It establishes presumptions whereby a non-contracting party vessel sighted fishing in the regulatory area (RA) is presumed to be undermining NAFO's CEMs. If the vessel is on NEAFC's IUU List, then the mere sighting of the vessel in the RA leads to the presumption of illegal fishing.[259] Inspections at sea are authorized.[260] If a NCP presumed fishing enters a CP's port, it must be fully inspected before any fish can be landed or transshipped.[261] A CP vessel cannot receive fish from a NCP vessel in a CP port unless the fish is from outside the RA, or it is established that the fish was caught in conformity with CEM.[262]

Once NAFO gets information from CPs based upon provisions in this CEM relative to illegal fishing activities of NCP vessel, the ship is placed on a Provisional List on a secure NAFO website, NAFO notifies the NCP that a vessel flying its flag has been thus observed, requests the reason for the transgression and that the vessel be informed to desist, and provides timelines for a NCP response and the next meeting where vessels will be added to a formal IUU List. NCP representatives are invited to this meeting. A vessel may immediately be moved from the Provisional List to the published IUU List if the NCP agrees to the listing.[263]

The IUU list is reviewed regularly both as to vessels added and removed through a process handled by a standing committee of NAFO's Fisheries Commission.[264] Article 50 lists the repercussions of being on the IUU List. CPs shall take all necessary measures, mindful of national law, to prohibit (except for an emergency); any assistance by any CP vessel, including fish processing, transshipment, or joint fishing or provisioning of any kind; right of entry into any CP port or change of crew; fishing in CP national waters; chartering involving the CP; CP flagging the vessel; import of any fish from such vessel. CPs should encourage importers, transporters, and other sectors concerned to refrain from negotiating and transshipping fish caught by such vessels. And it encourages CPs to engage in wide-ranging information exchange among themselves, NCPs, and RFMOs in order to help dissuade the practice of IUU fishing.[265]

The final article in the chapter has CPs, severally or jointly, seeking cooperation from NCPs with offending vessels, reviewing facts to identify NCPs that have not taken actions to rectify IUU fishing problems and restricting export or transfers of any CP's formerly licensed fishing vessels to those NCPs.[266]

The NAFO website currently shows 21 vessels on its IUU List (although notes indicate six of those have been scrapped). Over half of these same vessels are

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[259] NAFO, Conservation and Enforcement Measures, Supra note 214, Art. 44.
[260] NAFO, Conservation and Enforcement Measures, Supra note 214, Art. 45.
[261] NAFO, Conservation and Enforcement Measures, Supra note 214, Art. 46.
[262] NAFO, Conservation and Enforcement Measures, Supra note 214, Art. 47.
[263] NAFO, Conservation and Enforcement Measures, Supra note 214, Art. 48.
[264] NAFO, Conservation and Enforcement Measures, Supra note 214, Art. 49.
[265] NAFO, Conservation and Enforcement Measures, Supra note 214, Art. 50. Article 15 also prohibits a CP from being involved in any chartering of a vessel involved in IUU activity under Chapter VI of the CEM. NAFO, Conservation and Enforcement Measures, Supra note 214, Art. 15.
[266] NAFO, Conservation and Enforcement Measures, Supra note 214, Art 51.

also shown on IUU list of NEAFC (although with different names and flags). Georgia is the predominant place of registry (6 vessels, five of which have been scrapped). Other nations include Russia, Cambodia, Togo, Sierra Leone**,** Guinea, Belize, Bahamas, Panama, and Cuba.[267]

While the NAFO IUU Fishing Vessel List only contains NCP boats, there are provisions in Chapter IV of the CEM as to illegal fishing by contracting party ships, and a list of recommended sanctions that can be taken, in accordance with the CP's national law, including fines, seizure of gear and catch, sequestration of vessel, suspension or cancellation of right to fish, reduction or withdrawal of quota.[268]

WCPFC Western and Central Pacific Fisheries Commission

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Establishment: Convention on the Conservation and Management of the Highly Migratory Fish Stocks of the Western and Central Pacific Ocean, Honolulu, Adopted, September 5, 2000; Entered into force, June 19, 2004.

Members as of November, 2007: Australia, China, Canada, Cook Islands, European Community, Federated States of Micronesia, Fiji, France, Japan, Kiribati, Korea (Rep. of), Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Chinese Taipei, Tonga, Tuvalu, USA, Vanuatu.[269] There are also seven participating territories and one cooperating non-member.

Geographic Scope: Broadly speaking, the area of competence of the Commission is the Western and Central Pacific Ocean. Article 3 of the Convention provides a detailed delimitation.
[Map]

Material Scope: Highly migratory fish stocks, defined as all fish stocks of the species listed in Annex 1 of the LOS Convention occurring in the Convention Area, and such other species of fish as the Commission may determine.

Main Objectives: To ensure, through effective management, the long-term conservation and sustainable use of highly migratory fish stocks in the western

[267] NAFO website, http://www.nafo.int/about/frames/about.html, last visited Dec. 7, 2007.
[268] NAFO, Conservation and Enforcement Measures, Supra note 214, Ch IV, Joint Inspection and Surveillance Scheme, Articles 25-40, Art. 36.
[269] Western and Central Pacific Fisheries Commission website, http://www.wcpfc.int/index.html last visited Dec 7, 2007.

and central Pacific Ocean in accordance with the LOS Convention and the UN Fish Stocks Agreement.[270]

This convention, the second regional fisheries management to be negotiated after conclusion of the 1995 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of December 10, 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, did not begin operations until late 2005.[271] Its major resource concerns are target bigeye, yellowfin, South Pacific albacore, and North Pacific albacore with bycatch issues involving sea turtles, sea birds and immature tuna and non-target species.

The Convention specifically outlines a precautionary approach that shall be used in management and details application methods.[272] It provides for the Western and Central Pacific Fisheries Commission (WCPFC) to carry out the business of the convention and specifically to adopt necessary conservation and management measures.[273] Other organizational elements include an administrative Secretariat,[274] a Scientific Committee,[275] a Technical and Compliance Committee to advise as to implementation of and compliance with conservation and compliance measures,[276] and a Northern Committee, which makes recommendations on stocks north of 20 degrees north parallel.[277]

Although negotiated in 2000, the Convention has no specific IUU fishing language. It thus also has no provision for establishing an IUU Fishing Vessel list. Not unexpectedly, in the Convention's compliance and enforcement article, it does speak about actions that may be taken in regard to illegal fishing or activities that diminish the effectiveness of the established conservation regimes.[278] Other articles give boarding and inspection rights[279] and provide very basic port state remedies to prevent landings and transfers if catch is identified

[270] Internet Guide to International Fisheries Law, http://www.intfish.net/orgs/fisheries/wcpfc.htm
[271] Secretariat of the Western and Central Pacific Fisheries Commission, Contribution to the Review Conference on the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of December 10, 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (New York, 22-26 May 2006, available at http://www.un.org/Depts/los/convention_agreements/reviewconf/wcpfc_reviewconference.pdf last visited Nov. 29, 2007.
[272] Convention on the Conservation and Management of the Highly Migratory Fish Stocks of the Western and Central Pacific Ocean, Art. 5(c), 6, available at http://www.wcpfc.int/index.html last visited Dec 7, 2007.
[273] Id., Art 10.
[274] Id. Art 15.
[275] Id. Art. 12, 13.
[276] Id. Art. 14.
[277] Id., Art. 11, para. 7.
[278] Id. Art. 25.Par. 6, 10.
[279] Id. Art 26.

as caught in contravention to conservation measures[280] and encourage cooperation with a list of other fisheries-related bodies.[281]

In 2006, the WCPFC adopted Conservation and Management Measure (CMM) 2006-09 which went into force on February 13, 2007.[282] It sets out provisions to establish an IUU Vessel List and a process, with presumptions, that first results in a draft, then a provisional, and finally the published IUU Vessel List. It determines how a vessel gets placed upon such a list and how it can get removed. As of October 2007, there were five ships on the Provisional WCPFC IUU Vessel List, which will be finalized by the Commission at its December 2007 meeting.[283] However, unlike the NAFO web site discussed above where the IUU Vessel List is a prominent button, there appears to be no easy (or even direct) way to gain access to the WCPFC list.

The most recent annual meeting of the Technical and Compliance Committee (TCC), its third regular session, occurred from September 27 to October 2, 2007, in Pohnpei and its actions and recommendations are forwarded to the full commission meeting in December for action. Several issues relating to dealing successfully with IUU fishing were considered.[284] These included discussion of a draft CMM for transshipment monitoring with a decision to have further drafting occur and to submit that to the December 2007 full commission meeting for review.[285] A draft on Port State Measures was presented, but after discussion, including recognition that the FAO was working on developing legally binding standards with a scheduled Expert Consultation, the draft was referred to the next year's TCC session (TCC4).[286] Discussion about vessel chartering schemes occurred, but no draft was presented and it was agreed that it would be revisited at TCC4.[287] The Committee did not reach a conclusion on the next steps after presentations of trade documentation schemes, which would be included under monitoring surveillance and control programs.[288] And a report by the working

[280] Id. Art 27, Par. 3.
[281] Id. Art. 22.
[282] Western and Central Pacific Fisheries Commission, Conservation Measure to Establish a List of Vessels Presumed to Have Carried Out Illegal, Unreported and Unregulated Fishing Activities in the Western and Central Pacific Ocean, available at http://www.wcpfc.int/ last visited Nov. 29, 2007.
[283] WCPFC, Technical and Compliance Committee, Third Regular Session, Summary Report of Meeting 27 Sept.-2 Oct 2007 Attachment H, p 78 ; WCPFC, Report of the Executive Director on the Work of the Commission prepared for the WCPFC Fourth Regular Session, December 3-7, 2007, Guam, Pars. 14, 15, Nov. 2007 WCPFC4-2007/15 both available at http://www.wcpfc.int/ last visited Nov. 29, 2007.
[284] WCPFC, Technical and Compliance Committee, Third Regular Session, Summary Report of Meeting 27 Sept.-2 Oct 2007 available at http://www.wcpfc.int/ last visited Nov. 30, 2007.
[285] Id. Par. 63-76.
[286] Id. Par. 77-82.
[287] Id. Par. 83-87.
[288] Id. Par. 88-91.

group of TCC3 on the development of a vessel monitoring system for the WCPFC resulted in a decision to continue to work on the issue.[289]

Concluding Comments on RFMOs

It is probably undeniable that a majority on commentators and observers believed that the 1995 U.N. Fish Stocks Agreement's placement of regional fisheries management organizations at the heart of international fisheries management would provide relief from the tragedy of the commons. Garret Hardin's proposition, as revealed in the world's oceans, had resulted in diminished fish populations. Unfortunately, most of those same parties seem to admit that the reality of the situation is that high seas fisheries have continued to decline. In the words of Richard Tarasofsky, Head, Energy, Environment and Development Program at London's Chatham House (The Royal Institute of International Affairs), "RFMO performance has not lived up to expectations," as evinced by "the FAO's recently released *State of the World Fisheries and Aquaculture 2006* [that] reveals [the] stark picture [that] more than two thirds of high fish stocks are either depleted or at high risk of collapse, especially the straddling stocks that move between national maritime waters and the high seas."[290] Michael Lodge, Director of the Independent High Level Panel on Regional Fisheries Management Organizations and an Associate Fellow at Chatham House states that "if international actions aimed at curbing IUU fishing were to achieve their full effect, it would be essential to improve the effectiveness with which the present system of high seas governance is implemented," a key element being "progressive reform of RFMOs."[291]

The Chatham House report, Recommended Best Practices for Regional Fisheries Management Organizations, is more than 100 pages of analysis with recommendations on how the expectations of RFMOs might be better met. Some of the most salient issues are summarized below, with mention of other reports that have focused specifically on certain aspects of IUU fishing.

It is probably goes without question that a majority of commentators and observers believed that the 1995 U.N. Fish Stocks Agreement's placement of regional fisheries management organizations at the heart of international fisheries management would provide relief from the tragedy of the commons. Garret Hardin's proposition[292], as revealed in the world's oceans, had just as undeniably resulted in (often dramatically) diminished fish populations. Unfortunately, most of those same parties today seem to admit that the reality of

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[289] WCPFC, Technical and Compliance Committee, Third Regular Session, Outcomes from the TCC3 Vessel Monitoring System Working Group, available at http://www.wcpfc.int/tcc3/pdf/WCPFC-TCC3-2007-34%20_Rev.1_%20%5BVMS%20Working%20Group%20Paper_rev%201_%5D.pdf last visited Nov. 30, 2007.

[290] Chatham House, Recommended Best Practices, supra note 173, vi.

[291] Chatham House, Recommended Best Practices, supra note 173, vii.

[292] Hardin, G. Tragedy of the Commons. Science 162:1243-1248 (1968). The incentives that arise in open access fisheries have been likened to Hardin's discussion of the village commons, where each user has an incentive to graze many cattle because doing so costs no more than grazing a few.

the situation is that high seas fisheries have continued to decline. In the words of Richard Tarasofsky, Head, Energy, Environment and Development Program at London's Chatham House (The Royal Institute of International Affairs), "RFMO performance has not lived up to expectations," as evinced by "the FAO's recently released *State of the World Fisheries and Aquaculture 2006* [that] reveals [the] stark picture [that] more than two thirds of high seas fish stocks are either depleted or at high risk of collapse, especially the straddling stocks that move between national maritime waters and the high seas."[293] Michael Lodge, Director of the Independent High Level Panel on Regional Fisheries Management Organizations and an Associate Fellow at Chatham House states that "if international actions aimed at curbing IUU fishing were to achieve their full effect, it would be essential to improve the effectiveness with which the present system of high seas governance is implemented," a key element being "progressive reform of RFMOs."[294]

The full Chatham House report, Recommended Best Practices for Regional Fisheries Management Organizations, is more than 100 pages of analysis with recommendations on how the expectations of RFMOs might be better met. Some of the most salient issues are presented here, with mention of other reports that have focused specifically on IUU fishing issues. The following discussion is based on paragraphs of the IPOA-IUU that are enumerated above.[295] These admonitions, which are to be developed and implemented through a NPOA-IUU, would, if met, go a long way toward meeting the best practices enumerated below. Furthermore, the IPOA-IUU was not adopted by the FAO until 2001; the U.N. Fish Stocks Agreement only preceded it by six years. Thus in less than a decade and a half there has been a dramatic shift of expectations as to RFMOs – this while most of the organizations have charters that precede both of these seminal documents. Such earlier-established RFMOs may not have the mandated capacity to undertake the roles and duties ascribed to them without charter revision. Some have done so as was discussed relative to NAFO at text accompanying footnote 211 and following; but many others have not.

However, general agreement also exists that there are a number of practical issues that could be addressed without major changes in most RFMO underlying agreements. These involve more effective internal communications among members; better communication between RFMOs and a more systematic approach in dealing with non-members to prevent them from undermining adopted conservation mechanisms. This is especially true as to compliance and enforcement matters. Michael Lodge summarizes those to include: standardizing and sharing/consolidating vessel registers and information from vessel monitoring systems; adoption of a uniform port state scheme combined with a standardized catch documentation scheme; and use of alternative dispute

[293] Chatham House, Recommended Best Practices, supra note 173, vi.
[294] Chatham House, Recommended Best Practices, supra note 173, vii.
[295] See supra, notes 141-173, and accompanying text.

resolution including an experts' panel to promote better, more rapid decision making.[296]

Other expectations will be more difficult to accomplish without prerequisite modification of charters or dramatic changes as to how many RFMOs currently operate. These include incorporation of the precautionary approach and use of ecosystem-based management; dealing with overcapacity of the global fleet and allocation; and moving toward rational, uniform mechanisms to deal with developing countries that often are flag states for IUU fishing vessels.

For instance, Lodge points out that while defining best practices for use of the precautionary approach and ecosystem-based management may be relatively straightforward, implementation will be more challenging, in no small part because of the additional data and analytical tools required,[297] plus the need to utilize prudent, longer-termed foresight when sufficient information is lacking. Other factors that will hinder instituting ecosystem-based and precautionary approaches, but that are not unique to these elements, include not only the questions of the legal ability to act based upon the interpretation of the charter, but also matters related to external conditions. Lodge succinctly lists these as including "poverty alleviation, food security, profit motives and lack of political will…."[298]

Overcoming this stasis is important. Professor Eric Molenaar of the Netherlands Institute for the Law of the Sea urges that a critical but currently largely missing initiative must be taken to insure that efforts to preserve the vitality of high seas fisheries succeed.[299] He discusses the United Nations General Assembly Resolution 59/25[300] passed in 2004 and its paragraph 68, which relates to threats to marine biodiversity posed by marine capture fisheries. He is convinced that the issue boils down to whether RFBs are authorized to regulate all bottom fisheries not only for the purpose of the sustainability of the target species but also for the purpose of minimizing negative ecosystem impacts resulting from take of species that have not yet been directly related to the health/magnitude of target species. He concludes that of the RFBs with high seas regulatory areas, only CCAMLR and SEAFC clearly have competence to do both; SIOFA, once in force, will also grant competence for this to its annual meetings of the parties; and both NEAFC and NAFO are considering expanding their regulatory ability as to this matter.[301]

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[296] Michael Lodge, Managing International Fisheries: Improving Fisheries Governance by Strengthening Regional Fisheries Management Organizations, 5 (Chatham House Briefing Paper, March 2007) available at http://www.chathamhouse.org.uk/publications/papers/view/-/id/446/ last visited Dec 26, 2007

[297] Id.

[298] Id.

[299] Molenaar, supra n. 139 at 535-537

[300] United Nations General Assembly (UNGA) Resolution 59/25 (2004), Adopted on 17 November 2004 (Doc. A/RES/59/25, of 17 January 2005) available at http://daccessdds.un.org/doc/UNDOC/GEN/N04/477/70/PDF/N0447770.pdf?OpenElement last visited Dec. 26, 2007.

[301] Molenaar, supra n. 139 at 535-537.

An analysis of the progress towards the use of the precautionary approach and ecosystem-based management was issued October 2007 as part of the Chatham House series of technical papers on RFMOs. It looked at 13 RFMOs in this regard (one now defunct). It concludes that most have taken some steps toward incorporation, but only a few have actually firmly embraced precautionary measures that resulted in a positive management advantage, namely IPHC and NAFO. It determines what all the reviewed RFMOs lack is adequate compliance and enforcement by the contracting parties. Even when catch limits are established, only a few RFMOs have sufficient, clear management measures in place to respond if they are surpassed.[302]

A particularly thorny issue in the IUU fishing discussion is how to incorporate or manage parties that are not members of a RFMO with jurisdiction where vessels registered to the non-member fish. An October report by Chatham House discusses a variety of practices regarding non-members after investigating 11 RFMOs (one with a treaty not yet entered into force).[303]

If the FAO Uniform legally binding recommendations for port state measures are approved in 2008, they will boost port state measures worldwide. Some of the implications for how a better and more coordinated front in this regard could help alleviate IUU fishing are addressed in the TRAFFIC report published in 2007.[304] How effective these and other trade-related measures are will take more research and further wider implementation, but the report notes "…there is some evidence that, where such measures have been used systematically, and in conjunction with other MCS measures, such as centralized vessel monitoring systems, observer programmes and controls on transshipment, there has been a reduction in estimated IUU catch."[305]

The increasingly important role of RFBs is indicated by the establishment of a RFB Secretariats Network, which held its first meeting (RSN-1) March 12-13, 2007 in Rome.[306] This closely followed the 27th Meeting of the Committee on

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[302] Chatham House, Recommended Best Practices for Regional Fisheries Management Organizations, Regional Fisheries Management Organizations, Technical Study No. 1: Progress in Adopting the Precautionary Approach and Ecosystem-Based Management, Marjorie L Mooney-Seus and Andrew A Rosenberg, xvii (October 2007), available at http://www.chathamhouse.org.uk/research/eedp/papers/view/-/id/563/ last visited, Dec. 26, 2007. Certainly, CCAMLR should be incorporated here. FAO, Fisheries Report No. 837, infra note 262, 14-16.

[303] Chatham House, Recommended Best Practices for Regional Fisheries Management Organizations, Technical Study No. 2: Practice of RFMOs Regarding Non-members, Daniel Owen (October 2007) available at http://www.chathamhouse.org.uk/publications/papers/view/-/id/554/ last visited Dec. 26, 2007.

[304] M. Lack, Catching On? Trade-Related Measures as A Fisheries Management Tool, A TRAFFIC Report (2007) available at http://www.traffic.org/content/850.pd last visited Dec. 26 2007. The U.S. approach on port access measures is the subject of proposed rulemaking that is currently in development.

[305] Id. at vi

[306] FAO, Fisheries Report No. 837, Report on the First Meeting of the RFB Secretariats Network, (March 12-13, 2007 Rome) available at ftp://ftp.fao.org/docrep/fao/010/a1184e/a1184e00.pdf last visited Dec. 27, 2007. This was also considered the fifth meeting of the RFBs. Id., i.

Fisheries (COFI-27) where emphasis was placed on key issues including better collection and sharing of fisheries data; development of a legally binding port state measures document; implementation of an ecosystems approach to fisheries (EAF); overcapacity; and development of best practices for regional fishery bodies.[307]

These were prime issues of discussion for the gathered representatives of RFBs at RSN-1. The Assistant Director-General of FAO Fisheries and Aquaculture set the tone as he opened the meeting by noting that with illegal, unreported and unregulated fishing constituting one of the greatest threats to sustainable and responsible fisheries, RFBs have a growing role, obligation and status in terms of effective fisheries governance to counteract the problem. He concluded, echoing Michael Lodge, that this highlights the urgent need to further strengthen and improve regional and global fisheries governance, the reason for the gathering.[308]

The meeting also reviewed the results of a conference on the Straddling Stocks Agreement that took place in May 2006, at U.N. headquarters in New York. [309] Of highest importance were the Review Conference's recommendations to modernize the approach of RFMOs to fisheries management; to encourage non-members and post opt-out members to use sustainable practices; to conduct RFMO performance reviews; and to strengthen compliance and enforcement and to develop mechanisms to coordinate monitoring, control and surveillance among RFMOs to ensure full exchange of information on IUU fishing.[310]

Delegates discussed the Chatham House effort to develop best practices for RFMOs and considered how to establish criteria for RFMO performance reviews.[311] The key IUU fishing question centered on how to improve the dissemination of information about these actions. Because of the lack of access to such information in general, and particular difficulty of availability in developing states, it was agreed that a most beneficial start would be to complete a comprehensive global record of fishing vessels and further agreed that blacklisting through use of IUU Vessel Lists seemed to be effective.[312] The conferees emphasized the need for harmonization of catch documentation schemes and, while it might not be appropriate for every RFB, commended CCAMLR's CDS.[313]

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[307] FAO, Fisheries Report No. 830 Supra note 121, xii-xiii, 3 (par. 16).
[308] FAO, Fisheries Report No. 837, supra note 262, 28-29.
[309] Review Conference of the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA Review Conference) (22-26 May 2006 at UN headquarters in New York), summary report available at International Institute for Sustainable Development, Earth Negotiations Bulletin website at http://www.iisd.ca/vol07/enb0761e.html last visited Dec. 26 2007.
[310] FAO, Fisheries Report No. 837, supra note 262, 4-5, 31-32.
[311] FAO, Fisheries Report No. 837, supra note 262, 7-8.
[312] FAO, Fisheries Report No. 837, supra note 262, 9-10.
[313] FAO, Fisheries Report No. 837, supra note 262, 11-12.

Participants acknowledged that while ecosystem based approaches to fisheries management are a work in progress, efforts are to be encouraged. Efforts of the Benguela Current Commission's were referenced and, again, CCAMLR was noted as the only RFMO with such a system fully in place, instituted in 1980. As with other actions, it was pointed out that such complex management would require capacity building especially in developing countries.[314]

Finally, the parties discussed the possibility of establishing a web site for the RSN in order to facilitate and coordinate information exchange among the RFMOs; and determined that the next meeting, RSN-2, will be held immediately after the 2009 meeting of the Committee on Fisheries (COFI-28).[315]

The full Chatham House report, Recommended Best Practices for Regional Fisheries Management Organizations devotes Chapter 12, a stand-alone summary, to a listing of recommended best practices in relation to conservation and management of fish stocks. [316] These are broken down into nine broad categories: General Practice (including to "recognize the grave threat to the stability of the cooperative regime posed by IUU fishing and work vigorously towards the suppression and elimination of such fishing;");[317] Conservation and Management Practices (including "In each RFMO, the members should ensure that: There are robust methods for measuring and monitoring so as to account for illegal, unreported and unregulated fishing and catch, including by-catch.");[318] Allocation Practices; Compliance and Enforcement Practices (including : "Schemes promoting compliance by nationals of its members, requiring the latter to ensure that natural and legal persons subject to their jurisdiction do not support or participate in IUU fishing; and Mechanisms for sharing surveillance information with adjacent coastal States and with other RFMOs targeting non-members conducting IUU fishing.");[319] Decision-Making Practices; Dispute Settlement Practices; Transparency; Special Requirements of Developing Countries; and Institutional Practices. They cover, in succinct form, over a dozen pages. They are a "model." Some might consider them overbroad, too general or, perhaps, too specific in certain areas. But in conjunction with the IPOA-IUU, they are required reading for how RFMOs might be constituted, in light of what is now and will be in the future expected of them.

Further discussion of the role of RFMOs and the potential for the United States to foster capacity to address IUU fishing is the subject of a NOAA Fisheries report that will be submitted to Congress in the first part of 2008.

[314] FAO, Fisheries Report No. 837, supra note 262, 14-16
[315] FAO, Fisheries Report No. 837, supra note 262, 17-18.
[316] Chatham House, Recommended Best Practices, supra note 173, 117-128.
[317] Chatham House, Recommended Best Practices, supra note 173, A.1.(d), p.117.
[318] Chatham House, Recommended Best Practices, supra note 173, B.16., p.121.
[319] Chatham House, Recommended Best Practices, supra note 173, D.1., p.122.

APPENDIX C

2006 REPORT ON U.S. FISHERIES BYCATCH REDUCTION STANDARDS AND MEASURES RELEVANT TO SECTION 202(H) OF THE MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

2006 REPORT ON U.S. FISHERIES BYCATCH REDUCTION STANDARDS AND MEASURES RELEVANT TO SECTION 202(h) OF THE MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

Section 202(h)(l) of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) states that "The Secretary of State, in cooperation with the Secretary, shall seek to secure an international agreement to establish standards and measures for bycatch reduction that are comparable to the standards and measures applicable to United States fishermen for such purposes in any fishery regulated pursuant to this Act for which the Secretary, in consultation with the Secretary of State, determines that such an international agreement is necessary and appropriate." Similar provisions are contained in both the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA).

Section 202(h)(3) of the Magnuson-Stevens Act requires that the Secretary of Commerce, in consultation with the Secretary of State, submit annually to the Senate Committee on Commerce, Science and Transportation and the House Committee on Natural Resources a report describing actions pursuant to Section 202(h) of the Act.

In its 2000 Annual Report to Congress on International Bycatch Reduction Agreements, the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) concluded, with Department of State concurrence, that seeking international agreements with foreign nations conducting pelagic longline fishing operations for Atlantic and Pacific highly migratory species was necessary to protect endangered and threatened sea turtles. An international strategy, referred to as the Course of Action to Promote International Agreements that Address the Need to Reduce Sea Turtle Bycatch in Foreign Longline Fisheries, was subsequently developed to address this issue and detailed in the 2001 Report to Congress on International Bycatch Reduction Agreements.

In January 2002, NMFS convened an International Bycatch Reduction Task Force to develop a Plan of Action to implement the sea turtle bycatch strategy. This Task Force was made up of NMFS and Department of State personnel. Although the initial focus of this group was to further discussions and ultimately to reduce sea turtle bycatch in longline fisheries internationally, the issues of incidental catch of seabirds in longline fisheries and the conservation and management of sharks were quickly added to the work of the Task Force. More information on the Course of Action to Promote International Agreements that Address the Need to Reduce Sea Turtle Bycatch in Foreign Longline Fisheries and the activities of the International Bycatch Reduction Task Force is available from NMFS.

In this report, NMFS identifies relevant bycatch standards and measures adopted in 2006 under fishery management plans addressing fish stocks also harvested by foreign fishermen. A description of these bycatch standards and measures by region, an update on initiatives identified in previous reports (where relevant), and NMFS' conclusions on the necessity and

appropriateness of seeking international agreements establishing comparable standards and measures follow. This report also provides an update on the status and work of the International Bycatch Reduction Task Force.

I. NORTHEAST REGION

The Final Rule to Implement Framework 43 to the Northeast Multispecies Fishery Management Plan (FMP) (71 FR 46871, August 15, 2006) is designed to address bycatch of haddock by New England groundfish vessels fishing for Atlantic herring. Under the Final Rule, vessels with a
Category 1 Atlantic herring fishing permit (generally larger, herring-specific vessels) may possess incidentally caught haddock until they reach a specified cap. Once the Category 1 cap is reached, all herring vessels in the fishery are limited to 2,000 pounds of herring per trip if any of the herring was caught within a defined area. In addition, Atlantic herring processors and dealers that sort herring catches as part of their operations are required to cull and report all haddock.

The Final Rule to Implement Framework 18 to the Atlantic Sea Scallop FMP (71 FR 33211, June 8, 2006) establishes a seasonal closure of the Elephant Trunk Access Area to reduce potential interactions between the scallop fishery and sea turtles and to reduce finfish and scallop bycatch mortality.

During 2006, the United States and Canada discussed bilateral strategies for reducing bycatch in the transboundary herring and scallop fisheries detailed above during meetings of the U.S.-Canada Transboundary Guidance Committee and the U.S.-Canada Steering Committee.

II. SOUTHEAST REGION

Although final rules were adopted in 2006 implementing new measures to reduce bycatch by U.S. vessels fishing for shrimp and reef fish in the Gulf of Mexico, these fish stocks are not harvested by foreign fishermen.

III. ATLANTIC HIGHLY MIGRATORY SPECIES

The Final Rule to Implement the Consolidated Highly Migratory Species FMP (71 FR 58058, September 2, 2006) establishes a circle hook requirement for U.S. fishermen using natural bait and natural/artificial bait combinations in billfish tournaments. The final rule also establishes mandatory workshops on sea turtle handling and safe release for pelagic and bottom longline and shark gillnet vessel owners and operators.

During 2006, NMFS completed a research program to evaluate methodology to reduce sea turtle bycatch and bycatch mortality in the U.S. Atlantic pelagic longline fishery. The research was conducted using commercial vessels as research platforms in the Atlantic Ocean and Gulf of Mexico. The experiment tested fishing protocols using bait types and hook types and resulted in implementation of the measures contained in the Final Rule to Implement the Consolidated Highly Migratory Species FMP. In 2006, the United States actively sought bilateral and international bycatch reduction agreements focusing on the use of appropriate circle hook and bait technology by pelagic longline vessels and safe handling and release of sea turtles in fisheries of highly migratory species.

IV. NORTHWEST REGION

The Final Rule to Implement Revisions to the 2006 Commercial and Recreational Measures for West Coast Groundfish (71 FR 8489, February 17, 2006) is intended to reduce and minimize the incidental catch and discard of overfished and depleted stocks. This fishery's trawl bycatch model was updated with bycatch and discard rates based on West Coast Groundfish Observer Program data from September 2004 through April 2005. The Pacific Fishery Management Council recommended adjustments to cumulative limits in limited-entry trawl fisheries for certain target species coastwide, such as sablefish, thornyheads, Dover sole, other flatfish, and arrowtooth flounder, based on projections from the trawl bycatch model. These adjustments for 2006 are projected to keep harvest within optimum yields. NMFS concurred with this recommendation and adjusted cumulative limits for these species during March through December 2006.

The Final Rule to Implement Amendment 18 to the Pacific Coast Groundfish FMP (71 FR 66122, November 13, 2006) requires vessels that participate in the open access groundfish fisheries to carry observers if directed by NMFS; and authorizes the use of depth-based closed areas as a routine management measure for minimizing the incidental harvest of any protected or prohibited non-groundfish species and discouraging target fishing while allowing small incidental catches to be landed.

V. SOUTHWEST REGION

No new measures specifically to reduce bycatch were implemented in 2006.

VI. PACIFIC ISLANDS REGION

In March 2006 (71 FR 14416, March 22, 2006), NMFS closed the Hawaii-based shallow-set swordfish longline fishery after it reached the interaction limit for loggerhead sea turtles. Federal regulations limit the fishery to 2,021 sets annually, beginning January of each year, and also specify that the fishery must be closed for the remainder of the year if the longline fleet reaches a threshold of allowable interactions of 16 leatherback or 17 loggerhead turtles. As of March 13, 2006, under a 100 percent observer coverage program for this fishery, NMFS observers had recorded 17 loggerhead interactions, triggering the closure. NMFS continues to conduct research to evaluate the efficacy of sea turtle protection measures on reducing sea turtle bycatch in the Hawaii-based pelagic longline fishery.

During 2006, NMFS conducted research to determine the survival rate of turtles by-caught in pelagic longline fisheries by monitoring post-release movements of turtles with satellite tag technology. Additionally, NMFS conducted behavioral and physiological research and experimented with various longline gear and bait adaptations to evaluate

practices that may reduce the unintentional catch of sea turtles in pelagic longline fisheries.

NMFS also supported institutional capacity building, including support to the Forum Fisheries Agency in their continuing efforts to provide observer training services for members from the western and central Pacific region. NMFS also sponsored workshops and clinics to export advances in pelagic longline gear technology aimed at reducing sea turtle bycatch to institutions in Japan, Philippines, Vietnam, Indonesia, Korea, Mexico, Costa Rica, Peru, Brazil, Columbia, Chile, and Spain. NMFS disseminated sea turtle identification and safe handling guidelines, turtle handling tools, and provided training on safe handling of unintentionally hooked sea turtles to officials in Ecuador, Guatemala, Costa Rica, Brazil, Korea, Thailand, and Japan.

VII. ALASKA REGION

The Final Rule to implement Amendment 69 to the FMP for Groundfish of the Gulf of Alaska (71 FR 12626, March 13, 2006) revises components of “other species” management. The final rule also raises the maximum retainable amount of "other species" in the directed arrowtooth flounder fishery from 0 percent to 20 percent, which will reduce the amount of "other species" that are discarded in the arrowtooth flounder fishery.

The final rule to implement Amendment 79 (71 FR 17362, April 6, 2006) to the FMP for Groundfish of the Bering Sea and Aleutian Islands establishes a groundfish retention standard (GRS) program for non-American Fisheries Act trawl catcher/processors that are 125 ft (38.1 m) length overall. The program is effective beginning January 20, 2008, for each vessel on an annual basis. The percent of groundfish retained will be calculated as a specified ratio of the weight of retained groundfish to total catch. Vessel owners or operators will be required to meet a GRS of 65 percent in 2008, 75 percent in 2009, 80 percent in 2010, and 85 percent in 2011 and following years. To monitor and enforce the GRS program, each vessel owner or operator will be required to use NMFS-approved scales to determine the weight of total catch, carry two observers or modify fishing practices so that each haul is available for sampling, and provide an observer sampling station where samples may be collected and processed from a single location. In addition, individual hauls may not be mixed.

A final rule was published on April 20, 2006 (71 FR 20346), amending regulations that require catcher vessels, catcher/processors, motherships, and shoreside and stationary floating processors carrying the observer communications system (OCS) to install hardware upgrades to meet current technology standards necessary to support OCS software. The OCS consists of industry-provided hardware and NMFS-supplied software that allows observers to provide fishery-dependent data to fishery managers. Timely electronic communication of catch reports submitted to NMFS by industry and observers is crucial to the effective in-season monitoring of groundfish catch and bycatch quotas.

VIII. MARINE MAMMAL PROTECTION ACT (MMPA) ACTIVITIES

MMPA List of Fisheries: NMFS finalized the 2006 List of Fisheries (LOF) on August 22, 2006 (71 FR 48802) and proposed the 2007 LOF on December 4, 2006 (71 FR 70339). Final LOFs reflect new information on interactions between commercial fisheries and marine mammals. The LOF places all commercial fisheries into one of three categories based on the level of incidental serious injury and mortality of marine mammals that occur in each fishery.

Bottlenose Dolphin Take Reduction Plan: In April 2006, NMFS finalized a plan (71 FR 24776) to reduce bottlenose dolphin serious injury and mortality incidental to nine commercial fisheries along the U.S. East Coast. The plan includes both regulatory and non-regulatory measures to reduce dolphin bycatch. Regulatory measures include prohibiting fishing at night in certain areas during specific times and requiring that fishermen tend their gear. Non-regulatory measures include increased enforcement and monitoring efforts, outreach to fishermen, and research.

Pelagic Longline Take Reduction Team: In June 2005, NMFS convened a team of stakeholders to address the incidental mortality and serious injury of long-finned pilot whales, short-finned pilot whales, and Risso's dolphins in the mid-Atlantic region of the Atlantic pelagic longline fishery. Under section 118 of the MMPA, the team was charged with developing a take reduction plan to reduce bycatch of pilot whales and Risso's dolphins in the Atlantic pelagic longline fishery to a level approaching a zero mortality and serious injury rate within 5 years of implementation of the plan. The team submitted consensus draft recommendations to NMFS in June 2006. Recommended measures to reduce bycatch include a 20-nautical-mile limit on mainline length in the Mid-Atlantic Bight; designation of a special research area off Cape Hatteras, North Carolina, with observer and other special requirements; development and use of equipment and methods for careful handling and release of entangled or hooked marine mammals; distribution of an updated informational placard on careful handling and release of marine mammals; and development of mandatory certification workshops on marine mammal bycatch for owners and operators of pelagic longline vessels.

Atlantic Trawl Gear Take Reduction Team (ATGTRT): In October 2006, NMFS convened a team of stakeholders to address the incidental mortality and serious injury of long-finned pilot whales, short-finned pilot whales, common dolphins, and white-sided dolphins in the Northeast bottom trawl, Northeast mid-water trawl (including pair trawl), mid-Atlantic mid-water trawl (including pair trawl), and mid-Atlantic bottom trawl fisheries. Under section 118 of the MMPA, the ATGTRT is charged with developing a take reduction plan to reduce bycatch of pilot whales, common dolphins, and white-sided dolphins in Atlantic trawl fisheries to a level approaching a zero mortality and serious injury rate within 5 years of implementation of the plan.

IX. OTHER ACTIVITIES—INTERNATIONAL BYCATCH REDUCTION

Larger Turtle Excluder Device Openings: Public Law 101-162 mandates that shrimp exported to the United States be harvested in a manner that is comparable to the sea turtle regulations of the United States. The law requires foreign governments whose shrimp trawl fleets adversely impact sea turtles to adopt programs requiring the use of turtle excluder devices (TED) if they want to export shrimp to the United States. Beginning in 2003, U.S. shrimp fishermen were required to use larger openings in their TEDs. The larger openings allow leatherback sea turtles, as well as large sexually mature loggerhead and green turtles, to escape the shrimp nets. Due to the changes in U.S. requirements, large TED openings were required by August 31, 2004, for those nations exporting wild-harvested shrimp to the United States. NMFS and the Department of State made 14 visits to these nations to inform them about the new TED opening requirements. During 2006, NMFS and the Department of State inspected 11 countries.

International Bycatch Reduction Task Force: In January 2002, NMFS convened an International Bycatch Reduction Task Force made up of NMFS and Department of State representatives. The Task Force subsequently developed a Plan of Action to: (1) implement the strategy to promote international agreements that reduce sea turtle bycatch in foreign longline fisheries, and (2) promote the implementation of the Food and Agriculture Organization (FAO) International Plan of Action (IPOA) for Reducing Incidental Catch of Seabirds in Longline Fisheries and the FAO IPOA for the Conservation and Management of Sharks.

The Task Force Plan of Action outlines steps to be taken in implementing the U.S. strategy for international bycatch reduction. These tasks are broken up into four categories: (1) international sea turtle workshops, technology transfer, and gear experiments; (2) international seabird workshops, technology transfer, and gear experiments; (3) international communications relating to sea turtles, sharks, and seabirds; and (4) other task force activities. NMFS activities during 2006 relating to these categories include the following:

1) *International Sea Turtle Workshops, Technology Transfer, and Gear Experiments:* Since 1999, NMFS has conducted and supported research to develop measures to reduce the incidental take, mortality, and serious injury of sea turtles in pelagic longline fisheries. Efforts have focused on fishing gear modifications and changes to fishing practices to reduce sea turtle interactions and mortality. Experiments conducted in the eastern and northwestern Atlantic Ocean demonstrated that the use of 18/0 and larger circle hooks in combination with certain bait significantly reduces loggerhead and leatherback interactions with longline gear. In addition, 16/0 and 18/0 circle hooks lessen the severity of associated injuries. Activities relating to sea turtle bycatch reduction in longline fisheries continued to be influenced by these studies in 2006. NMFS remains committed to working cooperatively with other nations (including through establishment of international agreements) to share these results and to advance the adoption of technology and fishing practices that will reduce global sea turtle longline interactions. A selection of 2006 activities relating to workshops, technology transfer, and gear research are included below.

- *International Sea Turtle Workshops and Meetings:* During 2006, NMFS continued to engage in discussions and organized working sessions on sea turtle longline interactions at numerous international fishery and conservation forums and at fisheries bilateral meetings with longlining nations, including the 26th Annual Symposium on Sea Turtle Conservation and Biology (April 2006, Greece); the NAFO Annual Meeting (September 2006, Dartmouth, Nova Scotia); the 3rd Conference of Parties for the Inter-American Convention for the Protection and Conservation of Sea Turtles (September 2006, San Jose, Costa Rica); the Annual Trilateral Committee Meeting (May 2006, San Diego, California); the U.S.–Brazil Common Agenda Meeting (December 2006, Brasilia, Brazil); the U.S.–Canada Fisheries Bilateral (July 2006, Washington, D.C.); other fisheries bilateral meetings; and a November 2006 meeting in Juan Dolio, Dominican Republic, to discuss environmental projects funded under the Central American–Dominican Republic Free Trade Agreement.

- *Technology Transfer and Outreach:* NMFS staff in the Southeast, Pacific Islands, and Southwest Fisheries Science Centers are working with numerous longlining nations to provide information on results of gear experiments that have been conducted with the U.S. fleet; disseminate educational and outreach materials that have been translated into multiple languages; conduct training workshops on safe handling and release practices; provide technical guidance and circle hooks for the development of research programs; and coordinate on longline gear experiments. The Pacific Islands Fisheries Science Center, in cooperation with the Inter-American Tropical Tuna Commission (IATTC), held the First Technical Workshop of the Regional Sea Turtle Program of the Eastern Pacific, June 12–17, 2006 in Puntarenas, Costa Rica. The workshop focused on standardization and improvement in data collection and regional database development with participants from Central and South America, Spain, and Japan.

- During 2006, NMFS partnered with the Department of State's Bureau of Oceans, Environment and Science (OES) to develop and support scientific, technological, and environmental initiatives in member countries of the Central America–Dominican Republic Free Trade Agreement (CAFTA-DR). Specifically, NMFS will use funds to expand the capacity of the CAFTA countries to reduce bycatch of sea turtles in longline and trawl fisheries, improve fisheries management and enforcement, and reduce threats from invasive species. These research and management activities build upon past and ongoing cooperative activities and frameworks in the region, including existing regional programs to promote sustainable fisheries management and reduce marine turtle bycatch, as well as partnerships with the World Wildlife Fund and the IATTC.

- *Gear Experiments:* During 2006, NMFS continued to assist in the planning and/or execution of international and domestic workshops focusing on technology transfer and outreach relating to reduction of sea turtle bycatch in longline fisheries. These workshops focused on transfer of circle hook and bait technology to Latin American, Asian, and other countries that have longline fleets that

interact with sea turtles. In April 2005, NMFS convened the first Technical Assistance Workshop on Sea Turtle Bycatch Reduction Experiments. The purpose of this workshop was to provide technical assistance in the design of research programs for the development and testing of turtle bycatch reducing technology appropriate to the longline fisheries of participating nations. Australia, Indonesia, Malaysia, Mexico, and the Philippine Islands sent national delegations to the meeting, and individuals from Italy, New Caledonia, Papua New Guinea, Spain, the Solomon Islands, and Vietnam participated. In 2006, NMFS provided technical guidance for new research programs that evolved out of the 2005 workshop. In 2006, NMFS continued collaborative circle hook and bait research with a number of additional countries, including Chile, Peru, and Ecuador. In February and March 2006, the Southeast Fisheries Science Center, in cooperation with the IATTC and the Pacific Islands Fisheries Science Center, worked with longline fishermen in Peru and Ecuador to test a new circle hook design modification that effectively increases the width of the hook by using a wire appendage on the back side of the eye. If effective, this would allow smaller circle hooks in the mahi-mahi fishery, which has shown a significant loss of catch with the standard circle hooks tested to date. NMFS is also continuing to engage with Japan on Japanese-style tuna hook experiments. NMFS continues to monitor sea turtle interactions in domestic longline fisheries and to conduct research in this area. In 2006 a cooperative research project investigating bycatch in coastal longline fisheries in the Gulf of Mexico and Atlantic was completed. The project involved using hook timers and time-depth recorders to investigate temporal and spatial relationships between target and bycatch species and further testing of circle hooks and baiting techniques. When analyses are completed, these findings should have application to international longline bycatch issues.

2) *International Seabird Workshops/Technology Transfer/Gear Experiments:* A number of Task Force members also participate as members of an Interagency Seabird Working Group, which works to increase coordination and collaboration between government agencies involved in the implementation of the U.S. National Plan of Action for Seabirds. During 2006, the Working Group provided input and guidance to a number of international workshops, gear experiments, and activities to promote technology transfer relating to reduction of seabird bycatch. These efforts are summarized below.

- International Seabird Workshops and Meetings: During 2006, Task Force members participated in a number of workshops and meetings, including: the 2nd Meeting of the Advisory Committee to the Agreement for the Conservation of Albatrosses and Petrels in Brasilia, Brazil (June 2006); presentation on the FAO's implementation of the IPOA-Seabirds at the North American Ornithological Congress in Veracruz, Mexico (October 2006); Co-convening the ad-hoc Working Group on the Incidental Mortality Associated with Fishing at the meeting of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), Hobart, Australia (Octobert/November 2006); and the 2nd Meeting of the Parties of the Agreement for the Conservation of Albatrosses and Petrels in Christchurch, New Zealand (November 2006)

- Technology Transfer and Outreach: The United States continues to share findings from seabird mitigation research conducted in the United States in international arenas as well as support the development of effective resolutions and mitigation measures, in arenas such as FAO's Committee on Fisheries (COFI), the International Commission for the Conservation of Atlantic Tunas (ICCAT), the Western and Central Pacific Fisheries Commission, International Scientific Committee, CCAMLR, and IATTC. Integrated weight groundlines and paired streamer lines (used and tested with demersal longline gear in Alaska to avoid seabirds) continue to be tested and used in Russian longline fisheries and elsewhere. A technical assistance program in the Hawaii pelagic longline fleet continues for vessel conversions to side-setting (used with pelagic longline gear to minimize seabird interactions).

- Research and Gear Experiments: NMFS and the U.S. Fish and Wildlife Service continue to collaborate with university Sea Grant programs, the longline industry, and non-governmental organizations to develop and evaluate the effectiveness of seabird mitigation devices. Continued efforts have included gear studies and sea trials on streamer lines, side-setting, integrated weight groundlines, and trawl mitigation devices. Research results have been presented at domestic and international scientific meetings and integrated into U.S. efforts to seek international bycatch reduction agreements. Through the Commission for Environmental Cooperation, the United States collaborates with Canada and Mexico on numerous projects involving marine species of conservation concern. A North American Conservation Action Plan for the Pink-footed Shearwater was developed and research projects implementing this plan continued in 2006.

3) *International Communications Relating to Sea Turtles, Sharks, and Seabirds:* Task Force members participated in a number of activities designed to communicate U.S. concern regarding bycatch of sea turtles, sharks, and seabirds. As noted above, many of these international communications and other activities focused on further dissemination of information relating to gear/bait modifications to reduce sea turtle bycatch in longline fisheries and measures to reduce the bycatch of seabirds in longline fisheries. Recent activities included the following:

- Over the past year, the United States has continued to use international organizations, regional and subregional fishery management organizations and arrangements, and bilateral relationships to highlight international problems of sea turtle bycatch and incidental catch of seabirds and sharks in longline fisheries. We have continued to impress upon foreign governments the importance of this issue to the United States and have stressed the need for their active engagement and concrete action (including bilateral and international agreements) as part of an effective strategy for the conservation and management of these species. In this regard, the Administration's efforts to address this pressing problem continue to focus on the following key areas:

    a) Obtaining additional data on the level of sea turtle interaction with longline fisheries, including distribution by time, depth and area.
    b) Continuing research into new fishing gear and techniques to reduce sea turtle bycatch, including gear modifications, alternative baits, and alternative fishing strategies.
    c) Identifying interim measures at the international level to reduce sea turtle bycatch, while efforts continue to further identify, refine, and implement possible solutions through numbers 1 and 2, above.
    d) Providing technical assistance and outreach to foreign nations to document sea turtle interactions in longline fisheries, conduct gear modification experiments and implement measures to reduce sea turtle bycatch, and implement safe-handling practices to reduce sea turtle injury and mortality.
    e) Promoting full international implementation of the Guidelines adopted by the 2004 FAO Technical Consultation on Sea Turtle Conservation and Fisheries and supported by COFI.

4) *Other Task Force Activities*: In addition to tasks specifically associated with the Task Force Action Plan, members of the Task Force participated in the following activities:

- *Inter-American Sea Turtle Convention:* The United States was a driving force behind negotiation of the Inter-American Convention for the Protection and Conservation of Sea Turtles in the Western Hemisphere. The Convention, which entered into force in May 2001, establishes a comprehensive framework for international protection of sea turtles and their habitats, including specific provisions relating to the interaction of sea turtles in commercial fisheries. Before 2006, there were two Conferences of the Parties (COP1—August 2002/August

2003, and COP2—November 2004). During these meetings, Parties to the Convention agreed to procedural rules and bylaws; developed guidelines for international cooperation and an ongoing work program for the Secretariat pro tempore; constituted the Consultative Committee; finalized the format for the annual report form; continued discussions on the structure of the Scientific Committee; passed the Convention's first resolution (a largely advisory resolution on conservation of the leatherback sea turtle); and concluded its first Memorandum of Understanding between the Convention and the regional South American fisheries development organization OLDEPESCA.

All 11 Parties to the Convention sent delegates to COP3, which was held September 2006 in Mazatlan, Mexico. The major issues discussed at COP3 included the rules of procedure for the Scientific Committee, establishing and funding a permanent Secretariat, revising the annual report format, and convening a meeting in 2007 to resolve important issues (e.g., establishing and funding a permanent Secretariat). Two resolutions passed at COP3—convening a regional meeting to discuss declines in hawksbill nesting at Yucatan, Mexico, and encouraging Parties to implement bycatch mitigation techniques outlined in the FAO guidelines to reduce sea turtle fisheries bycatch. The United States is continuing to take a lead role, and is working with the other Parties to establish the framework, including a permanent Secretariat, for the Parties to carry out their Convention obligations.

- *Indian Ocean Sea Turtle Memorandum of Understanding:* The Memorandum of Understanding (MOU) on the Conservation and Management of Marine Turtles of the Indian Ocean and Southeast Asia, and its associated Conservation and Management Plan (CMP), provide a comprehensive framework for the conservation and protection of sea turtles and their habitats in the Indo-Pacific region. Though non-binding, the MOU and CMP contain strong, forward-looking provisions that, if effectively implemented, will advance conservation of endangered sea turtle populations and promote their recovery. To date, 24 countries have signed the MOU. The 3rd meeting of the Signatory States was held in March 2005 in Bangkok. Member States requested the Indian Ocean–South-East Asia (IOSEA) Advisory Committee to assess the impacts of the December 2004 tsunami on sea turtles and their habitats, with a special emphasis on leatherbacks. The IOSEA also decided to launch a regionwide Year of the Turtle initiative in 2006 to draw attention to the dramatic declines in turtle populations. The 4th meeting of the Signatories was held in March 2006 in Oman, the first Middle Eastern country to host a meeting. This meeting focused largely on outreach, specifically launching the 2006 Year of the Turtle initiative. The advisory committee presented a draft report on the 2004 tsunami impacts on leatherback turtles, and the United States agreed to provide additional information on threats to leatherbacks as they migrate through the high seas before the report is finalized. Here again, the United States continues to work to establish through the MOU and CMP a strong and effective sea turtle conservation regime.

- *IATTC Consolidated Resolution on Bycatch:* At its 74th annual meeting, June 26–30, 2006, in Busan, Korea, the IATTC extended the Consolidated Resolution on Bycatch
(C-04-05) through January 1, 2008. This resolution requires full retention of juvenile tunas and non-target species of fish, and provides for a review of compliance on the full retention measure (by flag state or entity) to take place in the Permanent Working Group on Compliance in 2007. The U.S. proposal to strengthen sea turtle mitigation measures was deferred until next year. A standalone resolution or amendments to the Consolidated Resolution on Bycatch to further elaborate sea turtle interaction requirements was discussed but not adopted due to resistance from the European Union and Korea. The European Union called for the Bycatch Working Group to meet in early 2007 and for the issue of sea turtles to be on the agenda.

- *2006 ICCAT Annual Meeting:* During the 2006 ICCAT annual meeting, no additional measures were taken regarding species taken as bycatch. However, the Commission decided to conduct its first-ever assessment on the impact of ICCAT fisheries on seabird populations in the Convention area, an important step to improving fisheries management to protect these species. In addition, the Standing Committee for Research and Statistics formed a new working group whose focus will be ecosystem effects of fishing, mainly looking at impacts on sea turtles, sea birds, and sharks. Scheduled assessments for shortfin mako and blue sharks were delayed until 2008 with a Standing Committee data preparatory meeting scheduled for 2007. These assessments will be critical as ICCAT moves forward in its management of sharks.

- *2006 NAFO Annual Meeting:* During the 2006 NAFO Annual Meeting, the Organization adopted a U.S.-proposed resolution calling for implementation of the *Guidelines to Reduce Sea Turtle Mortality in Fishing Operations* adopted by the 2004 FAO Technical Consultation on Sea Turtle Conservation and Fisheries and supported by COFI. In addition, the resolution calls on NAFO Contracting Parties to enhance implementation of existing sea turtle mitigation measures; collect and provide to the NAFO Secretariat information on sea turtle interactions in the NAFO Convention Area; and collaborate with each other and with subregional, regional, and global organizations to share data on sea turtle interactions and develop and apply compatible bycatch reduction measures. Beginning in 2007, all NAFO Contracting Parties should provide to the NAFO Secretariat detailed sea turtle–fishery interaction data (including observer data) in NAFO fisheries. The NAFO Secretariat will compile the data resulting from implementation of this resolution and NAFO will develop further strategies for consideration at the 2008 Annual Meeting. Resulting data will also be shared with the FAO.

CONCLUSION

During 2006, the United States continued its efforts to secure international measures to reduce bycatch that are comparable to the standards and measures applicable to United States fishermen. Given the ongoing negative impacts of bycatch internationally, the United States will continue these efforts seeking to secure international measures designed both to minimize bycatch and minimize the mortality resulting from unavoidable bycatch.

Section 610 of the newly reauthorized Magnuson-Stevens Act contains substantial new obligations to address international issues in living marine resource stewardship, including actions to address bycatch of protected species. The implementation of these measures is an extremely high priority for NMFS, NOAA, and the Department of Commerce. This implementation, as well as the relationship between the new Magnuson-Stevens Act requirements and those contained in the MMPA and ESA, are currently under consideration.

APPENDIX D

EXAMPLES OF APPLICATION OF U.S. LAW

TO IUU FISHING AND BYCATCH

Examples of Application of U.S. Law to IUU Fishing and Bycatch

Related materials are provided in additional Appendices: complete listings of U.S. law related to IUU fishing (Appendix A), U.S. actions to reduce bycatch (Appendix C), and tools to reduce global bycatch of cetaceans (Appendix E).

The amendments to the Magnuson-Stevens Act and the Enforcement Act in 2006 are not the first attempt by the U.S. Congress to enact laws aimed at stopping fishing activity that compromised the effectiveness of domestic and international conservation regimes, though they differ from prior efforts in their emphasis on using multilateral approaches to address IUU fishing and bycatch. The existing statutory framework was employed in these earlier actions under the Lacey Act, the Pelly Amendment to the Fisherman's Protective Act of 1967, the Packwood Amendment to the Fishery Conservation and Management Act of 1982, and the Driftnet Impact, Monitoring, Assessment and Control Act of 1987. In contrast, in the 1970s and 1980s the United States sought to use unilateral trade sanctions to push compliance with provisions of the International Convention for the Regulation of Whaling. Also in the 1980s, the approach was tried to require shrimp trawlers in other nations to apply measures comparable to those required of U.S. shrimpers who used turtle excluder devices (TEDs) as a means to release endangered marine turtles from their trawl nets. By the 1990s, the unilateral trade sanction approach was used to exclude import of products caught in driftnets or in purse seine nets set on dolphins in order to catch tuna swimming beneath.

The earliest example of domestic law aimed at excluding imports of fishery products taken illegally is the Lacey Act of 1900. While not aimed specifically at fishery products, the purpose of the original Lacey Act was to strengthen state fish and wildlife laws by restricting commerce of illegal fish and wildlife. It was bolstered in 1926 by the Black Bass Act, which prohibited interstate shipment of species of bass when the fish were taken contrary to state law. The modern Lacey Act results from amendments in 1981 that repealed the earlier law and the Black Bass Act, and substituted new provisions that strengthen and expand the provisions against importation of illegally taken fish and wildlife.[1] The Lacey Act Amendments of 1981 are considered "one of the United States' primary laws directly targeting illicit interstate or foreign trade in illegally taken species."[2] The act prohibits import, export, transport, sale, possession or transactions in interstate or foreign commerce of any fish or wildlife "taken, possessed, transported, or sold in violation of any law, treaty, or regulation of the United States or in violation of any Indian tribal law."[3] It includes specifications on package marking and record keeping,[4] and provides for penalties including forfeiture of product and equipment in felony cases.[5] The two-part prohibition requires evidence of a violation of domestic or

[1] Pub. L. 97-79, 95 Stat 1073, 18 U.S.C. 3371 et seq. *See*, M. Bean. 1983. The Evolution of National Wildlife Law, rev'd edition, at 111.
[2] P. Ortiz. An overview of the U.S. Lacey Act Amendments of 1981 and a Proposal for a Model Port State Fisheries Enforcement Act. Prepared for Ministerially Led Task Force on IUU Fishing on the High Seas. November 2005, at 3.
[3] 18 U.S.C. 3372.
[4] 18 U.S.C. 3372 (b), (d).
[5] 18 U.S.C. 3374.

foreign law and of trafficking: import, export, sale and so forth.[6] The law has been used extensively in a variety of wildlife resource cases, and NOAA has used it to prosecute foreign fishing vessels that import catch such as tuna that was caught without authorization in another country's EEZ.[7]

In 1971, Congress passed the Pelly Amendment to the Fisherman's Protective Act of 1967. The amendment was in response to concerns regarding the inability of the International Whaling Commission to enforce its quotas. The Amendment directs the Secretary of Commerce to certify to the President if "nationals of a foreign country, directly or indirectly, are conducting fishing operations in a manner or under circumstances which diminish the effectiveness of an international fishery conservation program."[8] Although the President always retains the discretion to direct the Secretary of Treasury to impose trade sanctions, the Fisherman's Protective Act specifies a prohibition on the importation of fish products from the certified country.[9] The Secretary of Commerce made five certifications under Pelly in the ensuing 10 years, but no sanctions or import bans were ever imposed.[10]

The Packwood Amendment to the Fishery Conservation and Management Act was passed in 1982, and added the additional sanction on certified nations of a 50 percent reduction in their allocation of fish from the U.S. EEZ.[11] The amendment made the imposition of sanctions mandatory once a certification of "diminishing effectiveness" of the IWC was made.[12] It did not, however, change the standard for certification set out earlier in Pelly.[13]

The Marine Mammal Protection Act of 1972[14] provides another example of how Congress has asserted itself in international wildlife conservation policy. From the inception of the MMPA, the Congress placed a strong injunction on the Department of State to develop "new arrangements for protection of these animals [marine mammals] and of ocean ecosystems that are significant to their welfare."[15] Congress also acknowledged that "unilateral action by the U.S." affecting any species or subspecies of

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[6] Ortiz at 4.

[7] Ortiz provides a detailed description of the investigation, charge and trial aspects of the Lacey Act and uses the U.S. experience to develop a model enforcement law for port states.

[8] 22 U.S.C. 1978(a)(1).

[9] 22 U.S.C. 1978(a)(4).

[10] H. R. Rep. No. 95-1029, p. 9 (1978); 125 Cong. Rec. 22084 (1979) (remarks of Rep. Oberstar).

[11] 16 U.S.C. 1821(e)(2). At the time, foreign nations could receive an allocation in U.S. waters for fish not being harvested by U.S. fishermen. New language was added to in Section 201(d) in MSRA regarding the Total Allowable Level of Foreign Fishing (TALFF) as follows: "Allocations of the total allowable level of foreign fishing are discretionary, except that the total allowable level shall be zero for fisheries determined by the Secretary to have adequate or excess domestic harvest capacity."

[12] 16 U.S.C. 1821 (e)(2)(B)(ii)

[13] Japan Whaling Assn v American Cetacean Society. 478 US 221 (1986) at 227. Court held that even though sanctions were mandatory once a certification was made, the Secretary had a range of discretion in making the finding whether a nation's fishing activity was sufficient to diminish the effectiveness of the IWC, citing "no reason to impose a mandatory obligation upon the Secretary to certify that every quota violation necessarily fails the standard." At 228.

[14] 16 U.S.C. 1371-1407

[15] Report 92-707 House of Representatives, 92d Congress, 1st Session page 18

marine mammals could be fruitless unless other nations involved in the taking of marine mammals work with the U.S. to preserve and protect these creatures."[16]

The MMPA prohibits "taking" (harassment, hunting, capture, killing or attempt thereof) and importation into the U.S. of marine mammals, except where an exception is explicitly authorized. The act's stated goal is that the incidental kill or serious injury of marine mammals in the course of commercial fishing be reduced to insignificant levels approaching zero.[17] The U.S. Customs Service within the Department of Homeland Security enforces the provisions regarding importation.

Section 101(a)(2) of the MMPA authorizes limited incidental taking of marine mammals by U.S. fishermen in the course of commercial fishing pursuant to a permit issued by NMFS, in conformity with and governed by certain statutory criteria in sections 103, 104, and 118 and implementing regulations. Section 101(a)(2) of the MMPA states: "The Secretary of Treasury shall ban the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of U.S. standards." This prohibition is mandatory. Subparagraph (A) requires the Secretary to "insist on reasonable proof from the government of any nation from which fish or fish products will be exported to the U.S. of the effects on ocean mammals of the commercial fishing technology in use for such fish or fish products exported from such nation to the U.S."[18]

The importation ban provisions have been used only used once outside the context of the "tuna-dolphin issue."[19] The history of U.S. action to reduce the number of dolphins killed in the course of tuna fishing operations in the Eastern Pacific Ocean is one of the most prominent examples of unilateral enforcement of conservation standards. The story is a lengthy one and will not be repeated here although the issue was one of the driving forces behind the enactment of MMPA.[20]

The MMPA creates a ban on "the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of U.S. standards."[21] In 1984 and 1988, Congress amended section 101(a)(2) of MMPA to require governments of nations that export yellowfin tuna harvested in the purse-seine fishery in the Eastern Tropical Pacific Ocean (ETP) to provide documentary evidence that the government has adopted a regulatory program governing the taking of marine mammals that is comparable to that of the U.S. and that the average rate of incidental taking of the harvesting nations is comparable to that of the U.S.

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[16] Report 92-863 Senate 92d Congress 2d Session page 10.
[17] 16 U.S.C 1372 (a)(2)
[18] 16 U.S.C 1372 (a)(2)(A)
[19] Protecting marine mammals from direct takes for crab bait was the primary focus of discussions during the initiation of a bilateral agreement between the U.S. and Chile in the 1990s.
[20] See, e.g. Michael J. Bean and Melanie J. Rowland, The Evolution of National Wildlife Law (3d ed. 1997) at 116-136; C.J. Carr and H.N. Scheiber, Dealing with a Resource Crisis: regulatory regimes for managing the world's marine fisheries, in How Globalization affects national regulatory policies. 2002. Available online at http://repositories.cdlib.org/uciaspubs/editedvolumes/1/3.
[21] 16 U.S.C.A. § 1371(a)(2)

Subsequently, Mexico, an embargoed nation, and the EU, an embargoed intermediary nation, requested that a dispute-settlement panel be established pursuant to the General Agreement on Tariffs and Trade (GATT). The GATT panels issued decisions in favor of Mexico and the EU, but the GATT Council did not adopt either decision. This result precipitated, in 1992, enactment of the International Dolphin Conservation Act of 1992 (IDCA).[22] The IDCA amended the MMPA to (1) impose a five-year moratorium on the harvesting of tuna with purse seine nets deployed on or to encircle dolphins; and (2) lift the tuna embargo for those nations that made a declared commitment to implement the moratorium and take other steps to reduce dolphin mortality. No nation issued intent to honor the provisions of the IDCA.[23]

In October of 1995, the U.S. and eleven other nations signed the Panama Declaration. In this declaration these nations made commitments to strengthen the protection of dolphins and negotiate a new binding agreement to establish the IDCP, but only if the U.S. amended its laws to (1) lift the embargoes imposed under the MMPA; (2) permit the sale of both dolphin-safe and non-dolphin safe tuna in the U.S. market; and (3) change the definition of "dolphin safe tuna" to mean "tuna harvested without dolphin mortality." In 1997, Congress enacted the IDCPA,[24] which revised the criteria for banning imports by amending the MMPA. Pursuant to this amendment, nations are permitted to export tuna to the U.S. if a nation provides documentary evidence that it (1) participates in the IDCP and is a member (or applicant member) of the Inter-American Tropical Tuna Commission; (2) is meeting its obligations under the IDCP and the Inter-American Tropical Tuna Commission; and (3) does not exceed certain dolphin mortality limits.[25]

As a result of amendments to the MMPA made by the IDCPA, the trade restrictions for intermediary countries were eliminated, and provisions were put in place to lift the embargoes on yellowfin tuna harvested by setting purse-seine nets on dolphins in the eastern Pacific Ocean. Since then, the embargoes were lifted for Ecuador, Mexico, and El Salvador. Spain also has been issued an affirmative finding and can export to the U.S. yellowfin tuna caught in the ETP using purse seines. To date the following nations remain embargoed: Belize, Bolivia, Colombia, Guatemala, Honduras, Nicaragua, Panama, Vanuatu, Venezuela, and Peru. Currently, there are no intermediary nations identified by NMFS subject to import prohibitions.[26]

A detailed discussion of the most recent progress in dolphin conservation, research, tuna tracking, labeling standards, and litigation can be found in the August 2007 NOAA Report to Congress.

The Driftnet Impact Monitoring, Assessment and Control Act attempts to reduce the mortality of non-target marine animals in driftnets used by foreign fisheries operating in the North Pacific Ocean and Bering Sea.[27] It was passed in response to congressional

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[22] Pub. L. No. 102–523, 106 Stat.3425 (1992).
[23] H.R. Rep. No. 105-74(I), at 14, 1997 U.S.C.C.A.N. at 1632.
[24] Pub. L. No. 105-42, 111 Stat. 1122 (1997).
[25] Id. at § 4, 111 Stat. at 1123-1124 (codified at 16 U.S.C.A. 1371(a)(2)(B)).
[26] Available online at http://swr.nmfs.noaa.gov/psd/embargo2.htm.
[27] Driftnet Act §4002, 16 U.S.C. 1822. On February 6, 1990, the House of Representatives passed H.R. 2061 amending the Magnuson Fishery Conservation and Management Act to prohibit "large-scale driftnet

findings that driftnets are "a fishing technique that may result in the entanglement and death of enormous numbers of target and non target marine resources in the waters of the North Pacific Ocean."[28] The Driftnet Act was intended to increase efforts "to monitor, assess, and reduce the adverse impacts of driftnets."[29]

The President signed Public Law 101-627, the Fishery Conservation Amendments of 1990, on 28 November 1990. Title I, Section 107, of the law amended Section 206 of the Magnuson-Stevens Fishery Conservation and Management Act (hereafter referred to as the Magnuson-Stevens Act) (16 USC 1826) to incorporate and expand upon provisions of the Driftnet Impact Monitoring, Assessment, and Control Act of 1987.

On 2 November 1992, the President signed Public Law 102-582, the High Seas Driftnet Fisheries Enforcement Act. Among other things, this Act is intended to enforce implementation of United Nations General Assembly Resolution 46/215, which called for a worldwide driftnet moratorium beginning in December 1992.

Public Law 104-43, the Fisheries Act of 1995, was enacted on 3 November 1995. Title VI of this law, the High Seas Driftnet Fishing Moratorium Protection Act, prohibits the United States, or any agency or official acting on behalf of the United States, from entering into any international agreement with respect to the conservation and management of living marine resources or the use of the high seas by fishing vessels that would prevent full implementation of UNGA Resolution 46/215.

A description of efforts the U.S. has made to carry out the policy expressed in these provisions is available in the annual report to Congress.[30] The most recent report made to Congress describes efforts the United States has made to implement its own driftnet ban as well as the United Nations General Assembly driftnet ban and the Wellington Convention in the North Pacific, Mediterranean, Antarctic and globally. Activities have included coordination with other fishing nations, U.S. Coast Guard enforcement actions, negotiation of bilateral agreements, coordination with other nations to track vessels with the potential for high seas drift net fishing and research on the impacts of driftnet fishing on marine resources.

Sea turtle conservation, particularly through reduction of bycatch in shrimp trawls, was set forth in a 1989 amendment to the Endangered Species Act,[31] requiring the United States to embargo shrimp harvested with commercial fishing technology that may adversely affect sea turtles. Currently, 16 nations have received positive certification under the law, 24 nations fish for shrimp in environmental conditions where sea turtles are unlikely to occur, so do not pose a threat, and 8 additional nations use small-scale technology that is determined not to pose a threat. [32] Any other nations catching shrimp are prohibited from importing it into the United States. The import ban has been applied

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fishing" in U.S. waters. 136 Cong. Rec. H231 (daily ed. Feb. 6, 1990). The bill also instructed the Secretary of State to seek an international ban on large-scale driftnet fishing. *Id.* at 230.

[28] *Id*. at §4002(1).

[29] *Id*. at § 4002(3).

[30] Available online at http://www.nmfs.noaa.gov/ia/intlbycatch/docs/CONGO07RPT.pdf.

[31] Sea Turtle Conservation Amendments to the Endangered Species Act, Pub. L. 101-162, sec. 609, 103 Stat. 988, 1037 (Nov. 21, 1989) (amending 16 U.S.C. § 1537 (1994)).

[32] Federal Register notice available online at http://www.thefederalregister.com/d.p/2007-05-22-E7-9884.

to countries that failed to meet the requirements for positive certification, with mixed results.

In 1991, the United States issued guidelines for assessing the comparability of foreign sea turtle conservation programs with the U.S. program. The 1991 Guidelines also determined that the scope of Section 609 was limited to the wider Caribbean/western Atlantic region. In 1993, the United States issued revised guidelines providing that, to receive a certification in 1993, affected nations (those determined in 1991 Guidelines) had to maintain their commitment to require TEDs on all commercial shrimp trawl vessels.

The Earth Island Institute, a San Francisco-based environmental organization, filed suit in the U.S. Court of International Trade to force the Departments of State and Commerce to comply with certification procedures under federal law[33] for countries exporting to the United States shrimp caught in a manner that harmed endangered sea turtles.[34] In December of 1995, the U.S. CIT found that the 1991 and 1993 Guidelines were contrary to law by limiting the geographic scope of the application of Section 609 to shrimp harvested in the wider Caribbean/western Atlantic region. In April 1996, the U.S. Department of State published revised guidelines to comply with the CIT order of December 1995. The new guidelines extended Section 609 to shrimp harvested in all foreign nations, but confined positive certification to nations whose vessels used TEDs. In October 1996, the CIT ruled that the 1996 Guidelines were contrary to Section 609 because they allowed imports of shrimp from non-certified countries, if the shrimp was harvested with commercial fishing technology that did not adversely affect sea turtles. The CIT later clarified that shrimp harvested by manual methods, which did not harm sea turtles, could continue to be imported even from countries which had not been certified under Section 609, and refused to postpone the worldwide enforcement of Section 609.

Once application of the requirements expanded, several Asian nations were not able to obtain positive certification and import bans ensued. In accordance with World Trade Organization (WTO) rules, the governments of Pakistan, Malaysia, India, and Thailand expressed their concerns to the WTO regarding the U.S. imposed embargo of shrimp imports. In 1996, they filed a complaint against the United States under WTO dispute settlement procedures, claiming that the U.S. law violated international trade law by barring the importation of their shrimp and shrimp products.[35] After pursuing informal consultations unsuccessfully, the complaining parties requested that a WTO Dispute Panel be convened and for the Panel to find that Section 609 of Public Law 101-162 and its implementing measures were contrary to the Governing Agreement on Tariffs and Trade (GATT). The dispute panel found the measure was inconsistent with the GATT, and the U.S. appealed. The WTO Appellate Body ruled in 1998 against the United States, finding that it had discriminated by giving Asian countries only four months to comply with the law, but giving Caribbean Basin nations three years. Even though the United

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[33] *See*, discussion of sea turtle conservation amendments to the ESA, supra n. 23.

[34] Earth Island Institute vs. Christopher, 20 Ct. Int'l Trade 1221 (1996) vacated sub nom EII v Albright, 147 F2d 1352 (Fed Cir 1998).

[35] United States— Import Prohibition of Certain Shrimp and Shrimp Products. WTO case Nos. 58 and 61. Ruling adopted on 6 November 1998. Available online at http://www.wto.org/english/tratop_e/envir_e/edis08_e.htm.

States lost the case, the Appellate Body ruling recognized the validity of the U.S. Endangered Species Act and the rights of the United States to adopt environmental conservation measures as long as they are administered fairly.[36]

In response to the original Panel and Appellate Body decisions, the United States revised its guidelines on the importation of shrimp, changing both the method and the schedule by which it evaluated turtle protection measures. Under the original guidelines, countries were certified if they implemented regulation to require shrimps to use TEDs. Under the Revised Guidelines, other regulatory approaches to the protection of sea turtles may substitute for TEDs, or a state may show that its shrimp fishing does not threaten sea turtles and on that basis obtain certification. Malaysia took the action back to the WTO in 2001, but the WTO Appellate Body held that the implementation steps had remedied any unfair discrimination and provided due process to exporting nations.[37]

[36] Report of the Appellate Body on U.S. Import Prohibitions of Certain Shrimp and Shrimp Products, Oct. 12, 1998, 38 I.L.M. 118 (1999)

[37] USTR. U.S. Wins WTO Case on Sea Turtle Conservation. Available online at http://www.ustr.gov/Document_Library/Press_Releases/2001/October.

APPENDIX E

AN EVALUATION OF THE MOST SIGNIFICANT THREATS TO CETACEANS, THE AFFECTED SPECIES AND THE GEOGRAPHIC AREAS OF HIGH RISK, AND THE RECOMMENDED ACTIONS FROM VARIOUS INDEPENDENT INSTITUTIONS

NOAA TECHNICAL MEMORANDUM NMFS-OPR-36

WORLDWIDE BYCATCH OF CETACEANS

An evaluation of the most significant threats to cetaceans, the affected species and the geographic areas of high risk, and the recommended actions from various independent institutions.

N.M. Young and S. Iudicello

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A Report to the NOAA Fisheries Office of International Affairs

NOAA Technical Memorandum NMFS-OPR-36
July 2007

U.S. Department of Commerce
Carlos M. Gutiérrez, Secretary

National Oceanic and Atmospheric Administration
Vice Admiral Conrad C. Lautenbacher, Jr., USN (Ret.), Under Secretary for Oceans and Atmosphere

National Marine Fisheries Service
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Worldwide Bycatch of Cetaceans

ANALYSIS AND ACTION PLAN

Order No.
DG133F06SE4641

A Report to the NOAA Fisheries Office of International Affairs

Nina Young, Principal Investigator.
With S. Iudicello and MRAG Americas

30 June 2007

Photo Credits : Dall’s porpoise—National Oceanic and Atmospheric Administration
Harbor Porpoise—Duke University, Andy Read
Harbor Porpoise-- National Oceanic and Atmospheric Administration
Hector's dolphin (*Cephalorhynchus hectori*) calf killed in gillnet, New Zealand.© WWF / Stephen Dawson

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EXECUTIVE SUMMARY

Humans have exploited cetaceans (whales, dolphins, and porpoises) since primitive whaling activities began in Japan and Scandinavia many centuries ago. The U.S. Ocean Commission in 2005 judged incidental catch in fisheries the "biggest threat to marine mammals worldwide . . .[killing] hundreds of thousands of them each year." Fishing gear, especially gillnets, indiscriminately catches an undetermined number of marine species, including dolphins and porpoises. Still, progress on quantifying the scale of this mortality, identifying the magnitude of this threat, and mitigating or reducing the mortality has been slow, sporadic, and limited to a few specific fisheries or circumstances.

Cetaceans are "migratory." They spend several months each year traveling from one area to another, often covering vast distances in search of food, a particular climate, or a safe breeding ground. From a conservation and management perspective migratory species are exposed to an array of threats because they do not confine themselves to one location. Moreover, because they periodically cross through a number of jurisdictions, the level of protection afforded to cetaceans fluctuates according to their geographical location. Inevitably, migrating animals will pass through jurisdictions where cetacean conservation is less of a priority than in other areas. The protection of small cetaceans has largely been left to the domestic regimes of coastal states, and a number of nations have enacted legislation to protect dolphins and porpoises—particularly Australia, New Zealand, the United Kingdom, and the U.S.

With bycatch a serious and widespread threat to cetaceans, there is an urgent need to better document the extent of this threat, assess cetacean populations, develop alternative fishing gear and practices and, at the same time, institute effective regional agreements that call for mitigation measures ranging from temporal and spatial closures to deterrents. There is also the need to foster greater engagement by inter-governmental bodies (e.g. Food and Agriculture Organization of the United Nations (FAO), the United Nations, and the International Union for the Conservation of Nature (IUCN)) as well as international regional fishery management bodies. Because it requires a country to outline specific measures to address bycatch, the FAO's International Plan of Action model and resolutions adopted through regional fishery management organizations may provide useful mechanisms to address interactions between cetaceans and fisheries. Finally technology transfer is necessary to develop the scientific infrastructure necessary to monitor cetacean populations, fisheries, and any accompanying bycatch.

There are other recognized threats to cetaceans including toxic pollution, acoustic pollution, ship strikes, environmental change, global warming, and habitat degradation. The occurrence and effects of these threats are even more poorly documented than bycatch. With provisions in U.S. law and international attention turning toward cetacean bycatch, it is appropriate that the focus of this report is the assessment and mitigation of global cetacean bycatch. Any efforts to better document and mitigate bycatch will have collateral benefit to address other threats to cetaceans. Therefore, this report will evaluate the magnitude of the bycatch problem, the affected species and the geographic areas of high risk, and the recommended actions from various independent institutions. The report will describe the tools afforded through the MMPA and international agreements relevant to marine mammal conservation and bycatch; identify gaps in conservation and management efforts related to cetacean bycatch and identify opportunities for international action, cooperative research, and information exchange. The final element will prioritize and recommend strategic actions that NMFS' Office of International Affairs can undertake to address the international cetacean bycatch threat.

Methodology

The report was completed under contract with the Office of International Affairs of the National Marine Fisheries Service (NMFS) of NOAA for a study that details steps it could take to engage foreign nations and multilateral organizations in reducing marine mammal bycatch. The project scope of work called for an evaluation of the most significant threats to cetaceans, the affected species and the geographic areas of high risk, and the recommended actions from various independent institutions. The report identifies gaps in conservation and management efforts related to threats to cetacean populations and opportunities for international action, cooperative research, and information exchange.

As a structure for examining bycatch of cetacean species, the report is organized geographically, using area designations similar to the Statistical Areas of the FAO. This alignment enables the analysis to overlay the activity of the principal fisheries of the world and the existence of multi- or bi-lateral agreements on areas of occurrence or migration of cetaceans. Following the first general geographic cut, the next level of focus is on populations that are affected by bycatch that represents more than 2 percent of the population. The next screen is for high-risk populations in areas where bycatch occurs in the absence of conservation measures, lack of enforcement of authorized measures, or lack of a policy framework for taking action. Where a policy framework is available, the analysis examines feasibility of implementing conservation measures and the likelihood of their success.

The investigation was undertaken primarily by a review of the scientific literature, but also included some follow-up personal contacts with key authors, managers and policy experts. The summary of legal instruments was conducted through examination of U.S. law and relevant international materials, particularly treaties summarized in 1997 by the U.S. Marine Mammal Commission in a *Compendium of Selected Treaties, International Agreements and Other Relevant Documents*. The analysis of potential tools examines the domestic and international framework available to the U.S., either unilaterally or multilaterally, to implement protection measures, initiate discussions or foster programs in high-risk areas. Exemplary agreements are discussed and similar regional schemes are listed in text boxes.

A comparison of the highest risk populations to agreements in place, parties to those agreements, and whether actions are being taken to reduce bycatch produced a gap analysis that highlights both gaps in information and mitigation measures. Recommendations were drawn from the literature, in response to the gap analysis, and from discussion with key authors, managers and policy experts. A ranking of the recommendations was completed by sorting possible actions according to the level of risk and potential benefit to cetacean species and examining the feasibility and likelihood of success of possible actions. This template for priority setting based on considerations of risk and feasibility results in recommendations for high, second-tier and low priority action options.

The Magnitude of Cetacean Bycatch

Through a review of the literature, several overarching themes or issues emerged. The first is the consistent need that permeates all species in all regions for cetacean abundance and bycatch estimates. Even though most species of cetaceans have been recorded at some time caught in some type of fishing gear, very few studies, with the exception of a few in the U.S., have successfully assessed and quantified the actual impact of a fishery or fisheries bycatch on cetacean populations. Part of the problem is that only a very small proportion of cetacean catches are ever actually recorded using some type of quantifiable process or an independent observer program. Consequently, the evidence for or estimates of bycatch tends to be anecdotal or non-quantitative, consisting of stranding reports, interviews, port monitoring, self-reporting by countries, and opportunistic observations by scientists and fishery observers. Such information can result in underestimates of bycatch. Also, estimates of total bycatch or bycatch rate are difficult to obtain, especially in developing countries where extensive coastal or artisanal fisheries account for most of the bycatch. Further compounding the problem is that in many regions of the world data generally are lacking statistics on fisheries catch, fishing capacity and fishing effort. Additionally, for most cetacean species, it is very difficult and costly to assess population size and trends or to assess the consequences of an uncertain and unpredictable bycatch rate. Adding to the intractability of this problem is the fact that where fisheries are coastal, local, or artisanal, international or even bi- or multi-lateral agreements do not provide mechanisms for action because these activities are solely within the purview of the coastal states. This problem is exacerbated in developing coastal states where fisheries management does not rank high as a national priority, and thus funds are frequently unavailable to undertake such assessments. Furthermore, reporting significant cetacean bycatch may be a low priority, or politically unacceptable, in countries where fishery development is considered vital for food security or maintaining the balance of trade.

There are large areas of the world where it seems likely there may well be interactions between cetaceans and fisheries, but for which there are, as yet, no data, and no idea of any impact that such fisheries may cause. This lack of information on the impacts of a fishery does not imply, however, that there is no problem, especially since reporting of just a few individuals in a specific fishery may be indicative of a larger interaction. Only when scientists can accomplish a detailed study of the cetacean stock abundance, the fishing effort, and the bycatch rate in each fishery can a thorough and accurate assessment be made.

Such assessments are integral to the development of long-term solutions to mitigate bycatch. Solutions to the problem of cetacean entanglement have been sought in several parts of the world with a variety of techniques. No universal solution to the problem has been found, but in one or two cases some reduction in the numbers of cetaceans caught in gillnets has been accomplished through gear modifications (e.g., rigging driftnets to fish a few meters below the surface or increasing twine size) or technological aids (e.g., pingers). Because banning the use of gillnets worldwide is not an option and site-specific gear prohibitions are not always effective, approaches will have to be found on a fishery-by-fishery basis, and such solutions should consider socio-economic alternatives (e.g., eco-tourism opportunities).

For several cetacean species—including the harbor porpoise, vaquita, Hector's and Maui's dolphin, finless porpoise, humpback and bottlenose dolphins, Irrawaddy dolphins, dusky dolphin, and Burmeister's porpoise—operational interactions with fisheries may threaten survival or recovery. In the report, the authors review by FAO statistical area the known fisheries interactions for species for which this interaction is either unsustainable (> than two percent of the population estimate) or may be approaching an unsustainable level (one to two percent of the population estimate). The material in boxes highlights those species that are considered a

priority for the Atlantic and Pacific, based on the level of incidental mortality. Chapter 2 of the report describes and highlights research needs that have been identified in the literature and by scientists and managers; offers preliminary recommendations for action in each area based on scientific data and available mitigation strategies (e.g., national laws, closed areas, or technological fixes); and provides a thorough analysis and review of the literature for all cetaceans incidentally killed in fisheries in each FAO statistical area. Appendix A provides a detailed listing of these findings.

Most notably, in almost all the statistical areas where studies have been conducted, large numbers of small cetaceans, especially coastally distributed species, are affected by coastal gillnet, purse seine, trawl, and trap fisheries. Major (in the top 20 for global, wild-capture landings) fisheries in the Atlantic include Atlantic herring, skipjack tuna, chub mackerel, Atlantic cod, Argentine shortfin squid, European pilchard, Gulf menhaden, European sprat, Atlantic mackerel, and European anchovy. Major fishing nations in the Atlantic are the U.S., Norway, Iceland, Denmark, Spain, and Canada. In the Atlantic Ocean, the major bycaught species and gear types in which this bycatch occurs are north Atlantic right whales off eastern North America, trap lines and gillnets; harbor porpoises in the North Sea, Celtic Sea, and Baltic Sea, gillnets; tucuxis in Caribbean coastal waters, gillnets; humpback dolphins in West Africa, coastal gillnets; sperm whales, striped dolphins, and short-beaked common dolphins in the Mediterranean, pelagic driftnets and gillnets; harbor porpoises in Black Sea, coastal gillnets; tucuxis in eastern South American coastal waters, gillnets; dusky and Commerson's dolphins in Argentina, coastal gillnets and midwater trawls and franciscanas in coastal gillnets.

Atlantic Species at Risk from Fishery Bycatch

- *Northwest Atlantic—Northern right whale*
- *Northeast Atlantic—harbor porpoise, common and striped dolphins*
- *Western Central Atlantic—tucuxi*
- *Eastern Central Atlantic—humpback dolphin*
- *Mediterranean and Black Sea—sperm whale, striped and common dolphins, harbor porpoise*
- *Southwest Atlantic—tucuxi, dusky and Commerson's dolphins, Franciscana*

Nine FAO statistical areas make up the Pacific region, including the Indian Ocean. Many areas in the Pacific are characterized by a lack of information about cetacean population size and incidental bycatch, making difficult an assessment of highest risk. Based on what is known about comparable fisheries and gear types elsewhere, it is likely that critical issues arise for a dozen species of marine and fresh water dolphins, three species of porpoise, and the false killer whale in the waters of 17 countries covering the entire Pacific Rim.

Developed nations such as the United States and Japan, as well as developing countries such as Natal and Sri Lanka, all have fisheries that interact with cetaceans. Challenges include gathering the most basic information on abundance and fishing effort to providing more complex technological solutions and implementation of action plans.

Major (in the top 20 for global, wild-capture landings) fisheries in the Pacific include Peruvian anchovy, Alaska pollock, skipjack tuna, chub mackerel, Japanese anchovy, Chilean jack mackerel, largehead hairtail, blue whiting, yellowfin tuna, capelin, Araucanian herring, and Akiami paste shrimp. Major fishing nations in the Pacific are China, Peru, Japan, Chile, U.S., Indonesia, Russian Federation, India, Thailand, Republic of Korea, Philippines, Malaysia, Mexico, Vietnam, and Taiwan. In the Pacific Ocean, the major bycaught species and gear types in which this bycatch occurs are Risso's dolphins in Sri Lanka, drift and set gillnets in combination with direct harpooning; bottlenose dolphins off the coast of Natal, South Africa, anti-shark gillnets, south coast of Zanzibar (Tanzania), drift and bottom-set gillnets; Indo-Pacific humpback dolphins in Natal (South Africa), anti-shark nets south coast of Zanzibar (Tanzania), drift and bottom-set gillnets, Madagascar and East Africa, coastal gillnets; Ganges river dolphins in India and Bangladesh, gillnets; Irrawaddy dolphins in Chilka Lake (India), gillnets, Bay of Bengal, heavy-mesh drift gillnets for elasmobranches; Dall's porpoise in direct harvests and salmon driftnets off Japan and Russia; Finless porpoises in Korea and Japan, coastal nets and traps, in Inland Sea (Japan), gillnets, Yangtze River, gillnets and electrofishing; marine waters of China and Southeast Asia, coastal nets and traps; Baijis in China, electrofishing and rolling hooks; Spinner dolphins and Fraser's dolphins in the Philippines, driftnets for large pelagics and flying fish, purse seines for small pelagics; Irrawaddy dolphin (marine), Phillippines, (matang quarto) crab nets; (freshwater) Mekong River, Mahakam River, Songkhla Lake, and Ayeyarwady River, gillnets; False killer whales, Hawaii, longlines; Vaquitas, Gulf of California (Mexico), gillnets; Hector's dolphins, North Island (New Zealand), coastal gillnets; Dusky dolphin, Peru, drift gillnets; Burmeister's porpoises, Peru, coastal gillnets.

Pacific Species at Risk from Fishery Bycatch

- *Northwest Pacific (including the Sea of Japan, East and South China Seas, Yangtze River)—finless porpoise, baijiis, Dall's porpoise, finless porpoise*
- *Western Central Pacific (including Mekong River, Mahakam River, Songkhla Lake, and Ayeyarwady River) —spinner dolphin, Fraser's dolphin, Irrawaddy dolphin,*
- *Eastern Central Pacific—Vaquita and false killer whales ,*
- *Southwest Pacific--Hector's dolphin and Maui's dolphin*
- *Southeast Pacific—Dusky dolphin, Burmeister's porpoise*
- *Western Indian Ocean—Spinner, Risso's, bottlenosed and humpback dolphins*
- *Eastern Indian Ocean—Ganges and Irrawaddy river dolphins*

Tools for Action to Reduce Bycatch

U.S. law and policy provide mechanisms for action to reduce bycatch of cetaceans and other marine mammals in fishing operations. The Marine Mammal Protection Act, the Endangered Species Act and the Magnuson-Stevens Fishery Conservation and Management Act provide policy statements, action mandates and research direction for U.S. actions. The MMPA, and more recently the M-SFCMA also direct U.S. managers to work in the international arena to protect marine mammals.

The Marine Mammal Protection Act of 1972 (MMPA) contains international sections that provide tools to address international threats to cetaceans. The MMPA requires the Secretary of Commerce or the Secretary of the Interior, working through the Secretary of State, to negotiate agreements with other nations to protect and conserve marine mammals. The act's international provisions are particularly strong in the area of bycatch and provide the U.S. with the tools to take a leadership role in initiating negotiations with all foreign governments engaged in commercial fishing found to be unduly harmful to any species or population stock of marine mammal and in developing bilateral and multilateral treaties with such countries to protect marine mammals. However, the U.S. has rarely applied these measures nor has it taken actions to reduce cetacean bycatch or to protect ecosystems abroad.

In 2006, the Congress reauthorized provisions of the Magnuson-Stevens Fishery Conservation and Management Act (M-SFCMA), the law governing how the U.S. manages fisheries within its EEZ. The reauthorization also directed substantial attention on fishing issues outside U.S. waters, particularly illegal, unregulated and unreported fishing (IUU) and bycatch. Although aimed primarily at strengthening U.S. leadership in international conservation and management of fisheries for purposes of leveling the playing field between the U.S. fleet and those of other nations, the new provisions have strong bycatch language calling for measures comparable to U.S. policy.

The international title of the reauthorization creates a new section in the M-SFCMA authorizing the Secretary to promote improved monitoring and compliance for high seas fisheries or fisheries governed by international or regional fishery management agreements. The provisions call for improved communication and cooperation among law enforcement organizations, an international monitoring network, an international vessel registry, remote sensing technology, technical assistance, and a listing and certification process to decide whether sanctions should be applied to nations that participate in IUU fishing or do not reduce bycatch of protected living marine resources.

The U.S. is party to numerous international agreements related to cetacean protection as well as to fishery agreements that have bycatch-reduction provisions. Another source of authority for action or diplomatic initiatives arises from the numerous regional agreements to which the U.S. is party. Finally, the increasing role of regional fishery management organizations in reaching out to both coastal states and fishing nations, whether they are contracting parties or not, may provide an additional venue for discussion of cetacean bycatch in fisheries.

The global framework for conservation of living marine resources includes agreements that apply to all the seas, some that cover specific seas or regions, and some that govern ocean areas that are used by numerous coastal and flag nations. Fishery conservation agreements, particularly those that create new regional fishery management organizations (RFMOs) have potential to prevent bycatch of non-target species and protected species in the course of fishing. The report examines the emergence of an increased role for regional fishery management organizations in bycatch reduction. This report summarizes relevant and applicable examples in

key regions, concentrating on a few international tools and the agreements that relate to the “hot spots,” or areas where the most significant incidental bycatch require urgent action.

International agreements examined include the International Convention for the Regulation of Whaling, the Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention) and the Convention on International Trade in Endangered Species among others. Under the auspices of the Bonn Convention, parties have negotiated additional regional agreements such as the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas, the Agreement on the Conservation of Cetaceans of the Black Sea, and the Mediterranean Sea and Contiguous Atlantic Area. The report describes and posits options for action under regional measures such as the UN Regional Seas Programme and specific area protocols that are relevant to cetacean conservation. In addition to wildlife, environmental and specific marine mammal conventions, treaties that govern fisheries can be brought to bear on cetacean bycatch problems.

Attempts at widespread international agreement on fishery management were unsuccessful until the 1982 United Nations Conference on the Law of the Sea (UNCLOS III). With it came recognition of the extension of coastal state jurisdiction to 200 miles, and for the first time, the freedom of fishing on the high seas was circumscribed. Article 56 of the Convention gives coastal states sovereign rights over resources out to 200 miles. (UNCLOS III) This includes the authority to conserve and manage living resources. The UN Law of the Sea, and measures that flow from it, such as the voluntary Code of Conduct for Responsible Fisheries and the Straddling Stocks agreement provide numerous alternatives for tackling cetacean bycatch, such as General Assembly resolutions or creation of new regional management authorities, including ones that may be specific to cetacean conservation.

Exemplary regional authorities discussed include the Northwest Atlantic Fisheries Organization, the International Convention for the Conservation of Atlantic Tunas, Convention on the Conservation and Management of Fishery resources in the Southeast Atlantic Ocean, the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean, and the Convention for the Conservation of Antarctic Marine Living Resources. In addition to treaties and other legal instruments, tools such as information exchange, training and technical assistance, gear workshops, professional exchanges and other capacity building activities can contribute to reducing cetacean bycatch.

Analysis

The analysis examines problems by region. It sets out species at risk, gaps in abundance and bycatch information, gaps in management frameworks and gaps in implementation or enforcement of existing measures. The table below illustrates the gaps in elements critical to conservation.

AREA/ SPECIES	ABUND.EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS[1] IUCN	CITES	CMS	AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES[2] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT. Monitoring Mitigation Observers Enforcement
ATLANTIC OCEAN, MEDITERRANEAN & BLACK SEAS										
AREA 21-NORTHWEST ATLANTIC										
PHOCOENA PHOCOENA - HARBOR PORPOISE										
Gulf of Maine/Bay of Fundy	89,700		55/year (2000-2004)		NE (VU-over all)		II	BILAT	US-Canada	Pingers
EUBALAENA GLACIALIS NORTHERN RIGHT WHALE										
	300		1.2/year		E	I &II	I&II	BILAT	US-Canada	
AREA 27-NORTHEAST ATLANTIC										
PHOCOENA PHOCOENA - HARBOR PORPOISE										
Northern and Central North Sea	61,335		2,700/4.1%		VU		II	Reg	CS/FS/PS	
Kattegat and Oeresund	36,046 (20,276-64,083)		83/0.2%		VU		II	Reg	CS/FS/PS	
Skagerrak	4,738		114/2.4%		VU		II	Reg	CS/FS/PS	Pingers
Kattegat	4,009		50/1.2%		VU		II	Reg	CS/FS/PS	
Kiel & Mecklenburg Bight	588 (240-1,430)				VU		II	Reg	CS/FS/PS	

[1] For IUCN Red List, Categories are: LC, Least Concern; LR, Lower Risk, NT Near Threatened; NE, Not Evaluated; DD, Data Deficient; VU, Vulnerable; EN, Endangered; CR, Critically Endangered. LR/cd, Conservation Dependent (cd). Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years. If listed on CITES, the Appendix is indicated as I, II or both. For the Convention on Migratory Species, Appendix II listings are shown.

[2] The parties to the international, regional and bi-lateral agreements discussed in Chapters 4 and 5 and summarized in this table are listed in Appendix B.

AREA/ SPECIES	ABUND.EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS[1] IUCN	CITES	CMS	AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES[2] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT. Monitoring Mitigation Observers Enforcement
Southwestern Baltic proper	599 (200-3,300)		13/2.1%		VU		II	Reg	CS/FS/PS	
Northern North Sea	98,564 (66,679-145,697)		5,000/5%		VU		II	Reg	CS/FS/PS	Pingers (DMK) gillnet fishery Aug - Oct
Southern & Central North Sea	169,888 (124,121-232,530)		7,493/4.3%		VU		II	Reg	CS/FS/PS	
Celtic Sea	36,280 (12, 828-102,604)		2,200/6.2%		VU		II	Reg	CS/FS/PS	
North Sea	268,800		3,410/1.3%		VU		II	Reg	CS/FS/PS	
DELPHINUS DELPHIS-COMMON DOLPHINS										
Celtic Sea	75,449 (22,900 - 284,900)				LC	nl	II	Reg	CS/FS/PS	
Bay of Biscay	61,888 (35,461 - 108,010)		410-419 /0.67%		LC	nl	II	Reg	CS/FS/PS	Driftnet fishery banned
Celtic Sea & Western Waters	101,205 (55,125 – 185,802)		356-8353 614-2005/ 0.6-1.1%		LC	nl	II	Reg	CS/FS/PS	
STENELLA COERULEOALBA-STRIPED DOLPHINS										
Bay of Biscay	73,843		1193-1526 /1.6-1.56%		LR/cd	nl	II	Reg	CS/FS/PS	
Celtic Sea & Western Waters	66,825		136-5287 448/ 0.27-0.79%		LR/cd	nl	II	Reg	CS/FS/PS	
AREA 31-WESTERN CENTRAL ATLANTIC										

AREA/ SPECIES	ABUND.EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS[1] IUCN	CITES	CMS	AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES[2] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT. Monitoring Mitigation Observers Enforcement
SOTALIA FLUVIATILIS TUCUXI										
Cananeia estuary	156-380 No estimate for rest of range				DD	I&II	II	Reg	CS (US)	Marine Mammal Action Plan under SPAW Protocol
AREA 34-EASTERN CENTRAL ATLANTIC										
SOUSA TEUSZII-ATLANTIC HUMPBACK DOLPHIN										
Dakhla Bay	Considered small				DD	I&II	II	Int'l/Reg	CS	
Parc National du Banc d' Arguin in Mauritania.	Considered small				DD	I&II	II	Int'l/Reg	CS	
Saloum delta, Senegal	100				DD	I&II	II	Int'l/Reg	CS	
Canal do Geba-Bijagos	< 1,000 animals				DD	I&II	II	Int'l/Reg	CS	
South Guinea					DD	I&II	II	Int'l/Reg	CS	
Cameroon					DD	I&II	II	Int'l/Reg	CS	
Gaboon Estuaries					DD	I&II	II	Int'l/Reg	CS	
Angola	Considered small				DD	I&II	II	Int'l/Reg	CS	
AREA 37-MEDITERRANEAN AND BLACK SEA										
STENELLA COERULEOALBA – STRIPED DOLPHINS										
Alboran Sea	14,736 (6,923 – 31,366)		145-201/1.2%		LR/cd	nl	II	Int'l/Reg	CS/FS/PS	Swordfish driftnet fishery banned
Corsican/Ligurian Sea	25,614 (15,377 – 42,685)		51-326 (+/-146) 0.19 – 1.3%		LR/cd	nl	II	Int'l/Reg	CS/PS	Swordfish driftnet fishery banned
Western Mediterranean	117, 880 (68,379-214,800)		14-15/0.006%		LR/cd	nl	II	Int'l/Reg	CS/FS/PS	

AREA/ SPECIES	ABUND.EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS[1] IUCN	CITES	CMS	AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES[2] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT. Monitoring Mitigation Observers Enforcement
DELPHINUS DELPHIS -COMMON DOLPHINS										
Alboran Sea	14,736 (6,923 – 31,366)		145-201/1.2%		LC	nl	II	Reg	CS/FS/PS	Swordfish driftnet fishery banned
PHYETER MACROCEPHALUS—SPERM WHALE										
Mediterranean			7-14/year		VU	I	II	Reg	CS/FS/PS	Swordfish driftnet fishery banned
PHOCOENA PHOCOENA – HARBOR PORPOISE										
Azov Sea in total	2,922 (1,333–6,403l)				DD		II	Reg	CS/FS/PS	
Kerch Strait	54 (12–245)				DD		II	Reg	CS/FS/PS	
NW, N and NE Black Sea within Ukrainian and Russian territorial waters	1,215 (492–3,002)				VU		II	Reg& Nat (EC Direct.)	CS/FS/PS	
SE Black Sea < Georgian terr waters	3,565 (2,071–6,137)				VU		II	Reg	CS/FS/PS	
Central Black Sea> waters Ukraine/Turkey	8,240 (1,714–39,605)				VU		II	Reg	CS/FS/PS	
AREA 41-SOUTHWEST ATLANTIC										
SOTALIA FLUVIATILIS-TUCUXI										
Cananéia estuaryBrazil	156-380				DD	I&II	II			
Southwest Atlantic			141		DD	I&II	II			
LAGENORHYNCHUS OBSCURUS – DUSKY DOLPHIN										
Patagonian coast	7,252		70-200/		DD	nl	II			

AREA/ SPECIES	ABUND.EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS[1] IUCN	CITES	CMS	AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES[2] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT. Monitoring Mitigation Observers Enforcement
coast			.96%-2.7%							
Punta Ninfas and Cabo Blanco, Argentina	6,628				DD	nl	II			
CEPHALORHYNCHUS COMMERSONII – COMMERSON'S DOLPHIN										
Southwest Atlantic	21,000		141-212/ .67%-1.0% 25-170/ .1%-.8%		DD	nl	I			
Tierra del Fuego	14,000		5-30/.03%-.2%		DD	nl	I			
PONTOPORIA BLAINVILLEI FRANCISCANA										
FMA I			110		DD	nl	I&II			
FMA II			375		DD	nl	I&II			
FMA III	42,078 (33,047 – 53,542)		1,374 (694-2,215) 3.2%		DD	nl	I&II			
FMA IV	34,131 (16,360-74,397)		651 (398-1097) 1.9%		DD	nl	I&II			

PACIFIC AND INDIAN OCEANS

AREA 51 – WESTERN INDIAN OCEAN

SOUSA CHINENSIS – INDIAN HUMPBACK DOLPHIN										
Natal coast	200		7.5/3.75%		DD	I&II	II	Reg	CS/FS	
Zanzibar (Tanzaniza)	71		5.6%		DD	I&II	II	Reg	CS/FS	
TURSIOPS TRUNCATES – BOTTLENOSE DOLPHINS										
Indian Ocean coast south of Natal SAfrica	250		20-23/8-9%		DD		II	Reg	CS/FS	

AREA/ SPECIES	ABUND.EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS[1] IUCN	CITES	CMS	AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES[2] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT. Monitoring Mitigation Observers Enforcement
Indian Ocean coast north of Natal S Africa	1,000		11-14/1-1.4%		DD		II	Reg	CS/FS	
TURSIOPS ADUNCUS – BOTTLENOSE DOLPHINS										
Zanzibar (Tanzania)	161		8%				II	Reg	CS/FS	
GRAMPUS GRISEUS – RISSO'S DOLPHIN										
Western Indian Ocean	5,500 to 13,000		1,300/24% - 10%		DD		II	Reg	CS/FS	
AREA 57 – EASTERN INDIAN OCEAN										
ORCAELLA BREVIROSTRIS – IRRAWADDY RIVER DOLPHIN										
Chilka Lake, India	20-30				DD		II	Reg	CS/FS	
PLATANISTA GANGETICA GANGES RIVER DOLPHIN.										
Ganges River	600-700				EN	I&II	I&II	Reg	CS/FS	
AREA 61 – NORTHWEST PACIFIC										
PHOCOENOIDES DALLI – DALL'S PORPOISE										
Western N Pacific	141,800		643-4,187/0.4-3.0%		LR		II	Reg	CS/FS	
NEOPHOCAENA PHOCAENOIDES – FINLESS PORPOISE										
Inland Sea Japan	4,900		84/1.7%		DD EN	I&II	II	Reg	CS/FS	
LIPOTES VEXILLIFER - BAIJI										
Yangtze	100-300		5/1.6-5.0%		CR	I&II				
AREA 71 – WESTERN CENTRAL PACIFIC										
TURSIOPS ADUNCUS – BOTTLENOSE DOLPHINS										
Northern Australia	700-1000		1700		nl	nl	II	Int'l/Reg	CS/FS/PS	
STENELLA LONGIROSTRIS – SPINNER DOLPHINS										
Northern Australia			1000		LR	nl	II	Int'l/Reg	CS/FS/PS	
Sulu Sea	30,000		1,500-3,000/5		LR	nl	II	Int'l/Reg	CS/FS/PS	

AREA/ SPECIES	ABUND.EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS[1] IUCN	CITES	CMS	AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES[2] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT. Monitoring Mitigation Observers Enforcement
			3,000/5-10%							
LAGENODELPHIS HOSEI—FRASER'S DOLPHIN										
Eastern Sulu Sea	8,700				DD	nl	II	Int'l/Reg	CS/FS/PS	
SOUSA CHINENSIS—INDO-PACIFIC HUMPBACK DOLPHIN										
Northern Australian—Central Section Great Barrier Reef	200		11-100/5.5-50%		DD	I&II	I	Int'l/Reg	CS/FS/PS	
ORCAELLA BREVIOSTRIS – IRRAWADDY (SNUBFIN) DOLPHIN										
Mahakam River, Indonesia	34-50		3/6-8%		CR		II			
Malampaya Sound, Palawan Philippines	77		2-5/2.5-6.5%		CR		II			
Mekong River	69		4/5.8		CR		II			
AREA 77 – EASTERN CENTRAL PACIFIC										
PSEUDORCA CRASSIDENS – FALSE KILLER WHALES										
Hawaiian stock	236		4-6/1.6-2.5%					Reg'l/Nat'l	FS (US)	
PHOCOENA SINUS – VAQUITA										
	567		35-39/6.2-6.9%		CR	I&II		BilatUS/ Mex	CS/FS(US)	Biosphere reserve
AREA 81 – SOUTHWEST PACIFIC										
CEPHALORHYNCHUS HECTORI – HECTOR'S DOLPHIN										
South Island east	1,900		16/.8%		EN			Nat'l	CS	Sanctuary regs, voluntary pingers
South Island west	5,400							Nat'l	CS	Regs, pingers
CEPHALORHYNCHUS HECTORI MAUI – MAUI'S DOLPHIN										

AREA/ SPECIES	ABUND.EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS[1] IUCN	CITES	CMS	AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES[2] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT. Monitoring Mitigation Observers Enforcement
North Island	100-150		3/3-2%		CR			Nat'l	CS	Protected area
AREA 87 – SOUTHEAST PACIFIC										
LAGENORHYNCHUS OBSCURUS – DUSKY DOLPHIN										
			500-1,800		DD		II	Nat'l/Reg	CS/FS	
PHOCOENA SPINIPINNIS – BURMEISTER'S PORPOISE										
			450-200		DD		II	Nat'l	CS/FS	

Following the problem assessment by region, the next step of the analysis examines actions that could be taken under a variety of mechanisms: U.S. law, agreements to which U.S. is a party, and areas with potential for negotiation of amendments to existing treaties or development of new instruments. In addition, the report examines actions the U.S. could pursue outside the legal and diplomatic arena, using grants programs, technology transfer, incentives, partnerships with the private and non-governmental organization sectors, and employing its convening power to foster information exchange.

Recommendations

Throughout this report the authors identify a combination of research needs and recommendations for agency action. With more than twenty recommendations provided in Chapter 6, but limited agency resources, priority setting is needed. While recognizing that there will be agency considerations, budget and policy guidance and diplomatic opportunities that will arise and that cannot be predicted here, the authors attempted to rank the recommended actions by using a set of scoring criteria.

The first overarching criterion analyses the level of risk to the population and the conservation benefit of implementing a particular recommendation. The subcriteria ask whether the recommendation:

1. Assists a critically endangered species;
2. Assists a species at risk (listed under the IUCN Red List);
3. Addresses unsustainable bycatch;
4. Aids a trans-boundary species;
5. Will help meet a critical research need (e.g., provide information on cetacean abundance or bycatch estimates).

The second overarching criterion evaluates the ease and effectiveness of implementation. The subcriteria query whether legal frameworks and capacity to implement mitigation measures exist:

1. Regional agreement is in place that can be used to implement the recommendation;
2. Bilateral agreement is in place that can bring about prompt action;
3. National legislation is in place that either requires enforcement or modification to strengthen conservation requirements;
4. Mitigation strategies or possible solutions are available to be used or tested;
5. Institutional capacity is such that intervention is feasible.

Each recommendation was analyzed, and a point value assigned based on the number of subcriteria that it satisfied. The results of that evaluation are graphed and summarized Chapter 7 (Table 7.1).

Top Priority

Ten recommendations fall within the Top Priority. Four of these can be categorized as bilateral negotiations that are either ongoing or should be initiated. They are the US/Mexico (MexBi) bilateral, the US/Canada bilateral (CanBi), negotiations related to Pelly Certification of Italy and other Mediterranean nations for the use of driftnets (MedDrift), and the initiation of bilateral negotiations (possibly in response to an MMPA Section 101 Pelly petition) with Peru to reduce cetacean bycatch and bring about greater enforcement of its national laws. The Canada, Mexico, and Mediterranean driftnet negotiations all have a lengthy history but joint efforts to take the necessary action to begin to resolve the bycatch problems have been slow. With additional effort substantial progress could be made to reduce cetacean bycatch through these negotiations over the next one to two years. The same is true if the Office of International Affairs initiated discussions with Peru similar to those that it has undertaken with Chile to reduce cetacean harvests. Peru has both the legal framework and the scientific infrastructure in place to better assess cetacean abundance and bycatch and to control it.

Three recommendations that occur in the Top Priority fall under actions that can be taken to reduce cetacean bycatch under existing multi-lateral agreements and will likely require two to three years of effort to achieve progress. These are: the Northwestern Atlantic Fisheries Organization (NAFO); Western Central Pacific Fisheries Commission (WCPFC); and a subset of the Western Central Pacific tuna/dolphin interactions. NAFO and the WCPFC have recently adopted resolutions to assess and mitigate sea turtle bycatch in longline and purse seine fisheries. In these agreements the Office of International Affairs can put forward a resolution (see example Appendix C) that calls upon member nations to estimate cetacean stock abundance and bycatch within their waters and to report the results of their findings back to the Secretariat of that particular agreement. It also could call upon member nations to take action where possible to reduce cetacean bycatch. The purpose of such a resolution is to use existing multilateral fisheries commissions or agreements as a mechanism to gather and share scientific information and to work collaboratively on techniques to reduce cetacean bycatch. In the situation where interactions are either suspected or scantily documented between purse seine fishing vessels fishing for tuna and dolphins, the WCPFC provides the framework to allow the U.S. to investigate the frequency and magnitude of this interaction and to mitigate any potential bycatch.

The final three recommendations will take three to five years to achieve and require either the adoption of new legislation or the negotiation of new multilateral agreements specifically focused on cetaceans within a particular geographic region such as the Pacific Ocean Multilateral Agreement or the Americas Multilateral Agreement. The cetacean bycatch legislation referred to here (Appendix E) was introduced in the 108th Congress. While many of its mandates calling for international negotiations to reduce cetacean bycatch overlap with

existing mandates in both the MMPA and the M-SFCMA, the provisions calling for the development of an international bycatch database are sorely needed and well worth the effort to secure passage of such legislation. This database could ultimately provide the baseline information needed by both the Office of International Affairs and the Office of Protected Resources to improve cetacean conservation and management and to meet the mandates of both the MMPA and the M-SFCMA. Section 108 provides the authority for the Secretary of Commerce to work through the Secretary of State to negotiate multilateral agreements to protect and conserve cetaceans. The areas most in need of such an agreement are the Pacific Ocean and the east and west coasts of Mexico, Central and South America. For these multilaterals, an agreement similar to the Inter-American Convention for the Protection and Conservation of Sea Turtles would provide an appropriate model. An international effort to negotiate this type of agreement would likely take five years to complete and ratify, yet it would provide the framework to assess cetacean abundance and bycatch and would likely have benefits beyond cetacean bycatch reduction including reducing direct harvests and consumption, preventing habitat degradation, and providing a mechanism to address issues such as climate change and the adverse impacts of anthropogenic sound and contaminants.

Second Tier Priority

The second tier priority includes adoption of a United Nations General Assembly Resolution on cetacean bycatch; workshop for science and technology transfer; an Indian Ocean Multilateral Agreement; modifications to the International Whaling Commission (IWC) to recognize its competence to manage small cetaceans; and investigations into West Coast of Africa tuna/dolphin interactions. While there is potentially great conservation benefit in either modifying the mandate of the IWC or negotiating a new cetacean specific multilateral, the likelihood of success is remote. The current membership composition of the IWC makes such changes unlikely and progress on the issues already identified through the Small Cetacean Subcommittee has been slow. In the Indian Ocean, the U.S. has little capacity or leverage to either spark negotiations for such an agreement (given the geography, it is unlikely that the U.S. would be a party to such an agreement) or to take action against nations like Sri Lanka or India for cetacean bycatch or harvests.

Within the next two to three years the U.S. could make progress in two areas. First, it could take a leadership role to hold a series of regional bycatch workshops, similar to the one held in La Jolla in the early 1990s. These workshops could review the status of cetacean populations and what is known about cetacean bycatch in each participating country. They could also become a forum to discuss the use of existing mitigation measures and testing and development of new technologies to reduce bycatch. This information provides the foundation for actions recommended in association with other bilateral and multilateral negotiations or agreements and mandates under the MMPA and the MS-FCMA. Second, the U.S. could use the framework of both ICCAT and SEAFO to investigate the interaction between tuna purse seine vessels fishing for tuna off the coast of West Africa and whales and dolphins. Allegations and sparse documentation of these interactions have existed for more than twenty years. By placing observers on tuna vessels fishing in these areas through the auspices of the RFMOs, the organizations could help document the occurrence of association of tuna schools with whales and dolphins and the frequency of encirclement and magnitude of any bycatch.

Finally, the Office of International Affairs could work to introduce a measure that calls upon parties to reduce cetacean bycatch as part of the sustainable fisheries resolution. This resolution relates to implementation of the provisions of the United Nations Convention for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks and it recalls and reaffirms the provisions of this agreement and calls upon parties to take specific actions. Although U.N. resolutions are not binding, passage of a measure that includes precise

language on cetacean bycatch and requests that parties take a specified course of action (e.g. assess cetacean abundance, estimate bycatch, establish bycatch limits, and mandate bycatch mitigation) might provide impetus to regional fishery management bodies and parties to other regional agreements to carry out efforts described earlier for venues such as NAFO, ICCAT, WCPFC, and SEAFO.

Third Tier Low Priority

These recommendations fall in the bottom two quadrants of the graph and encompass five recommendations. Four of these call for continued work within existing multilateral agreements to elevate the issue of cetacean bycatch. They are: Southeast Atlantic Fisheries Organization; the Caribbean Specially Protected Areas and Wildlife Protocol; the Marine Mammal Action Plan in the Southeast Pacific Ocean; and the South Pacific Regional Environment Program. The three organizations all have some form of marine mammal/cetacean action plan that provides a framework from which to assess cetacean stock abundance and to estimate bycatch. Because these plans encourage technology transfer and scientific exchange they would be fertile ground for the regional workshops previously discussed. And although they ranked lower than the recommendations pertaining to action within the IWC, ocean multilaterals or the UN, they should likely be elevated in priority to the second tier, given the framework that already exists and the natural alignment with other recommendations.

Finally, for the reasons outlined in Chapter 6 and earlier in this chapter related to agreements in the Indian Ocean, efforts to achieve bycatch reduction through the Southwest Indian Ocean Fisheries Organization should be a low priority. The U.S. will have little leverage and a great deal of difficulty in affecting change within this agreement.

Conclusion

Based on the analysis the table below illustrates the ranking of recommendations and priorities. As part of an overall action plan to reduce cetacean bycatch and comply with the mandates under the MMPA and the M-SFCMA over the next one to three years, it is recommended that the Office of International Affairs focus its efforts on the short term top and second tier priorities.

Table ES.2 Priority Recommendations

Short Term (1-3 yrs)—Top Priorities--Bilateral Agreements
US/Mexico Bilateral
US/Canada Bilateral
Mediterranean Driftnets
Peruvian Fisheries Bycatch
Workshops for Science and Technology Transfer
Short Term (1-3 yrs)—Second Tier Priorities—Multilateral Agreements
Northwestern Atlantic Fisheries Organization
Western Central Pacific Fisheries Commission
Western Central Pacific--tuna/dolphin interactions
Southeast Atlantic Fisheries Organization

Table ES.2 Priority Recommendations
West Coast of Africa--tuna/dolphin interactions
Plan of Action for Marine Mammals in the Southeast Pacific Ocean
Caribbean SPAW Protocol
South Pacific Regional Environment Program
Long Term (3-5 yrs)—Top Priorities—Multilateral Agreements
Pacific Ocean Multilateral Agreement
Americas Multilateral Agreement
Bycatch Legislation
United Nations General Assembly Resolution
Low Priority Recommendations
Amend IWC
Southwest Indian Ocean Fisheries Commission
Indian Ocean Multilateral Agreement

CHAPTER 1. INTRODUCTION

Humans have exploited cetaceans (whales, dolphins, and porpoises) since primitive whaling activities began in Japan and Scandinavia many centuries ago. Now the threats facing cetaceans go beyond whaling, to include toxic pollution, acoustic noise, ship strikes, environmental change, global warming, and habitat degradation. Even though the complexity and magnitude of these threats are increasing, there are still few international mechanisms to address these threats. Little is being done under the authorities that do exist to bring about any significant improvement. Another difficulty arises in that there is no single international entity with the authority to govern and focus solely on cetacean conservation issues.

The U.S. Ocean Commission stated in its 2005 report: the "biggest threat to marine mammals worldwide is their accidental capture or entanglement in fishing gear (bycatch)[9], which kills hundreds of thousands of them each year."[10] In particular, bycatch represents a major threat to the survival of cetaceans, particularly small cetaceans. Fishing gear, especially gillnets, indiscriminately catches an undetermined number of marine species, including dolphins and porpoises. Still, progress on assessing cetacean populations, quantifying cetacean bycatch, evaluating the scale and magnitude of this problem, identifying specific conservation actions, and reducing the mortality has been slow, sporadic, and limited to a few specific fisheries or circumstances.[11] Therefore, as a matter of priority, the focus of this report is the assessment and mitigation of global cetacean bycatch

Cetaceans, like many other animals, can be described as "migratory" because they spend several months each year traveling from one area to another, often covering vast distances in search of food, a particular climate, or a safe breeding ground. From a conservation and management perspective, migratory species are not exposed to specific threats because they do not confine themselves to one location; instead they periodically cross through a number of jurisdictions and encounter several threats as they do so. The level of protection afforded to cetaceans fluctuates according to their particular geographical location. Inevitably, migrating animals will pass through jurisdictions where cetacean conservation is less of a priority than in other areas. The protection of small cetaceans has largely been left to the domestic regimes of coastal states, and a number of nations have enacted legislation to protect dolphins and porpoises—particularly Australia, New Zealand, the United Kingdom, and the U.S.

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[9] Bycatch is defined in U.S. law as "fish which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic discards and regulatory discards. Such term does not include fish released alive under a recreational catch and release fishery management program." 16 U.S.C.1802(2). The Marine Mammal Protection Act uses the term "take," defined as "harass, hunt, capture, or kill…any marine mammal." 16 U.S.C. 1362(13). Bycatch is defined internationally as "Fish or other fauna (e.g. birds or marine mammals) that are caught during fishing, but which are not sold or kept for personal use. In commercial fishing these include both fish discarded for economic reasons (economic discards) and because regulations require it (regulatory discards)." Organisation for Economic Co-operation and Development Glossary of Statistical Terms, 2001. Available at http://stats.oecd.org/glossary/detail.asp?ID=252. Last visited 3 May 2007. For purposes of this report, the term "bycatch" will be used to describe all types of incidental capture of marine mammals in fishing gear, rather than the MMPA terminology "take," unless the discussion is about MMPA provisions. The term "incidental mortality" will be used when deaths are documented. However, it is generally understood that most bycatch of marine mammals results in death, with limited circumstances where live release is accomplished.

[10] U.S. Commission on Ocean Policy. An Ocean Blueprint for the 21st Century. Final Report. Washington DC, 20004 ISBN#0-9759462-0-X at 306.

[11] Reeves R.R., Berggren, P., Crespo, E.A., Gales, N., Northridge, S.P., Notarbartolo di Sciara, G., Perrin, W.F., Read, A.J., Rogan, E., Smith, B.D., and Van Waerebeek, K. 2005. Global Priorities for Reduction of Cetacean Bycatch. World Wildlife Fund

With bycatch a serious and widespread threat to marine mammals, there is an urgent international need to develop alternative fishing gear and practices and, at the same time, put into place effective regional agreements that call for the assessment of cetacean populations, documentation of bycatch, and the implementation of mitigation measures ranging from temporal and spatial closures to deterrents. Greater involvement of inter-governmental bodies such as regional fishery management organizations, the United Nations Environment Program, The World Conservation Union (IUCN), and the Food and Agriculture Organization of the United Nations (FAO) is necessary. Because it requires a country to outline a series of specific measures to deal with such interactions, FAO's International Plan of Action model may provide a useful mechanism to address interactions between cetaceans and fisheries. In some regions, FAO is the only body competent to engage countries on a multinational level.

The Marine Mammal Protection Act of 1972[12] (MMPA) contains an international program that includes tools to address international threats to marine mammals. Specifically, the MMPA requires the Secretary of Commerce or the Secretary of the Interior, working through the Secretary of State, to "initiate negotiations as soon as possible for the development of bilateral or multinational agreements with other nations for the protection and conservation of all marine mammals."[13] It also directs the federal government to encourage other agreements to protect specific ocean and land regions "which are of special significance to the health and stability of marine mammals" and to amend any existing treaty to make it consistent with the purposes and policies of the Act.[14]

The act's international provisions are particularly strong in the area of bycatch and provide the U.S. with the tools to take a leadership role in initiating negotiations with all foreign governments engaged in commercial fishing found to be unduly harmful to any species or population stock of marine mammal and in developing bilateral and multilateral treaties with such countries to protect marine mammals.[15] However, with the exception of the provisions associated with the Agreement on the International Dolphin Conservation Program (AIDCP), rarely has the U.S. applied these measures nor has it taken actions to reduce marine mammal bycatch or to protect ecosystems abroad.

In 2006 the Congress reauthorized provisions of the Magnuson-Stevens Fishery Conservation and Management Act (M-SFCMA),[16] the law governing how the U.S. manages fisheries within its Exclusive Economic Zone (EEZ). The reauthorization also directed substantial attention on fishing issues outside U.S. waters, particularly illegal, unregulated and unreported fishing (IUU) and bycatch. Although aimed primarily at strengthening U.S. leadership in international conservation and management of fisheries[17] for purposes of leveling the playing

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[12] Marine Mammal Protection Act of 1972, (16 U.S.C. 1361-1407, P.L. 92-522, October 21, 1972, 86 Stat. 1027) as amended.

[13] 16 U.S.C 1378(a)(1)

[14] 16 U.S.C 1378(a)(3)-16 U.S.C 1378(a)(4)

[15] 16 U.S.C 1378 (a)(2)

[16] 16 U.S.C. §§1801-1882 (1976), Pub. L. 94-265, as amended by H.R. 5946, Dec. 2006. Signed into law Jan 12, 2007.

[17] Report of the Committee on Commerce, Science & Transportation on S.2012, Magnuson-Stevens Fishery Conservation and Management Act Reauthorization Act of 2005. April 4, 2006. S. Rpt. 109-229. The Senate Report notes that restrictions placed on U.S. vessels to protect endangered or protected species "disadvantage U.S. fleets and fail to address the problem" because the harmful fishing practices continue by other fleets in high seas fisheries. S.Rpt. at 43.

field between the U.S. fleet and those of other nations, the new provisions have strong bycatch language calling for measures comparable to U.S. policy to protected species at risk, including marine mammals.

The Office of International Affairs of the NOAA National Marine Fisheries Service (NMFS) contracted development of a study that details steps it could take to engage foreign nations and multilateral organizations in reducing cetacean bycatch. The report produced under this contract reviews information on cetacean population abundance and documented bycatch, evaluates international cetacean conservation activities, describes the tools afforded through the MMPA and M-SA and international agreements relevant to cetacean conservation and bycatch, and makes recommendations for U.S. action.

Methodology

The project scope of work calls for an evaluation of the most significant threats to cetaceans, the affected species and the geographic areas of high risk, and the recommended actions from various independent institutions. The report is to identify gaps in conservation and management efforts related to threats to cetacean populations and identify opportunities for international action, cooperative research, and information exchange. The final element of the work is to develop a strategic plan of action for NOAA that identifies priorities for action, existing tools, necessary mechanisms, and required resources.

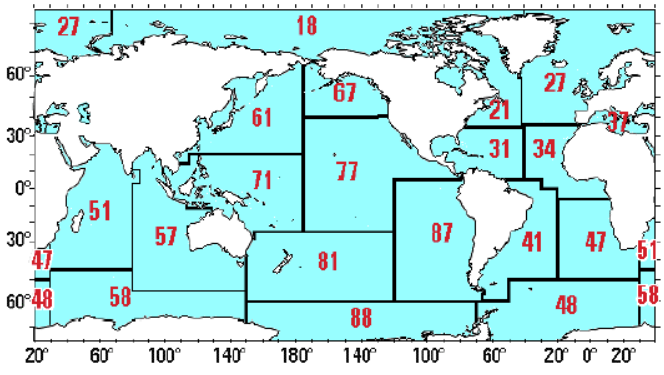

Figure 1

As a structure for examining bycatch of cetacean species, the report is organized geographically, using area designations similar to the Statistical Areas of the FAO (see Figure 1). This alignment enables the analysis to overlay the activity of the principal fisheries of the world and the existence of multi- or bi-lateral agreements on areas of cetacean occurrence or and documented bycatch. Part of the methodology includes a detailed review of cetacean abundance and bycatch within each statistical area (Appendix A) and every species at risk is summarized in Tables A1-A137. This is followed by a distillation of this information, placing a priority for action on species based on their status and the sustainability of the level of bycatch. The methodology then evaluates U.S. domestic authorities and international treaties and agreements. In this analysis, rising to priority level are instances where bycatch occurs in the absence of conservation measures, lack of enforcement of authorized measures, or lack of a policy framework for taking action. Where a policy framework is available, the analysis examines feasibility of implementing conservation measures and the likelihood of their success.

Chapter 2 describes incidental bycatch of cetaceans in fisheries by FAO statistical area and summarizes the species and areas of greatest interest. The analysis examines the areas and nature of bycatch and suggests which interactions represent the highest risk to these populations. It also discusses needs that have been raised in the literature by scientific or management bodies as necessary to assess the population abundance and status, estimate

and evaluate current bycatch levels, or mitigate cetacean bycatch. Chapter 3 describes the U.S. legal framework for international cetacean protection and management. Chapter 4 analyzes the international framework and tools that are available to the U.S., either unilaterally or multilaterally, to implement protection measures, initiate discussions or foster programs in high-risk areas. Exemplary agreements are discussed and similar regional schemes are listed in text boxes. Appendix B provides a list of parties to the agreements discussed, as of the date of this report. Chapter 5 compares the highest risk populations to agreements in place, parties to those agreements, and whether actions are being taken to reduce bycatch. It also identifies gaps in information and mitigation measures. This analysis is summarized in Table 5.1. Chapter 6 makes recommendations on the types of actions the United States could take or could urge upon states party to mutual marine mammal conservation agreements. It also examines actions the U.S. could pursue outside the diplomatic arena, using grants programs, technology transfer, incentives, partnerships with the private and non-governmental organization (NGO) sectors, and employing its convening power to foster information exchange. Appendices C, D and E provide sample language for resolutions and legislation discussed in Chapter 6. Chapter 7 concludes the report with a template for priority setting based on considerations of risk and feasibility and makes recommendations for high, second-tier and low priority action options.

CHAPTER 2. BYCATCH CRITICAL ISSUES

For decades scientists have known that large numbers of cetaceans are incidentally killed in fisheries each year throughout the world. The information provided in Appendix A substantiates this allegation and indicates an extensive worldwide interaction between cetaceans and fisheries. Most notably, in almost all the statistical areas where studies have been conducted, large numbers of small cetaceans, especially coastally distributed species, are affected by coastal gillnet, purse seine, trawl, and trap fisheries.

Most species of cetaceans have been recorded at some time caught in some type of fishing gear. However, very few studies, with the exception of a few in the U.S., have successfully assessed and quantified the actual impact of a fishery or fisheries bycatch on cetacean populations. Part of the problem is that only a very small proportion of cetacean catches are ever actually recorded using some type of quantifiable process or an independent observer program. Generally, data are still lacking on fisheries catch statistics, fishing capacity (number of vessels and fishers), and fishing effort in many regions of the world. Additionally, for most cetacean species, it is very difficult and costly to assess population size and trends or to assess the consequences of an uncertain and unpredictable bycatch rate. This problem is further compounded in developing nations where fisheries management does not rank high as a national priority, and thus funds are frequently unavailable to undertake such assessments. Furthermore, reporting significant cetacean bycatch may be a low priority, or politically unacceptable, in countries where fishery development is considered vital for food security or maintaining the balance of trade.

There are large areas of the world where it seems likely there may well be interactions between cetaceans and fisheries, but for which there are, as yet, no data, and no idea of any impact that such fisheries may cause. This lack of information on the impacts of a fishery does not imply, however, that there is no problem, especially since reporting of just a few individuals in a specific fishery may be indicative of a larger interaction. Only when scientists can accomplish a detailed study of the cetacean stock abundance, fishing effort, and the bycatch rate in each fishery can a thorough and accurate assessment be made.[18]

Such assessments are integral to the development of long-term solutions to mitigate bycatch. Solutions to the problem of cetacean entanglement have been sought in several parts of the world with a variety of techniques. No universal solution to the problem has been found, but in one or two cases some reduction in the numbers of cetaceans caught in gillnets has been accomplished through gear modifications (e.g., rigging driftnets to fish a few meters below the surface or increasing twine size) or technological aids (e.g., pingers). Because banning the use of gillnets worldwide is not an option and site-specific gear prohibitions are not always effective, approaches will have to be found on a fishery-by-fishery basis, and such solutions should consider socio-economic alternatives (e.g., eco-tourism opportunities).

For several cetacean species—including the harbor porpoise, vaquita, Hector's and Maui's dolphin, finless porpoise, hump-backed and bottlenose dolphins, Irrawaddy dolphins, dusky dolphin, and Burmeister's porpoise—operational interactions with fisheries may threaten their survival or recovery. The following sections review, by FAO statistical area, the known fisheries interactions for species for which the interaction is either unsustainable or may be approaching an unsustainable level. The descriptions highlight only those species that are considered a priority for this area, based on the level of incidental mortality. Text boxes highlight needs for

[18] The estimates in the U.S. Ocean Commission Report were derived from extrapolations and models, and are not estimates of actual bycatch.

abundance estimates, observer data or recommended actions that have been drawn from the scientific literature, proceedings of scientific bodies, or available mitigation strategies (e.g., national laws, closed areas, or technological or gear modifications). A more thorough analysis and review of the literature for all cetaceans incidentally killed in fisheries in each FAO statistical area is provided in Appendix A.

Atlantic Areas and Populations Analyzed for Highest Risk

The following sections examine incidental bycatch of cetaceans in FAO statistical areas in the Atlantic. Where available, an assessment of the level of bycatch against estimated population is made. There are eight areas examined in the Atlantic, including the Mediterranean and Baltic Seas. Figure 2 shows the boundaries of these areas. Critical issues that arise include bycatch of critically endangered northern right whales and sperm whales, incidental mortality of harbor porpoises from populations numbering only in the hundreds of animals, and bycatch of numerous species of dolphins in fisheries from the northernmost reaches of the Atlantic south to Tierra del Fuego.

Developed nations such as the U.S., Canada and the European Union (EU), as well as developing countries such as Ghana and Caribbean Island nations, all have fisheries that interact with cetaceans. Challenges include gathering the most basic information on abundance and fishing effort to more complex technologic solutions and implementation of action plans. Necessary actions that have been identified in the literature or by scientific or management organizations are summarized in boxes for each area. High priority recommendations are included in Chapter 6.

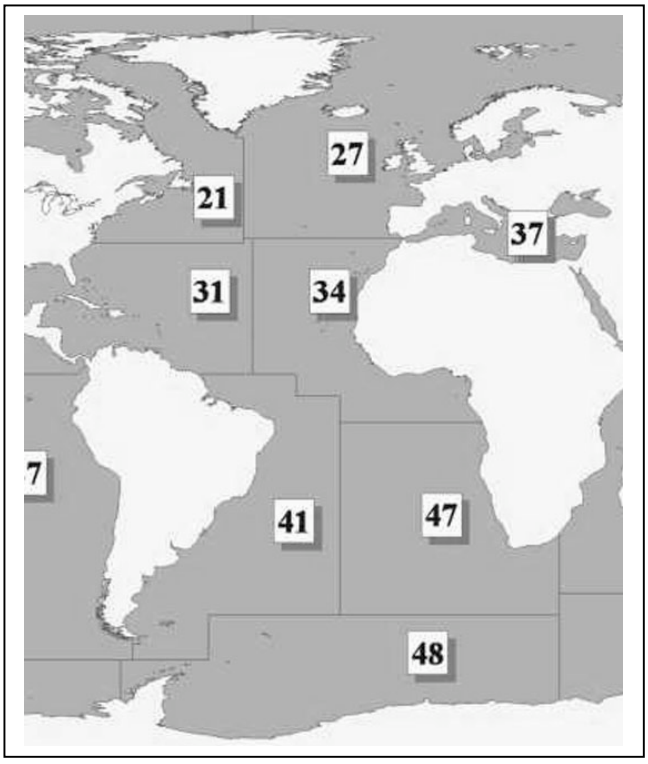

Figure 2: FAO Statistical Areas of the Atlantic

Area 21 Northwest Atlantic

Although the Northwest Atlantic includes the U.S. Exclusive Economic Zone (EEZ), because the focus of this report is international bycatch, the description for this area will focus only on international bycatch of shared cetacean stocks in the area. The assessment and mitigation of bycatch of these marine mammals within U.S. jurisdiction is governed under the MMPA and, as such, is not discussed here.

The species most affected by accidental entrapments in fishing gear in this area is the harbor porpoise. Catches of certain of the large whales, notably humpback and right whales, are also considered significant. The major fisheries involved with cetaceans are the Greenlandic driftnet fishery for salmon, the inshore trap and gillnet fisheries of Newfoundland (and probably elsewhere in eastern Canada, which remains comparatively less well-studied), Canadian herring weir fishery, and Canadian and U.S. gillnet fisheries and lobster trap fisheries.

The harbor porpoise may be most severely affected by gillnet fisheries in the Bay of Fundy–Gulf of Maine region, but also possibly in other gillnet and trap fisheries farther north. From 2000 through 2004, the total average annual mortality in Canadian fisheries is 55 animals (51 in the Canadian groundfish sink gillnet fishery and 4.4 in the Canadian herring weir fishery). This bycatch level is a significant decline from the high of 424 harbor porpoises incidentally killed in Canadian gillnets fisheries in 1993. The reduction in bycatch is due to a combination of closed areas and the implementation of pingers in the fishery beginning in 1996. In 2002, the Canadian Department of Fisheries and Oceans (DFO) suspended its Bay of Fundy monitoring program because of financial constraints. Without a monitoring program, it will be difficult to estimate overall bycatch.

In 1995, the International Whaling Commission (IWC) small cetacean subcommittee suggested that current levels of incidental mortality pose a serious threat to the harbor porpoise subpopulation in this area. However, subpopulations in the Gulf of St Lawrence, Newfoundland, Labrador, and Greenland are also subjected to large directed or incidental catch, but population status in these areas remains unknown. The U.S. must work with Canada to develop abundance and bycatch estimates for these stocks and an effective conservation plan for harbor porpoises.

Bycatch of right whales internationally is one of the leading causes of right whale mortality around the world. It is responsible for both the failure of the population to recover and its continuing current decline. While right whale bycatch numbers fewer than five animals per year, the precarious state of the population means this incidental mortality is considered a potential threat to population recovery. Northern right whales are entangled in cod traps, lobster trap lines, groundfish gillnets, and herring weirs at the rate of 1.2 whales per year (2000–2004). While this number may appear insignificant, it is unsustainable for a population that numbers only 300 animals. The DFO listed right whales as endangered under a Canadian Species At Risk Act, which is similar to the U.S. Endangered Species Act. DFO has developed a recovery plan and established a recovery-implementation team. The plan includes a number of recommendations to mitigate threats such as ship collisions and fishing gear entanglements, as well as recommendations on research, communications, whale watching, and regulations and enforcement. The U.S. right whale recovery plan calls on the federal government to engage in bilateral cooperative efforts with Canada to recover right whales.

Area 27 Northeast Atlantic

In the Northeast Atlantic, the major species affected by accidental catch in fishing gear are the harbor porpoise and the common dolphin. The fisheries that most frequently interact with cetaceans are gillnet fisheries, mainly set gillnet fisheries, which are distributed throughout coastal waters of this region and in some places extend for many tens of kilometers offshore. Trawls may also catch relatively large numbers of some species in some places (e.g., harbor porpoises in Shetland, common dolphins in mackerel mid-water trawls). Depending on tow times, most interactions with trawl fisheries result in death from drowning.

Overall, harbor porpoises are killed in more types of fishing gear, and possibly in larger numbers, than any other cetacean species in this area. Specifically, harbor porpoise bycatch from bottom-set gill nets is estimated as more than 7,000 animals annually in the North Sea. This exceeds 2 percent of the population and is considered unsustainable; in most cases, estimated mortality levels exceed the 1.7 percent of minimum population size established by the

Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS),[19] indicating that past or current bycatch levels are unsustainable.

Of particular concern are harbor porpoise mortality levels in the Celtic Sea, where more than 6 percent of the minimum population estimates are killed annually as bycatch. Likewise, bycatch in the Northern and central North Sea, Northern North Sea, and Southern and central North Sea are at unsustainable levels amounting to 4.1, 5.0, and 4.3 percent, respectively, of the population estimates for those areas. Removal levels are lower in other areas. For example, in Danish and UK fisheries that use mitigation measures such as pingers, more recent analyses are based on much lower estimated bycatch. However, these comparisons are made between recent bycatch estimates and relatively old abundance estimates and therefore do not take into account the potential decrease of harbor porpoise numbers due to bycatch that occurred between the two estimates.[20] The true impact to the various harbor porpoise stocks cannot be assessed until more current estimates of both abundance and bycatch are gathered, and the latter must be acquired through an effective independent monitoring program. Only when these data are available can effective mitigation strategies be developed and evaluated over time.

Dolphins tend to be caught more often in pelagic trawls. For example, vessels using large pelagic trawls to target horse mackerel southwest of Ireland are known to catch white-sided and common dolphins and long fin pilot whales, with a bycatch rate of one dolphin per 93 towing hours. From 2001 through 2003, 91 common dolphins were caught in 313 hauls in the pelagic trawl fisheries for bass (southwest England).[21] Prior to the introduction of EU legislation to ban the use of driftnets for tuna, dolphins—particularly striped and common—were caught in large numbers (more than 750 individuals in 1,420 hauls).[22] The impact of this bycatch on common dolphins is unknown. Common dolphin populations don't appear to be declining in this region, even though bycatch of common dolphins still numbers around 1,000 animals annually. It has been suggested that harbor porpoise populations may have declined in some areas such as the Baltic and southern North Seas, but what role, if any, fisheries may have had in such a decline is not clear. Up-to-date abundance and bycatch estimates for common dolphins in ASCOBANS waters are needed to determine the potential impact of known high mortalities in pelagic trawls.

Identified Needs

Information: regular abundance surveys, estimates of bycatch rates in fixed gear fisheries, knowledge of stock structure and growth.

Monitoring: Entanglement monitoring in pair trawl and drift net fisheries.

Mitigation: Employ pingers.

Legal Framework: Develop and implement European-wide framework, including enforceable bycatch mortality limits.

Enforcement: Enforce existing EU and ASCOBANS regulations and policies

Recent studies indicate that mortalities of delphinids such as white-sided and white-beaked dolphins and pilot whales may be substantial in pelagic trawl fisheries operating in the North

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[19] Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas. Done at New York 17 March 1992. Not in force. Concluded under the Convention on Migratory Species. ASCOBANS is principally intended to address the problems of fishery bycatch in the Baltic and North Seas. The focal species of ASCOBANS is the harbor porpoise although a variety of other odontocetes are regular inhabitants of the region.

[20] Furthermore, removal levels may be substantially underestimated, because bycatch remains to be assessed in many fisheries operating in the same area (e.g., Norwegian gillnet fisheries).

[21] Website for the Joint Nature Conservation Committee—Marine Mammal Bycatch.

[22] *Id.*

Sea, the English Channel, the Celtic Shelf, and the Bay of Biscay.[23] Similarly, abundance estimates are either outdated or lacking for these species, and bycatch estimates are unreliable.

The bottlenose dolphin populations in the nearshore Atlantic waters of Europe number only in the tens of animals for each stock. This species (along with harbor porpoise) is listed on Appendix II of the EU's Habitats Directive (Council Directive 92/43/EEC) as requiring special conservation measures. There is cause for concern that this "population" is low and declining and therefore requires particular measures to ensure that it suffers no further incidental mortality. Incidental mortality estimates are largely not available for this species and should be made a priority given the small population size.

There are very few recent comprehensive studies on cetacean abundance or population sizes; very little is actually known about stock structure in this region.

Estimates of abundance are either out-dated or completely lacking for cetacean species in these waters (e.g., Risso's dolphin, long-finned pilot whales, and killer whales). Alternatively, estimates are only available for some small regions (e.g., the Celtic Sea for common dolphins or striped dolphins) or have been combined for several species (e.g., white-beaked and Atlantic white-sided dolphins). More up-to-date estimates of cetacean abundance are needed because current impact assessments based on the 1994 abundance estimates and more recent bycatch numbers cannot take into account the potential depletion of stocks resulting from bycatch and other factors over the last decade. Scientists agree that it is necessity to carry out further comprehensive surveys to estimate cetacean abundance in ASCOBANS waters at regular intervals.[24] Moreover, scientists have said that, given the high costs of such surveys and the problems of current estimation techniques in low-density areas, there is a need to further develop existing techniques to overcome these problems.[25]

Additionally, monitoring cetacean entanglement is urgently needed for all single and pair pelagic trawling operations, particularly those targeting sea bass, mackerel, and horse mackerel in the Channel (as well as in the Celtic Sea and Bay of Biscay), especially between December and March where there is considerable evidence for high levels of bycatch. These include British, French, Dutch, Danish, and German fisheries, though there may be others. Monitoring the various—usually relatively small—driftnet fisheries operating in the Baltic also is needed, as is expansion and continuation of existing observer programs of all bottom-set gillnet fisheries in the North and Baltic seas and adjacent waters, including the English Channel.

Identified Needs

Information: Research investigating stock structure and maximum population growth rates, document bycatch rates in set nets.

Monitoring: Monitoring in set net and drift net fisheries.

Mitigation: Employ pingers.

Legal Framework: Develop and implement European-wide framework, including enforceable bycatch mortality limits.

Enforcement: Enforcement strategy for European-wide implementation of EU and ASCOBANS regulations.

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[23] Northridge S., 2003. Investigations into cetacean bycatch in a pelagic trawl fishery in the English Channel: preliminary results (SC/55/SM26). Berlin, Germany, (unpublished); 10.

[24] CEC, 2002b. Incidental catches of small cetaceans. Report of the second meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC(2002) 1134, Brussels, BL, Commission of the European Communities; 63.

[25] *Id*., at 63.

Information about bycatch rates is especially needed for the Norwegian setnet fisheries and German fixed gear fisheries operating in the North Sea and in the Kiel & Mecklenburg Bight. Scientists within ASCOBANS recommend observer coverage of 5 percent to 10 percent of total fishing effort for all bycatch monitoring programs.

In March 2004, the European Commission introduced a new regulation aimed at reducing the bycatch of harbor porpoises in bottom-set gillnets and entangling nets. From the summer of 2005, pinger Use was to become mandatory on bottom-set gillnets or entangling nets in the North Sea and the Skaggerak & Kattegat region that were deployed from vessels greater than 12m in length. Similar rules were to apply to the western English Channel and South Western approaches from January 2006 and to the east English Channel from January 2007. This regulation also made provision for the monitoring of dolphin bycatch in trawl fisheries from January 2005 in the English Channel, Irish Sea, and off western Britain and Ireland and from January 2006 in the North Sea and west Scotland.

On a larger scale, EU Commission scientists have stressed that a European wide management framework, including legally accepted bycatch limits and enforcement strategies, must be developed and implemented. Scientists generally agree that using an approach similar to the MMPA's potential biological removal (PBR), incorporating the ASCOBANS management goal of maintaining stocks at 80 percent of the carrying capacity, is useful in determining critical bycatch mortality limits.[26] However, they point out that the development of species-specific critical mortality limits for species other than harbor porpoises is necessary. More research investigating stock structure and maximum population growth rates would be necessary to achieve this objective.

Area 31 Western Central Atlantic

The Western-Central Atlantic encompasses the Mid-Atlantic, Southeast Atlantic, and Gulf of Mexico, U.S. EEZ. The abundance and mortality estimates for these areas are summarized in the U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments and will not be reviewed here. Instead, this section will focus on the incidental mortality in the Caribbean and off the Yucatan Peninsula and Central America.

Identified Needs

Information: Collaborative studies to understand and document range and abundance.

Monitoring: Training activities to aid in documentation of fishery bycatch and directed catch.

Legal Framework: Regional networks and collaboration under UNEP regional seas.

There has been a limited effort to document cetacean bycatch in the Mexican side of the Gulf of Mexico and Caribbean Sea, Colombia, the Dominican Republic, French Guyana, Puerto Rico, and Venezuela. Despite these valuable efforts, the magnitude of threat posed to cetacean populations in the wider Caribbean region as a consequence of fisheries operations is difficult to asses, and published information on bycatch is scarce. Systematic survey effort in the Caribbean and tropical Atlantic has been very limited; this results in sparse quantitative information on populations of cetaceans.

Small-scale and subsistence gillnet fisheries occur along the entire Gulf of Mexico and Caribbean. Cetacean species caught in these fisheries include pygmy sperm whale, tucuxi, Risso's dolphin, bottlenose dolphin, Atlantic spotted dolphin, killer whale, clymene dolphin,

[26] CEC, 2002b. Incidental catches of small cetaceans. Report of the second meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC(2002) 1134, Brussels, BL, Commission of the European Communities; 63.

spinner dolphin, and humpback whale. The annual incidental mortality has not been estimated for any species or fishery, and abundance estimates are sorely needed for most species.

In particular, studies call for scientific effort on Sotalia along coastal waters of Honduras, Nicaragua, Costa Rica, Panama, Colombia, Venezuela, Guyana, Surinam, and French Guyana. A recent study of bycatch in the mouth of the Amazon indicated incidental mortality of more than 1,050 tucuxis in a single year. Along with franciscanas, tucuxis are the most commonly caught cetaceans in Brazilian coastal gillnet fisheries.[27] The tucuxi may also be the cetacean most commonly caught as bycatch in coastal fisheries of the southern Caribbean Sea.

Given the sparse nature of the data, it is difficult to identify the species most frequently involved in fishery interactions. The Caribbean regional seas program of the United Nations Environment Programme (UNEP) has recently promulgated a regional marine mammal action plan. It also has established a Regional Activity Centre (RAC) in Guadeloupe for implementation of the protocol on Specially Protected Areas and Wildlife (SPAW). It has been suggested that local scientists and UNEP's RAC/SPAW officials develop regional networks, collaborative studies, and training activities to understand and document the range and abundance of cetaceans and the impacts of fishery bycatch and directed catch on cetacean populations in the wider Caribbean.

Area 34 Eastern Central Atlantic

In 1997, the IWC Scientific Committee concluded that information on small cetaceans in Africa (outside southern Africa) is very sparse and that issues of cetacean fishery bycatch must be addressed.[28] Projects that have sampled landing sites of small-scale coastal fisheries in Ghana since 1998 show that bycatch and directed harvests of small cetaceans are commonplace and possibly increasing. The largest catches, by far, are the result of deployment of large-meshed drift gillnets targeting tuna, sharks, billfish, manta rays, and dolphins. The species most frequently caught are clymene (Ghanaians call it the "common dolphin"), bottlenose, pan-tropical spotted, Risso's, long-beaked common, and rough-toothed dolphins, together with short-finned pilot and melon-headed whales.[29] Dwarf sperm and Cuvier's beaked whales may also be caught with some regularity.

Identified Needs

Information: Research to establish the range, distribution, natural history, taxonomy, abundance, and fishery interactions of Atlantic humpback dolphins.

Monitoring: Systematic data collection supported by training and resources.

Mitigation: Close RAMSAR site to gillnet fishing; add humpback dolphin to conservation program.

Legal Framework: CMS, national wildlife agencies.

Enforcement: Ban or limit commerce in cetacean products.

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[27] Beltrán, S. 1998. "Captura accidental de *Sotalia fluviatilis* (Gervais, 1853) na pescaria artesanal do Estuário Amazônico". M.Sc. thesis. Universidade do Amazonas, Manaus, Brasil. 100 pp.[In Portuguese] See also: Siciliano, S. 1994. Review of small cetaceans and fishery interactions in coastal waters of Brazil. *Report of the International Whaling Commission* (Special Issue) **15**: 241–250.

[28] IWC. 1998. Report of the scientific committee. Report of the International Whaling Commission **48**: 53–302.

[29] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A., and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans.* IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139 pp.

Off Mauritania, common dolphins and *Stenella* (spp.) are caught by eastern European pelagic trawlers. It is estimated these fisheries catch a minimum of about 500 to 1,000 dolphins per year. The artisanal lobster fishery near the border between Mauritania and Morocco is estimated to catch 20 harbor porpoises and other dolphins annually.[30]

Recent surveys sponsored by UNEP and the Convention on the Conservation of Migratory Species of Wild Animals (CMS or "Bonn Convention")[31] in Senegal and Gambia indicate continuing bycatch and deliberate takes of small cetaceans in artisanal and semi-industrial fisheries. Most of the animals caught are bottlenose, Atlantic hump-backed, and long- and short-beaked common dolphins and, on Senegal's Petite Côte, harbor porpoises.[32] The total bycatch in the artisanal fisheries in Senegal probably does not exceed 100 cetaceans per year.[33]

In West Africa, bycatch threatens the continued existence of Atlantic humpback dolphins. While bycatch of humpback dolphins is well documented in other West African countries, bycatch monitoring of coastal fisheries in Ghana and Togo has failed to yield a single record because of the severely depleted population.[34] Research is needed to establish the range, distribution, natural history, taxonomy, abundance, and fishery interactions of Atlantic humpback dolphins. A high priority area for dedicated field investigations is Ghana's Volta River region and western Togo.

Conservation efforts are needed for Atlantic humpback dolphins. For example, if research indicates cross-border movements between Ghana and Togo, the chances of international attention and investment in humpback dolphin conservation may be greatly improved through the Bonn Convention. The Ghana and Togo fisheries and wildlife departments must become engaged and cooperate to ban or at least limit commerce in cetacean products (e.g., restrict consumption to local fishing communities). One action Ghana could take to facilitate humpback dolphin conservation would be to add this species to the conservation program of Ada Sanctuary at the mouth of the Volta (Songhor RAMSAR site) and perhaps prohibit gillnet fishing in this area.

With sufficient funding and appropriate training, it should be possible to achieve systematic data collection at the national level and, in turn, to make progress toward assessing trends and implementing sound conservation measures. In the longer term, introduction of tourism focused

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[30] Maigret, J. 1994. Marine Mammals and Fisheries Along the West African Coast. In Gillnets and Cetaceans. Report of the International Whaling Commission. Special Issue 15.

[31] Convention on the Conservation of Migratory Species of Wild Animals, Done at Bonn, 23 June 1979. Entered into force 11 January 1983. 19 ILM 15 (1980). See Chapter 3.

[32] Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Drammeh, F., Jallow, A., Ndiaye, E., and Samba Ould Bilal, A.O. 2001a. Conservation efforts and field research on cetaceans in Senegal and The Gambia. Report to UNEP/CMS Secretariat, Bonn, Germany. See also Van Waerebeek, K., Ndiaye, E., Djiba, A., Diallo, M., Murphy, P., Jallow, A., Camara, A., Ndiaye, P., and Tous, P. 2000. A survey of the conservation status of cetaceans in Senegal, The Gambia and Guinea-Bissau. Report to UNEP/CMS Secretariat, Bonn, Germany. 80 pp.

[33] Maigret, J. 1994. Marine Mammals and Fisheries Along the West African Coast. In Gillnets and Cetaceans. Report of the International Whaling Commission. Special Issue 15.

[34] Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Drammeh, F., Jallow, A., Ndiaye, E. and Samba Ould Bilal, A.O. 2001a. Conservation efforts and field research on cetaceans in Senegal and The Gambia. Report to UNEP/CMS Secretariat, Bonn, Germany.

on dolphin watching seems feasible because species diversity is unusually high, seas are calm, and tourism to exotic Ghana is rising.[35]

A new Dakar-based non-governmental organization, Conservation and Research of West African Aquatic Mammals, or COREWAM, and an interdepartmental Gambian Aquatic Mammal Working Group are now in place. These organizations and other scientists must work together to obtain baseline abundance data and establish seasonal patterns of distribution of coastal cetaceans at subregional, rather than national, scales. These organizations and national bodies must also systematically collect data at the national level to assess trends in bycatch and develop practical measures for the reduction of net entanglements. Such actions are crucial to the survival of cetacean communities—especially the Atlantic humpback dolphin.

Finally, since at least the late-1960s, scientists have speculated that dolphins are involved in the tuna purse seine fishery in the eastern tropical Atlantic Ocean. The tuna vessels are registered in several countries, including France, Spain, and the U.S., as well as in several West African countries. The levels of mortality, stock sizes, and even exact species involved are not known with certainty, and there is conflicting information on the extent of the problem. It has been suggested that dolphin mortality in this fishery could be very high, as many as 30,000 or more animals per year.[36] The species involved likely include several species of the genus *Stenella*, as well as common dolphins (*Delphinus* spp.).[37] Tuna–whale interactions are also known to occur, and baleen whales are considered good indicators of tuna schools.[38] Despite claims to the contrary, there is reason to suspect a serious problem that has been neglected for more than 30 years. Independent observer data on the composition and extent of bycatch need to be obtained and published. Although observer programs may already exist in this fishery, adequate information to assess cetacean bycatch is currently lacking.

Area 37 Mediterranean and Black Seas

The species most affected by interactions with fisheries in this area appear to be harbor porpoise, striped dolphins, and sperm whales. Bottlenose dolphins are also caught in a wide variety of gear and are reported to cause damage to some fisheries locally. Common dolphins are also caught in high numbers in some fisheries in the Alboran Sea. The fisheries with the greatest level of cetacean–fishery interactions are generally gillnet fisheries. One major driftnet fishery has been banned since 1992, but others continue on a smaller scale, and setnet fisheries are widespread. Illegal driftnet fishing poses a major threat to all of these species.

The Black Sea population of harbor porpoises is classified as Vulnerable on the IUCN Red List. Harbor porpoises in the Black Sea are isolated from Atlantic populations by a range hiatus in the Mediterranean Sea. Harbor porpoises that occur in Greek waters of the Aegean Sea may

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[35] Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Drammeh, F., Jallow, A., Ndiaye, E. and Samba Ould Bilal, A.O. 2001a. Conservation efforts and field research on cetaceans in Senegal and The Gambia. Report to UNEP/CMS Secretariat, Bonn, Germany.

[36] Alverson, F.G. 1991. Tuna purse seine and gill/drift net fisheries in the oceans of the world and their relationship to tuna-dolphin, tuna-whale and tuna-whale shark associated schools. Unpublished Report Submitted to the CANAINPES Seccion Especializada en Pesca de Atun Programa Atun-delfin, Camara Nacional de la Industria Pesquera. 110 pp.

[37] Maigret, J. 1981. Introduction à l'étude des rapports entre les cétacés et la pêche thonière dans l'Atlantique tropical. *Bull. du Centre Natl. Rech. Oceanogr.* Pêches Mouadhibou **10**, 89–101.

[38] Alverson, F.G. 1991. Tuna purse seine and gill/drift net fisheries in the oceans of the world and their relationship to tuna-dolphin, tuna-whale and tuna-whale shark associated schools. Unpublished Report Submitted to the CANAINPES Seccion Especializada en Pesca de Atun Programa Atun-delfin, Camara Nacional de la Industria Pesquera. 110 pp.

belong to the Black Sea population or, alternatively, may be a remnant of a separate Mediterranean population.[39] Cetacean fisheries ended in the Soviet Union, Bulgaria, and Romania in 1966 but continued until 1983 in Turkey, mainly in the southeastern Black Sea.[40]

Identified Needs

Information: Determine the distribution and abundance of harbor porpoise in the Mediterranean and Black seas and connecting waters. Assess bycatch and develop a conservation plan.

Legal Framework: Implementation of ACCOBAMS.

Enforcement: Enforce existing gear regulations.

Harbor porpoises in the Black Sea are also threatened by accidental killing in large-mesh bottom-set gillnets for turbot, sturgeon, and dogfish. At present, incidental mortality in fishing nets is the most serious threat to harbor porpoises, with the majority (95 percent) of recorded cetacean entanglements being porpoises. Mortality estimates are not available. However, available data indicate that the annual level of harbor porpoise bycatch may be in the thousands.[41] This area needs a comprehensive effort to determine distribution patterns and to estimate abundance of harbor porpoises; it also needs a program—through interview surveys, visits to fish markets and landing sites, and on-board observer programs—to evaluate incidental catch and illegal hunting. Results of the population and threat assessments should lead to the development of a basin-wide conservation plan.

Large numbers of sperm whales are known to have been killed incidentally in the high-seas driftnet fishery for swordfish, possibly reducing their abundance in the Mediterranean. Entanglement in high seas swordfish driftnets has caused and continues to cause considerable mortality since the mid-1980s.[42] The recorded number of sperm whales found dead or entangled

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[39] Frantzis, A., Gordon, J., Hassidis, G., and Komnenou, A. 2001. The enigma of harbor porpoise presence in the Mediterranean Sea. *Marine Mammal Science* **17**, 937–944.

[40] From 1976 through 81, harbor porpoises accounted for 80% of the total catch of cetaceans in Turkey, with 34,000–44,000 killed annually. With an estimated loss rate (porpoises killed but not recovered) of 50% total mortality could have been as much as double these numbers. Illegal catches of unknown magnitude were also reported in 1990. Klinowska, M. 1991. *Dolphins, Porpoises, and Whales of the World. The IUCN Red Data Book.* IUCN, Gland, Switzerland and Cambridge, UK. See also IWC. 1992. Report of the scientific committee. *Report of the International Whaling Commission* **42**, 51–270.

[41] Commercial hunting of Black Sea cetaceans, including harbor porpoises, was banned in 1966 in the former U.S.S.R (present Georgia, Russia, and Ukraine), Bulgaria, and Romania and in 1983 in Turkey. The riparian states assumed international obligations to protect Black Sea cetaceans as contracting parties of the Convention on Biological Diversity (CBD), Convention on the Conservation of Migratory Species of Wild Animals (CMS), Convention on the Conservation of European Wildlife and Natural Habitats (Berne Convention), Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, Appendix II), and the Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea, and Contiguous Atlantic Area (ACCOBAMS). The harbor porpoise, *P. phocoena*, is mentioned in Annex II of the EC Directive No.92/43/EEC on the conservation of natural habitats of wild fauna and flora. In 1996, the Ministers of Environment of Black Sea countries adopted cetacean conservation and research measures within the framework of the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea (paragraph 62). The harbor porpoise is included as Data Deficient in the regional Black Sea Red Data Book (1999). In 2002, however, it was listed as Endangered in the Provisional List of Species of the Black Sea Importance, an annex to the Black Sea Biodiversity and Landscape Conservation Protocol of the Bucharest Convention.

[42] International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15:1–72. See also: Pace, D.S., Miragliuolo, A., Mussi, B. 2005.

from 1971 through 2004 in Spain, France, and Italy (combined) was 229. Surveys are needed to assess the abundance and distribution of sperm whales in the Mediterranean.

Likewise, large numbers of striped dolphins have been killed incidentally in the high-seas driftnet fishery for swordfish, possibly reducing their abundance in the Mediterranean. Entanglement in high seas swordfish driftnets has caused and continues to cause considerable mortality since the mid-1980s and may approach 1 percent of the population in the Alboran Sea and the Corsican–Ligurian Sea.[43] The recorded number of striped dolphins killed annually in driftnet fisheries may be in the thousands. With no recent estimates of abundance or incidental mortality available, surveys are needed to assess the abundance, distribution, and incidental mortality of striped dolphins in the Mediterranean.

Identified Needs

Information: Determine distribution and abundance of common dolphins; evaluate extent and risk posed by incidental mortality.

Monitoring: Monitor incidental mortality, develop bycatch estimates.

Mitigation: Eliminate driftnets in region.

Legal Framework: Implement ACCOBAMS actions and measures to regulate and reduce incidental mortality.

Enforcement: Enforce existing regulations on driftnets.

In the Mediterranean and Black seas, bottlenose dolphins occur in scattered inshore communities of perhaps 50–150 individuals. Incidental kills of bottlenose dolphins in trammel and gillnets occur frequently in some areas.[44] In some Mediterranean areas and the Black Sea, the incidental mortality rates are probably unsustainable.[45] There is a need for intensive population assessments in areas of the Mediterranean and Black seas and interconnecting waters where bottlenose dolphins are known to occur. Efforts are also required to monitor incidental catches (best accomplished through on-board observer programs).

Short-beaked common dolphins in the Mediterranean and Black seas have undergone a dramatic decline in abundance during the last few decades, and have almost completely disappeared from large portions of their former range, including the northern Adriatic Sea, Balearic Sea, Provençal basin, and Ligurian Sea.[46] No credible information exists on the abundance of common dolphins (and other cetaceans) in the Black Sea, but massive directed

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Behaviour of a nursery group of entangled sperm whales (*Physeter macrocephalus*) off Capo Palinuro (Southern Tyrrhenian Sea, Italy). Abstracts, 19Th Annual Conference of the European Cetacean Society, La Rochelle, France, 2–7 April 2005:69.

[43] International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15:1–72. See also: Pace D.S., Miragliuolo A., Mussi B. 2005. Behaviour of a nursery group of entangled sperm whales (*Physeter macrocephalus*) off Capo Palinuro (Southern Tyrrhenian Sea, Italy). Abstracts, 19th Annual Conference of the European Cetacean Society, La Rochelle, France, 2–7 April 2005: 69.

[44] Silvani, L., Gazo, M., and Aguilar, A. 1999. Spanish driftnet fishing and incidental catches in the western Mediterranean. Biological Conservation 90, 79–85.

[45] Silvani L., Raich J., Aguilar A. 1992. Bottlenose dolphins, *Tursiops truncatus,* interacting with fisheries in the Balearic Islands, Spain. European Research on Cetaceans 6:32–34.

[46] UNEP/IUCN. 1994. Technical report on the state of cetaceans in the Mediterranean. Mediterranean Action Plan Technical Reports Series No. 82, United Nations Environment Programme (UNEP), Regional Activity Centre for Specially Protected Areas, Tunis. 37 pp.

killing, which continued to the early 1980s, is believed to have considerably reduced the population size. [47] Other than the reported bycatch of 145–200 common dolphins in the Spanish swordfish driftnet fishery in 1993-1994, the threats posed to common dolphins by accidental killing in fishing gear are virtually undocumented.

Pelagic driftnets have been prohibited in Spain since 1992, and their use has been limited by EU regulations since 2002. However, a reduced Italian fleet still fishes with such gear in an unregulated manner, as does a large Moroccan fleet and the French *tonnaille* vessels.[48] All of these operations are known to cause substantial cetacean mortality.

The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)[49] calls for actions to address fishery bycatch for these species. ACCOBAMS came into force in 2001 and therefore is still in its early stages of development. In the near future, ACCOBAMS should coordinate among various national agencies and scientists to undertake the needed abundance surveys and to monitor incidental mortality to develop accurate bycatch estimates. Without such estimates, ACCOBAMS's ability to effectively regulate incidental mortality and develop conservation plans and measures will be severely diminished.

Area 41 Southwest Atlantic

The large number of species present and the wide range of geographical zones encompassed by this area make analyses difficult. The franciscana *(Pontoporia blainvillei)* is the most threatened cetacean species in the southwestern Atlantic Ocean. Although the franciscana is the species of greatest concern, the tucuxi has also experienced relatively high levels of incidental mortality in some areas. Commerson's dolphins are also reportedly caught quite frequently in Argentina; again, however, the impact on populations is not known. Other species—including bottlenose, spinner, Risso's, rough-toothed, Atlantic spotted, and common dolphins and false killer, killer, pilot, minke, humpback, and southern right whales—have been caught in lower numbers; current bycatch estimates for these species are either nonexistent or extremely poor.

Identified Needs

Information: Identify and delineate management units; acquire up-to-date abundance estimates for all populations in this region.

Monitoring: On-board observers.

Mitigation: Pingers.

The major fisheries in this area with cetacean bycatch are shark gillnet and other inshore gillnet fisheries. Trawls and seines also take a proportion of cetaceans, but apparently to a lesser extent than do gillnets. Driftnet fisheries in southern Brazil are also of concern because of their potential to incidentally kill humpback, sperm, dwarf sperm, and pilot whales and spinner, Atlantic spotted, common, striped, clymene, and bottlenose dolphins.

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[47] Buckland, S.T., Smith, T., and Cattanach, K. L. 1992. Status of small cetacean populations in the Black Sea: a review of current information and suggestions for future research. Report of the International Whaling Commission 42, 513–516.

[48] Imbert, G., Gaertner, J.-C., and Laubier, L. 2001b. Prevention a l'aide de repulsifs acoustiques des captures de dauphins par les thonailles. 10e Conference International sur les cetaces Mediterranee de la RIMMO. Juan-les Pins 16–18 Nov. 2001 (Abstract).

[49] Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea, and Contiguous Atlantic Area. Done at Monaco, 1996. Entered into Force 2001. Source citation from CMS Secretariat.

Between 1 and 10 percent of the population of franciscana are incidentally killed in gillnet fisheries. The total estimated mortality throughout the range could be in the order of 1,500–2,000 animals per year. Most animals incidentally captured in fisheries are juveniles with an average age of one year, and 64 percent of the individuals are under three years.[50] There has been significant progress made in the assessment of franciscana populations, mostly because of strong collaboration among researchers from Brazil, Uruguay, and Argentina, but work must continue to secure a more accurate abundance estimate for each of the four management areas.

Although workshops have been held in that region to address scientific questions regarding the status of franciscana and to identify research and conservation priorities, there is still a need to gather biological information on ecology, genetics, and mortality rates. The range states must (at the national and provincial level) focus on monitoring and mitigation of franciscanas bycatch, including mechanisms to evaluate potential mitigation measures and their implementation and monitoring.

The IWC Scientific Committee's Subcommittee on Small Cetaceans discussed the status of franciscanas at the 2004 meeting of the IWC. That group recommended further testing, implementation trials, and development of both pingers[51] and the replacement of gillnets with less harmful gear. The committee recommended developing educational programs with artisanal fishermen and fishing communities to promote awareness of the franciscana's vulnerability and to engage stakeholders in the search for solutions to the bycatch problem.

Pelagic trawls for hake and shrimp off Patagonia are harmful to pelagic dolphins such as dusky, short-beaked common, and Commerson's dolphins *(Lagenorhynchus obscurus*, *Delphinus delphis*, and *Cephalorhynchus commersonii)* that feed on anchovies, mackerels, or sardines.[52] This fishery incidentally kills less than 1 percent of the Commerson's and common dolphin populations, and 1 to 2 percent of the dusky dolphin population.

In addition to pelagic trawling, a shore-based gillnet fishery operates seasonally for Patagonian blenny *(Eleginops maclovinus)*, hoki *(Macruronus magellanicus)*, and silversides *(Odonthestes* spp). This artisanal fishery operates off southern Santa Cruz and Tierra del Fuego, from Cabo Espíritu Santo in the north to Río Irigoyen. Neither local nor regional authorities has made any attempt to estimate cetacean mortality in this gillnet fishery.

Bycatch has not been a priority in fishery management. Since 2002, provincial government authorities have been calling for an assessment of cetacean and seabird bycatch to take place prior to expansion of the anchovy fishery southward from 41ºS. Still, estimates of mortality levels or rates are sorely lacking. There is a clear need for detailed information on fleet characteristics and dynamics and on the numbers and species composition of the bycatch. On-board observers are essential to assessing bycatch and must be made a priority. Moreover, the impacts of fishery mortality on cetacean populations can only be assessed if abundance estimates are available. Consequently further research is needed to identify and delineate

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[50] Culik, B.M. (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pp.

[51] Pingers have shown promise for reducing bycatch mortality of franciscanas. Bordino, P., Kraus, S., Albareda, D., Fazio A., Palmerio, M. Mendez, A., and Botta, S. 2002. Reducing incidental mortality of franciscana dolphin *Pontoporia blainvillei* with acoustic warning devices attached to fishing nets. Marine Mammal Science 18:833–842.

[52] Crespo, E.A., Koen Alonso, M., Dans, S.L., García, N.A., Pedraza, S.N., Coscarella, M.A., and González, R. 2000. Incidental catch of dolphins in mid-water trawls for southern anchovy off Patagonia. Journal of Cetacean Research and Management 2:11–16.

management units and acquire up-to-date abundance estimates for all populations in this region. Finally, range states should develop and test devices to prevent dolphins from entering trawls and possibly also to assess the effectiveness and feasibility of using pingers to reduce dolphin mortality in the gillnet fisheries.

Area 47 Southeast Atlantic

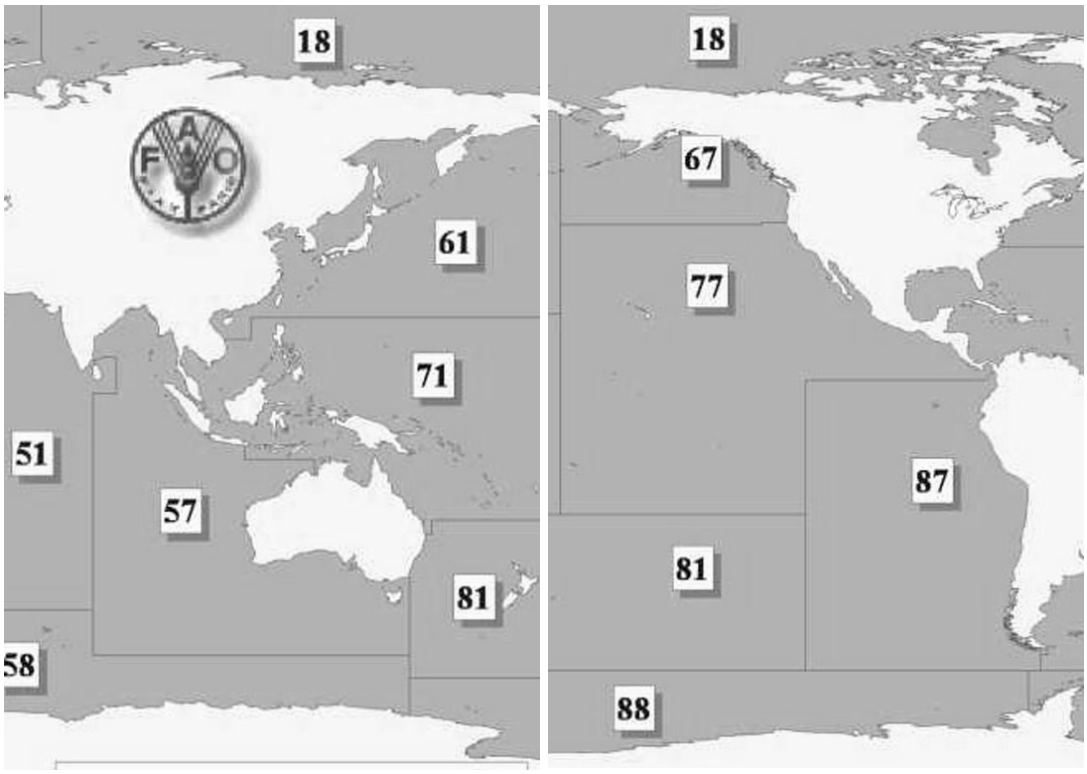
Few recent studies appear to have been made in this area. The recent revelation that a driftnet fishery has been operating off Tristan da Cunha for tuna, with concomitant incidental mortality of small whales and dolphins, suggests that there may also be considerable mortality to some as yet unidentified species. Incidental mortality to Heaviside's dolphin, which is restricted to the coastal zone of South Africa and Namibia, may also be an important interaction, but recent data on bycatch and population size are lacking.

Heaviside's dolphin is protected within the 200-mile Exclusive Fishery Zone of South Africa, where all delphinids are protected under the Sea Fisheries Act of 1973. Similar protection is provided in Namibia's 12-mile exclusive fishery zone (EFZ). The fisheries of concern are the inshore gillnet fishery and any coastal fisheries that may adversely affect Heaviside's dolphin. Neither the bycatch nor the abundance of this species is known, so there is a need for more thorough documentation. The St. Helena mullet and elephant fish fishery has caught only two dusky dolphins (*Lagenorhynchus obscurus*).

Pacific Areas and Populations Analyzed for Highest Risk

Nine FAO statistical areas make up the Pacific region, including the Indian Ocean, illustrated in Figures 3a and 3b. Where available, an assessment of the level of bycatch against estimated population is made. Many areas in the Pacific are characterized by lack of information about cetacean population size and incidental bycatch, making difficult an assessment of highest risk. Based on what is known about comparable fisheries and gear types elsewhere, it is likely that critical issues arise for a dozen species of marine and fresh water dolphins, three species of porpoise, and the false killer whale in the waters of 17 countries covering the entire Pacific Rim. Critical issues are summarized in the box below.

Developed nations such as the United States and Japan as well as developing countries such as Natal and Sri Lanka all have fisheries that interact with cetaceans. Challenges include gathering the most basic information on abundance and fishing effort to more providing complex technologic solutions and implementation of action plans. Critical issues that have been identified in the literature or by scientific and management organizations are summarized in the box below. Area specific recommendations also are drawn from the literature. High priority recommendations are included in Chapter 6.



Figures 3a & 3b: FAO Statistical Areas of the Western and Eastern Pacific

Critical Incidental Take Issues in the Pacific Ocean

- **Spinner dolphins in Sri Lanka, drift and set gillnets in combination with direct harpooning**
- **Risso's dolphins in Sri Lanka, drift and set gillnets in combination with direct harpooning**
- **Bottlenose dolphins off the coast of Natal, South Africa, anti-shark gillnets; south coast of Zanzibar (Tanzania), drift and bottom-set gillnets**
- **Indo-Pacific humpback dolphins in Natal (south Africa), anti-shark nets; south coast of Zanzibar (Tanzania), drift and bottom-set gillnets; Madagascar and East Africa, coastal gillnets**
- **Ganges river dolphins in India and Bangladesh, gillnets**
- **Irrawaddy dolphins in Chilka Lake (India), gillnets; Bay of Bengal, heavy-mesh drift gillnets for elasmobranches**
- **Dall's porpoise in direct harvests and salmon driftnets off Japan and Russia**
- **Finless porpoises in Korea and Japan, coastal nets and traps; in Inland Sea (Japan), gillnets; Yangtze River, gillnets and electrofishing; marine waters of China and SE Asia, coastal nets and traps**
- **Baijis in China, electrofishing and rolling hooks**
- **Spinner dolphins and Fraser's dolphins in the Phillippines, driftnets for large pelagics and flying fish, purse seines for small pelagics**
- **Irrawaddy dolphins (marine), Phillippines, *matang quarto* crab nets; (freshwater) Mekong River, Mahakam River, Songkhla Lake, and Ayeyarwady River, gillnets**
- **False killer whales, Hawaii, longlines**
- **Vaquitas, Gulf of California (Mexico), gillnets**
- **Hector's dolphins, North Island (New Zealand), coastal gillnets**
- **Dusky dolphins, Peru, drift gillnets**
- **Burmeister's porpoises, Peru, coastal gillnets**

Area 51 Western Indian Ocean

In the western Indian Ocean (See Figure 4), incidental catch appears to be of spinner (4,000), spotted (1,500), common (1,000) and Risso's (1,300) dolphins. Catches of pygmy sperm whales (2,700), dwarf sperm whales (2,700), and bottlenose (500–1,250) dolphins are particularly high in the Sri Lankan fisheries. From 4 to 9 percent of the populations of bottlenose and humpback dolphins, respectively, are caught in shark nets to protect bathers along the Natal coast; this amounts to an unsustainable incidental bycatch. Finless porpoises and Irrawaddy dolphins may also be heavily affected by gillnet fisheries in Sri Lanka, India, and Pakistan, but studies in this region are insufficient to make a quantitative assessment.

Large numbers of at least 14 species of cetaceans have been killed in directed hunts and by entanglement in fishing gear in Sri Lanka, with spinner dolphins caught most frequently.[53] Scientists estimate that, from 1984 through 1986, some 350,000 gillnets accounted for between 8,042 and 11,821 bycatch mortalities around the Sri Lankan coast.[54] Other authors estimate that the total annual catch for all cetaceans may be as high as 15,000 to 25,000 animals.[55] Additionally, many cetaceans are harpooned, and it appears that deliberate hunting may be increasing, possibly because of poor enforcement of legal protections for cetaceans enacted in Sri Lanka in 1993.[56] There is an immediate need to estimate population abundance for 14 cetacean species currently killed in Sri Lankan fisheries.

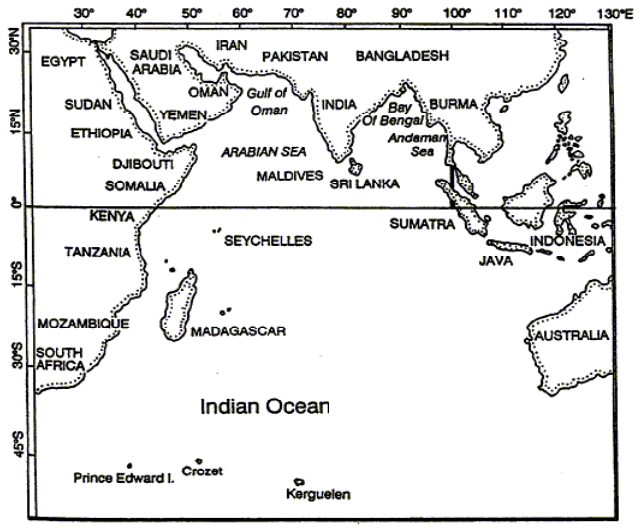


Figure 4: Indian Ocean

More than 2.5 million fishermen in the subcontinent of India deploy an estimated 1,216,000 passive gillnets annually, incidentally killing an estimated 1,000–1,500 cetaceans, 90 percent of which are killed along the southwest coast. Most of these animals are spinner or common dolphins, although coastal fisheries in India also take a toll on Indo-Pacific humpback dolphin populations.[43] Continued monitoring of the entanglement of dolphins along the Indian coast is very important because the expanding coastal gillnet fishery may adversely affect some coastal dolphins such as the humpback dolphin. Incidental mortality in fisheries is thought to be a significant conservation problem for cetaceans in numerous areas along the

[53] Leatherwood, S., and Reeves, R.R. (eds.). 1989. Marine mammal research and conservation in Sri Lanka 1985–1986. UNEP Marine Mammal Technical Report 1, Nairobi, Kenya.

[54] Leatherwood, S. 1994. Report of the workshop on mortality in passive fishing nets and traps. Annex D. Re-estimation of incidental cetacean catches in Sri Lanka. In: W.F. Perrin, Donovan, G.P., and Barlow, J. *(eds). Gill-nets and Cetaceans. Reports of the International Whaling Commission, Special Issue 15*, pp. 64–65. Cambridge, UK: International Whaling Commission.

[55] Dayaratne, P., and de Silva, J. 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2–6 July 1990 8 pp.

[56] Ilangakoon, A. 1997. Species composition, seasonal variation, sex ratio and body length of small cetaceans caught off west, southwest and south coast of Sri Lanka. *Journal of the Bombay Natural History Society* **94**, 298–306.

western shores of the Indian Ocean. Relatively few areas along the coast have been the focus of dedicated assessment efforts.

Additionally, the driftnet, shrimp trawl, gillnet, and seine fisheries in the waters of Pakistan, Iran, the Arabian Sea, the Arabian Gulf, and the Gulf of Oman have not been studied and may take cetaceans in numbers as large as in the Sri Lankan fishery.

Off the coast of East Africa there are several bycatch problems. First, dolphins *(Stenella* sp., *Steno bredanensis* and *Tursiops* sp.) are harpooned mainly for Use as bait in a longline fishery for tiger sharks in Zanzibar (Tanzania). Small populations of Indo-Pacific bottlenose dolphins *(Tursiops aduncus)* and humpback dolphins *(Sousa chinensis)* inhabit waters off the south coast of Zanzibar. Until 1996, these dolphins were hunted for bait and human consumption—an activity that likely reduced the local populations of these animals. The best current abundance estimates for the two species are 161 bottlenose and 71 humpback dolphins.[57] In 2000, scientists documented cetacean bycatch in fishing gear around Zanzibar. An estimated six species of dolphins are killed year-round in drift- and bottom-set gillnets predominantly; these killings were from two villages off the south coast of Zanzibar. In 2000–2004, observer programs estimated that the annual anthropogenic mortality was 8 percent and 5.6 percent of the estimated number of Indo-Pacific bottlenose dolphins and humpback dolphins in the area, respectively.[58]

Second, the Natal shark net fishery, although small, is also an important threat for local populations of bottlenose and humpback dolphins. Between 1980 and 1988 inclusive, 67 humpback dolphins died in shark nets to protect bathing beaches along the Natal coast, South Africa—or about 7–8 animals per year representing 3.5 to 4 percent of the population.[59] More recent estimates of both mortality and abundance are not available.

Urgent action is clearly needed to reduce the pressure on these East African populations that are likely already depleted. Bycatch mitigation is important to conserve both the dolphin populations and the long-term economies of the local communities for which dolphin-oriented tourism has become an important part of their livelihood.

Reliable and current data on cetacean populations and mortality rates are virtually non-existent, making it impossible to assess the magnitude of the problem and to establish clear priorities for conservation. What is needed is a comprehensive program to study cetacean populations and the impacts from hunting and fishing activities in the western Indian Ocean. Researchers from the various nations bordering the Indian Ocean need to be trained and equipped to conduct at-sea surveys; collect biological samples; estimate the species age, identify sex composition of landed cetaceans; and assess fishing effort by area and season.

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[57] Stensland, E. 2004. Behavioural ecology of Indo-Pacific bottlenose and humpback dolphins. Doctoral thesis, Stockholm University, Department of Zoology. ISBN: 91-7265-837-X. The hunt has since been replaced with dolphin-oriented tourism; in 2001, about 35 local boats were engaged in carrying passengers to watch dolphins. See: Amir, O.A., and Jiddawi, N.S., 2001. Dolphin tourism and community participation in Kizimkazi village, Zanzibar. Pp. 551–560 *in* M. Richmond and J. Francis (eds.), Marine science development in Tanzania and Eastern Africa. Proceedings of the 20th anniversary conference on advances in marine science in Tanzania, Zanzibar, Tanzania, IMS/ WIOMSA.

[58] Stensland, E. 2004. Behavioural ecology of Indo-Pacific bottlenose and humpback dolphins. Doctoral thesis, Stockholm University, Department of Zoology. ISBN: 91-7265-837-X.

[59] Jefferson, T.A., and Karczmarski, L. 2001. *Sousa chinensis*. *Mammalian Species* (American Society of Mammalogists) **655**, 9 pp. See also. Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. *South African Journal of Wildlife Research* **20(2)**, 44–51.

Finally, efforts are needed to assess populations, habitats, and bycatch in rivers or portions of rivers where the Ganges river dolphin occurs.

Area 57 Eastern Indian Ocean

Recent information on cetacean–fishery interactions in Area 57 is lacking. The following summary is based on what might be expected from previous studies and studies in other areas with comparable fisheries. A now-terminated Taiwanese shark and tuna gillnet fishery operated off Northern Australia and caught bottlenose dolphins, spinner dolphins, spotted dolphins, humpback dolphins and false killer whales, a proportion of which are in this area. The fishery was mainly located in Area 71 and is discussed under that section. Given the amount of gillnetting likely to occur in this region, accidental catches may adversely affect small coastal species such as the finless porpoise and Irrawaddy dolphin to some extent. The driftnet fisheries operating farther offshore—in the Bay of Bengal, for example—might be expected to catch spinner and spotted dolphins, at least, and perhaps other species. Driftnet fisheries in the southern Indian Ocean may catch a variety of species such as the spectacled porpoise, the southern right whale dolphin, and common dolphin. All of these fisheries require more detailed information on non-target catches.

Identified Needs

(Eastern & Western Indian Ocean)

Information: Reliable and current data on cetacean populations and mortality rates.

Monitoring: monitor entanglement in the Indian Ocean and establish bycatch estimates.

Mitigation: reduce mortality in drift- and bottom-set gillnets and shark nets.

Technology Transfer: train and equip scientists to conduct at-sea surveys; collect biological samples; estimate the species, age, and sex composition of landed marine mammals; and assess fishing effort by area and season.

Enforcement: enforce legal protections for cetacean in Sri Lanka.

Along the east coast of India, the expansion of marine fisheries results in large numbers of cetaceans dying in gillnets. Also, there is some indication that bottlenose dolphins (probably *T. aduncus)*, and possibly Indo-Pacific humpback dolphins, are also being deliberately killed along the coast of Andhra Pradesh, eastern India, because the fishermen perceive them as competitors for diminishing fish resources.[60] Deliberate and incidental killing of cetaceans may be especially frequent along the east coast of India near major population centers (e.g., Calcutta and Madras), where the demand is high for fish and fishing employment. This eastern coastline, at least as far south as Vishakhapatnam, includes the westernmost range of the Irrawaddy dolphin. The only other known freshwater population—in Chilka Lake, India—has not been adequately assessed but is known to be subject to bycatch in gillnets and drag nets and may number as few as 50 remaining individuals. Consequently, there is a need for a rigorous monitoring program to document cetacean mortality of Irrawaddy dolphins in Chilka Lake and all cetaceans along the east coast of India.

[60] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A., and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans.* IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp. at 62

Area 61 Northwest Pacific

The information in this section was derived from reports that Japan provided to the IWC on its directed hunts and incidental captures in Japanese fisheries, together with largely anecdotal accounts from Korean, Chinese, and Soviet fisheries. According to the FAO, Area 61 encompasses the most productive fishery waters in the world, and in 1999 accounted for 24.1 million tons of fish landings. China continues to report the largest landings of any fishing nation, most of which come from this area. As such, it is also an area of high levels of cetacean bycatch. Incidental catch in Vietnamese and Taiwanese fisheries would also be expected, but little information is available. Figures available for Japan might suggest some accuracy and reliability in estimating total bycatch, but the reported mortality is a minimum estimate and not corrected for total effort. Because of this enormous and unmonitored fishing effort, reported bycatch of cetaceans is likely to be grossly underestimated. Additionally, the IWC Scientific Committee has expressed concern that Japan (as well as other nations) may not be providing a complete reporting of all direct and incidental captures.

Identified Needs

Information: Stock structure information for Dall's porpoise, pilot whales and striped dolphins and systematic abundance survey throughout the range of the finless porpoise and better estimates of bycatch.

Monitoring: monitor bycatch in Chinese, Japanese, Vietnamese and Taiwanese fisheries.

Mitigation: eliminate electrofishing and rolling hooks and establish a protected area for finless porpoises in Dongting Lake or Poyang Lake .

In the 1980s, the estimated total bycatch for the Japanese, Taiwanese, and South Korean squid driftnet fishery was approximately 15,000–24,000 cetaceans per year. This mortality was particularly problematic for Pacific white-sided dolphins (6,100), Dall's porpoise (thousands or tens of thousands), and the northern right whale dolphin, which was reduced by 24 percent to 73 percent of its pre-exploitation size.[61] The Bering Sea population of Dall's porpoise is estimated to have been reduced to somewhere between 78 percent and 94 percent of its pre-exploitation size, and the Western Pacific population to between 66 percent and 91 percent of its original size.[62] In January 1993, a United Nations moratorium on high seas driftnet fisheries went into effect—virtually eliminating this source of mortality (See Chapter 4 for description of the moratorium). However, large numbers of Dall's porpoises continue to die in driftnets within national waters of Japan and Russia, where the UN ban on driftnets does not apply. The estimated bycatch in the Japanese salmon driftnet fishery operating in the Russian EEZ totaled close to 12,000 for the period of 1993 through 1999, ranging from 643 to 3,149 on an annual basis.[63]

More than 17,168 small cetaceans are caught by Japan each year in direct harvests. Dall's porpoise, Baird's beaked whale, pilot whales, and bottlenose and Risso's dolphins are all targets of directed fisheries. Catch levels for pilot whales and striped dolphins may be unsustainable if they are caught predominantly from one stock rather than several. While

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[61] Mangel, M. 1993. Effects of high seas driftnet fisheries on the northern right whale dolphin *Lissodelphis borealis*. Ecol App 3: 221–229

[62] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A., and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans.* IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp. at 62

[63] IWC. 2002c. Report of the standing sub-committee on small cetaceans. *Journal of Cetacean Research and Management* **4** (Supplement), 325–338.

available data indicate that, with the exception of the Dall's porpoise, the level of bycatch is less than 1 percent of each species, the absence of stock structure data and either absent or dated population estimates create significant uncertainty regarding whether these directed takes are adversely affecting these species. For nearly a decade the IWC Scientific Committee has expressed concern over the cumulative level of mortality of Dall's porpoise (14,992). Therefore, these catches highlight the need for an international agreement that regulates the direct harvests of small cetaceans.

The most severely affected species in this region is clearly the baiji, but fisheries may also threaten others such as the finless porpoise. For the baiji, there are many threats[64], but electrofishing is the greatest, and 5 of 12 documented deaths in the 1990s have been attributed to electrofishing.[65] Previously, the main cause of mortality was the use of a snagline fishing gear called "rolling hooks." While some types of rolling hooks are illegal, their Use continues within the limited remaining range of the baiji. Efforts are needed to end electrofishing and eliminate all forms of rolling hooks within the baiji's range. During an expedition in 2006, scientists failed to find any baiji in the Yangtze River. There are reports that scientists may now declare the baiji "functionally extinct," making it the first aquatic mammal species to become extinct since the 1950s.[66]

In the Yangtze, finless porpoises occur in the same areas as the critically endangered baiji and face similar threats. Although recent studies suggest a dramatic decline in abundance of finless porpoises, densities are said to remain relatively high in the mouths of Poyang and Dongting lakes. The Chinese government should consider establishing a protected area for finless porpoises in Dongting Lake or Poyang Lake and adjacent waters.

China's extensive fishing fleets Use gear (e.g., gill and trawl nets) known to kill cetaceans. Some scientists believe that the incidental catch of some small cetaceans, especially finless porpoises, is high.[67] From 1985 through 1992, 114 finless porpoises were found off the coast of

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[64] The Three Gorges Dam spans the Yangtze River at Sandouping, Yichang, Hubei province, China. Construction began in 1994. It will be the largest dam in the world, more than five times the size of the Hoover Dam. The reservoir began filling on June 1, 2003, and will occupy the present position of the scenic Three Gorges area, between the cities of Yichang, Hubei, and Fuling, Chongqing. Structural work was finished on May 20, 2006, nine months ahead of schedule. However, several generators still have to be installed, and the dam is not expected to become fully operational until 2009.

As with many dams, there is controversy over the costs and benefits of the Three Gorges Dam. Although there are economic benefits from flood control and hydroelectric power, there are also concerns about the future of more than 1.9 million people who will be displaced by the rising waters, the loss of many valuable archaeological and cultural sites, and the effects on the environment. It is believed that the dam is a contributing factor in the decline and possible "functional" extinction of the Chinese River Dolphin.

[65] Zhang, X., Wang Ding., Liu, R., Hua, Y., Wang, Y., Chen, Z., and Wang, L. 2001. Latest population of the baiji *(Lipotes vexillifer)* and its conservation in the Yangtze River, China. Pp. 41–53 in: [Proceedings of] Conference on Conservation of Cetaceans in China, March 2001, Shanghai. Published by Ministry of Agriculture, P.R. China.

[66] http://en.wikipedia.org/wiki/Chinese_River_Dolphin. Other scientists have noted, however, that conventional observation methods for sighting marine mammals may not be appropriate for the Yangtze, which not only is highly turbid, but also teeming with river traffic, making it nearly impossible to see any river dolphins even if any animals were present. Pers. Comm. David Cottingham, NOAA, March 2007.

[67] Parsons, E.C.M., and Wang, J.Y. 1998. A review of finless porpoises *(Neophocaena phocaenoides)* from the South China Sea. Pp. 287–306 *in:* The Marine Biology of the South China Sea. Proceedings of the Third International Conference on the Marine Biology of the South China Sea, Hong Kong, 28 October–1 November 1996 (ed. B. Morton). Hong Kong University Press.

western and northeastern KyU.S.hu, including part of the western inland sea of Japan: 84 were incidentally killed by fisheries—bottom gillnets killed 58; surface gillnets killed 17; trap nets killed 7; trawl nets killed 1, and drifting ghost nets killed 1.[68] Finless porpoises were also incidentally captured, most frequently in the coastal waters of China—totaling about 2,132 individuals in trawl, gillnet, and stow nets.[69] There is a tremendous need for a systematic abundance survey throughout the range of the finless porpoise and better estimates of bycatch for this species.

Numerically, the major fisheries that interact with cetaceans appear to be the smaller, salmon driftnet fisheries, but there are many other driftnet, gillnet, setnet, trap net, longline, and purse-seine fisheries in this area for which there is no information. Given the large and growing fisheries of Japan, China, Korea, and Taiwan, there is a need for systematic bycatch assessments in these diverse fisheries and for up-to-date abundance estimates.

Area 67 Northeast Pacific

Much of the Northeast Pacific Area 67 is made up of the U.S. EEZ off Alaska, Washington, and Oregon. It does, however, include areas off Canada and international waters outside the EEZs of Russia, Canada, and the United States. The United States and Canada account for 98 percent of all landings within the area.[70] This section will focus on international bycatch of shared cetacean stocks in the area, not on coastal stocks of cetaceans within the U.S. EEZ, which are managed under the MMPA and, as such, are not the subject of this report.

Many cetacean species interact with or are incidentally captured by commercial fisheries. Since the closure of the salmon and squid driftnet fisheries inside U.S. waters, the level of the mortality for cetacean species is less than 1 percent. Mortalities in fisheries in international waters in the area are poorly known. Fisheries include squid, pollock, salmon, halibut, cod, crab, and flatfish and Use a variety of gear, including pelagic and bottom trawls, longlines, gillnets, driftnets, purse seines, and troll lines.

The major fisheries that interact with cetaceans are the inshore salmon gillnet fisheries, the Alaska pollock fishery, longline fishery, and various pot fisheries. When considered in relation to other fisheries in the Pacific, the incidental mortality of cetaceans in Northeast Pacific fisheries is inconsequential.

Area 71 Western Central Pacific

Roughly 1,700 bottlenose dolphins and 1,000 spinner dolphins are incidentally caught in gillnet, driftnet, and purse-seine fisheries in the western central Pacific. Also at risk are Irrawaddy dolphins. This region's fisheries are diverse and poorly documented. Nevertheless, coastal gillnets, especially driftnets for tunas and mackerels, are widely Used. After a closure in Australian waters, the Taiwanese driftnet fishery relocated and continued fishing in Indonesian waters in the Arafura Sea. With no reduction in effort, high cetacean bycatch rates are probable.

Spinner and Fraser's dolphins experience substantial bycatch in Philippine fisheries. In the Philippines, scientists estimated that about 2,000 dolphins—primarily spinner, pan-tropical spotted, and Fraser's—were being killed each year by a fleet of five tuna purse seiners using fish-aggregating devices. The annual bycatch of small cetaceans in a single tuna driftnet fishery

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[68] Kasuy, T. 1999. Finless porpoise—*Neophocaena phocoenoides* (Cuvier, G. 1829). *in:* Handbook of Marine Mammals (Ridgway, S.H., Harrison, S.R., eds.) Vol. 6: The second book of dolphins and porpoises, pp 411–442.

[69] Yang G. Zhou K, Xu, X, and Leatherwood, S. 1999. A survey on the incidental catches of small cetaceans in coastal waters of China. Yingyong Shengtai Xuebao 10: 713–716.

[70] David and Lucille Packard Foundation. 2001. Mapping Global Fisheries and Seafood Sectors. 34.

in Negros Oriental was estimated at about 400.[71] Scientists estimate that even more cetaceans may be caught in round-haul nets. One estimate for the eastern Sulu Sea was 2,000–3,000 per year.[72] Directed fisheries for small cetaceans were also reported, with as many as 200–300 dolphins caught annually in San Francisco and smaller numbers caught for bait in shark and chambered nautilus *(Nautilus pompilius)* fisheries in Palawan.[73] Currently there are no total bycatch estimates for the Philippines. Preliminary analyses of cetacean abundance surveys indicate that current bycatch is not sustainable.[74]

There is still a need to continue efforts to assess incidental catch in the tuna purse seine and drift gillnet fisheries. The major need is for comprehensive monitoring and documentation of fishing effort and bycatch employing longitudinal monitoring of high-risk fleets with onboard observers and landing-site interviews. There should also be intensive surveys to assess cetacean abundance and threats in biodiversity hotspots such as the Tubbataha National Park and World Heritage Site and adjacent Cagayan Islands; there is also a need to conduct more extensive surveys under the auspices of the Convention on Migratory Species in the Sulu Sea and the Sulawesi Sea. Although the directed take of small cetaceans is believed to have declined as a result of protective legislation, monitoring has become more difficult because fishermen are secretive in disposing of their catch.[75]

Identified Needs

Information: Comprehensive cetacean abundance and bycatch surveys are needed for the Irrawaddy dolphin, Indo-Pacific humpback dolphin, Indo-Pacific bottlenose dolphin, finless porpoise, and spinner dolphin (and its dwarf form) in the Philippines, Indonesia, Thailand and throughout the region.

Monitoring: Incidental catch assessments in the tuna purse seine and drift gillnet fisheries; comprehensive monitoring and documentation of fishing effort and bycatch employing longitudinal monitoring of high-risk fleets with onboard observers and landing-site interviews.

Mitigation:, prohibit the intentional killing of dolphins and provide alternative gear or employment options for fishermen in Malampaya Sound and the Mahakam River.

Legal Framework: Use the Convention on Migratory Species to conduct abundance surveys.

Enforcement: enforce Indonesian and Philippine laws that prohibit killing and live-capture and direct harvests of cetaceans.

Incidental mortality in fisheries (e.g., gillnets, explosives) is likely the principal cause of depletion of Irrawaddy dolphin populations. The species has been seriously depleted in parts of Thailand.[76] Recent surveys indicate

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[71] Dolar, M.L.L. 1994. Incidental bycatch of small cetaceans in fisheries in Palawan, central Visayas and northern Mindanao in the Philippines. *Report of the International Whaling Commission* (Special Issue) **15**:355–363.

[72] *Id.*

[73] *Id.*

[74] Dolar, M.L.L. 1999. Abundance, distribution and feeding ecology of small cetaceans in the eastern Sulu Sea and Tañon Strait, Philippines. PhD. dissertation, University of California, San Diego. Xxv + 241 pp. See also Perrin, W.F. 2002. Problems of marine mammal conservation in Southeast Asia. Proceedings of International Symposium 70th Anniversary of the Japanese Society of Fisheries Science. Fisheries Science 68, Supplement 1:238–242.

[75] Dolar, *supra*, note 65.

[76] Andersen, M., and Kinze, C.C. 2000. Review and new records of the marine mammals and sea turtles of Indochinese waters. *Natural History Bulletin of the Siam Society* **48**, 177–184.

dramatic declines in range and abundance of the Mekong and Mahakam freshwater populations.[77]

Irrawaddy dolphins in the Mahakam River, Indonesia, number fewer than 50 individuals and are listed as Critically Endangered by the IUCN.[78] Between 1995 and 2001, at least 37 dolphins died, primarily from entanglement in gillnets but also from vessel collisions and illegal hunting.[79] From 1997 through 1999, an average of three dolphins died per year from gillnet entanglements, representing between 6 percent and 8.8 percent of the population.[80]

While Irrawaddy dolphins are protected from killing and live-capture according to Indonesian law, monitoring and enforcement are minimal. Further population monitoring is vitally important, as is a continued evaluation of the threats facing this population. But immediate action should be taken to eliminate fishery mortality by, at a minimum, prohibiting the intentional killing of dolphins and providing alternative gear or employment options for gillnet fishermen. Other options include establishing protected areas and deterrent measures, both of which should be examined.

Another small, geographically isolated group of animals living at the head of Malampaya Sound in Palawan, Philippines, numbers approximately 77 individuals (CV 27.4%) and is confined to a 133-square-kilometer area of the inner sound.[81] This population should also be classified as Critically Endangered simply by virtue of its low numbers. Between February and August 2001, researchers confirmed that two dolphins were accidentally killed in bottom-set nylon gillnets Used to catch crabs (called *matang quatro* nets locally). They also received reports from local fishermen that as many as three additional dolphins were killed in these nets during the same period.[82] These levels of bycatch are unsustainable and are threatening the existence of Irrawaddy dolphins in Malampaya Sound—the only known population of the species in the Philippines. The crab fishery provides substantial employment and income to the fishermen in Malampaya Sound, an economically depressed region. Despite a scientific recommendation that dolphin mortality in the crab fishery be eliminated or at least drastically reduced, promoting the conservation goal of reducing entanglement in *matang quatro* gillnets will require socio-economic alternatives to the crab fishery that ensure an equal or greater income to the fishermen. These efforts must be accompanied by long-term monitoring of dolphin abundance and mortality in Malampaya Sound.

Scientists believe that there may have been a dramatic decline in the abundance of Irrawaddy dolphins in the Mekong River, where the population is a high priority for Red List

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[77] IWC. 2001a. Report of the standing sub-committee on small cetaceans. *Journal of Cetacean Research and Management* **3** (Supplement), 263–291.

[78] Kreb, D. 2002. Density and abundance estimates of the Irrawaddy dolphin, *Orcaella brevirostris*, in the Mahakam River of East Kalimantan, Indonesia: a comparison of survey techniques. *Raffles Bulletin of Zoology*, Supplement, 85–95.

[79] *Id.*

[80] *Id.*

[81] Dolar, M.L.L., Perrin, W.F., Gaudiano, J.P., Yaptinchay, A.A.S.P., and Tan, J.M.L. 2002. Preliminary report on a small estuarine population of Irrawaddy dolphins *Orcaella brevirostris* in the Philippines. *Raffles Bulletin of Zoology,* Supplement, 155–160.

[82] *Id.*.

assessment.[83] In the Mekong River from 2001 through 2003, an average of four dolphin deaths per year were attributed to gillnet entanglement; this represents 5.8 percent of a population estimated to number only 69 individuals.[84] There is a need for a coordinated, comprehensive, and credible rangewide assessment of the Mekong River dolphin population. The assessment should include an abundance estimate, a determination of range limits during various water stages, and an evaluation of habitat quality.

In Thailand, the Irrawaddy dolphin, finless porpoise, and Indo-Pacific humpback dolphin are probably the most severely affected species because of their near-shore distribution and susceptibility to entanglement. Recent surveys revealed that Irrawaddy dolphins have almost entirely disappeared from Songkhla Lake, a large lagoon system connected to the Gulf of Thailand that may have harbored a substantial resident dolphin population in the past.[85] In Songkhla Lake from 1990 through 2003, scientists believe at least 15 Irrawaddy dolphins were killed incidentally in gillnets from a population that may number as few as 8–15 individuals.[86] A dwarf form of the spinner dolphin has been described from specimens caught by shrimp trawlers operating in the Gulf of Thailand. If these animals belong to a discrete breeding population, the impact of the shrimp fishery alone could put that population in jeopardy.[87] Now, there is a need for at-sea surveys to assess cetacean abundance, distribution, and fishery "hotspots" in the Gulf of Thailand and Andaman Sea.

Finally, this area needs further research. In the Philippines, Indonesia, Thailand, and elsewhere in the western central Pacific, where relatively little is known about abundance, distribution, and bycatch levels of cetaceans such as the Irrawaddy dolphin, Indo-Pacific humpback dolphin, Indo-Pacific bottlenose dolphin, finless porpoise, and spinner dolphin (and its dwarf form), comprehensive cetacean abundance and bycatch surveys are needed to develop effective mitigation strategies.

Area 77 Eastern Central Pacific

Although the Eastern Central Pacific includes cetaceans that occur within the U.S. EEZ, the description for this area will focus only on bycatch of shared cetacean stocks in international waters or the EEZs of other nations.

The species most frequently caught in this area are the dolphins incidentally captured in the purse-seine fishery for yellowfin tuna: eastern and white belly spinner dolphins; northeastern offshore and southern–western offshore spotted dolphins; coastal spotted dolphins, and the northern, central, and southern common dolphin.[88] In 1989, the U.S. and international fleets in the Eastern Tropical Pacific tuna purse-seine fishery incidentally caught approximately 100,000

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[83] Baird, I.G., and Mounsouphom, B. 1997. Distribution, mortality, diet and conservation of Irrawaddy dolphins *(Orcaella brevirostris Gray)* in Lao PDR. *Asian Marine Biology* **14**, 41–48.

[84] Beasley, I., Chooruk, S., and Piwpong, N. 2002. The status of the Irrawaddy dolphin, *Orcaella brevirostris*, in Songkhla Lake, southern Thailand, Raffles Bulletin of Zoology, Supplement 10: 75–83.

[85] *Id.*

[86] *Id.*

[87] *Id.*

[88] According to the National Marine Fisheries Service, although the number of coastal spotted dolphins reported caught by observers on class 6 purse seine vessels may be small, they may be caught more frequently by smaller purse seiners even though intentionally setting on dolphins with a vessel smaller than class 6 is technically prohibited. Personal communication with Brad Wiley, February 2007.

dolphins. In 2005, that mortality had declined significantly, to fewer then 1,200 dolphins. While the incidental mortality for each of these dolphin species still numbers in the low hundreds, the overall percentage of the population affected is less than 0.1 percent or the equivalent of the zero mortality rate goal in the U.S. MMPA. Nevertheless, within the Agreement on the International Dolphin Conservation Program (AIDCP) (see description in Chapter 3), the U.S. should advocate for updating the existing stock mortality limits to reflect the most recent and best available abundance estimates. Furthermore, the U.S. should continue to periodically conduct abundance surveys to investigate population trends and to support any modifications to the stock mortality limits that might be necessary.

Scientists are still concerned that despite the fact that reported dolphin mortality ahs been a very small fraction of population size, there is still no clear indication that either northeastern offshore spotted or eastern spinner dolphins are recovering. There are several hypotheses to explain this apparent failure to recover: cryptic effects of repeated chase and encirclement on survival or reproduction (internal injuries, stress, hyperthermia), separation of suckling calves from their mothers during the fishing process, unobserved or observed but unreported mortality, ecosystem or environmental changes, effects due to breakup of dolphin schools (increased predation, social disruption), ecological effects due to removing tuna from the tuna-dolphin association, and lags in recovery due to other inter-specific effects.[89]

Much of the research to date to evaluate the cryptic mortality and cow/calf separation hypotheses has been based on data mining and modeling from information collected from 1970 through the 1990s, and not on direct observation in the present-day fishery. Among the parties to the AIDCP, there has been significant debate about the model's assumptions resulting in a general unwillingness to accept the results or take any further action to account for cryptic mortality in the stock mortality limits. If the U.S. is to make any progress on this issue, it must partner with both the Inter-American Tropical Tuna Commission and the other parties to undertake direct observational research to further test these hypotheses. This will require a substantial commitment of resources to design and execute a series of at-sea experiments to better understand why these dolphin populations are not recovering at the expected rate.

The most significant incidental mortality in the eastern central Pacific region occurs with bycatch of the vaquita in coastal gillnet fisheries and false killer whales in longline fisheries. The vaquita, endemic to the upper Gulf of California, Mexico, is considered critically endangered by the IUCN. Vaquitas, numbering in the low to mid-hundreds, are threatened with extinction by gillnet fisheries. The populations may be declining as commercial and artisanal fisheries for sciaenids, scombrids, shrimp, and elasmobranchs in the upper Gulf kill 35 to 40 vaquitas per year—6 to 7 percent of the population. According to recent estimates by the Southwest Fisheries Science Center, the

Identified Needs

Information: estimate vaquita abundance and trends; undertake abundance and quantitative bycatch estimates in coastal fisheries in Central America

Monitoring: monitor fishing activities and bycatch throughout the vaquita's range

Mitigation: extend the southern boundary of the Biosphere Reserve to cover the entire range of the vaquita and phase out gillnets and trawlers in the entire Biosphere Reserve

Legal Framework: convene a take reduction team for false killer bycatch in longlines and export mitigation measures internationally.

[89] NOAA information available online at http://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=248&id=1408.

current estimate of annual mortality rate may be closer to 10 percent.[90]

In 1992, President Carlos Salinas of Mexico created the Technical Committee for the Preservation of the totoaba (an endangered sciaenid fish) and vaquita. On 10 June 1993, the Government of Mexico established the Biosphere Reserve of the Upper Gulf of California and Colorado River Delta, in large part to protect the habitat of vaquitas and totoabas. The management plan for this reserve called for a ban on commercial fishing in its "nuclear zone." In 1996, the Government of Mexico convened an international panel of experts to form a recovery team—the International Committee for the Recovery of the Vaquita. Regardless of which group, all of the various efforts have produced remarkably similar recommendations:

- To monitor fishing activities and bycatch throughout the vaquita's range
- To estimate vaquita abundance and trends
- To take immediate action to eliminate incidental catch of vaquitas

More recently, the International Committee recommended that the southern boundary of the Biosphere Reserve be expanded to incorporate the known range of the vaquita; gillnets and trawlers be phased out in the entire Biosphere Reserve; effective enforcement of fishing regulations begin immediately; acoustic surveys for vaquitas be initiated; research on alternative gear types be started; public outreach and education be developed; consideration be given to the compensation of fishermen for lost income; research be initiated on vaquita habitat; and international and nongovernmental cooperation be fostered.[91] Many scientists believe that banning gillnets in the entire range of the species is the single measure most likely to prevent extinction. This ban must be accompanied by socio-economic alternatives for the people whose incomes are adversely affected by any restrictions.

The impact of the longline fisheries off Hawaii is emerging as a potential problem for several species. National Marine Fisheries Service (NMFS) recognizes three stocks of false killer whales in the central Pacific: a Hawaiian stock within U.S. waters surrounding the Hawaiian archipelago, a Palmyra stock within U.S. waters surrounding Palmyra Atoll, and an undefined stock throughout international waters and the rest of the Pacific Islands Region. In recent years, mortality and serious injury from the Hawaiian and Palmyra stocks has exceeded sustainable levels (1.6 percent to 2.5 percent of the population).[92] To date, NMFS has not established a bycatch reduction team, as required by the MMPA, to develop measures to mitigate and reduce this bycatch. Additionally, the number of false killer whales caught by international fisheries has not been estimated for any of these three stocks, but scientists are concerned that bycatch may have a significant impact on them. NMFS must take the first step—convene a bycatch-reduction team—to develop effective mitigation measures that can then be exported to other international fleets that take false killer whales and enforced through international regional fisheries management organizations.

As stated, cooperative international management programs have dramatically reduced overall dolphin mortality in the yellowfin tuna purse-seine fishery in the eastern tropical Pacific during the last 15 years. Although much attention has been given to the bycatch problem associated with the yellowfin tuna purse-seine fishery, comparatively little notice has been given to incidental catch of cetaceans in coastal and artisanal gillnet fisheries in nations that border

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[90] Personal Communication, February 2007. Barbara Taylor, NOAA Southwest Fisheries Science Center.

[91] Rojas-Bracho, L., and Jaramillo-Legorreta, A.M. 2002. Vaquita *Phocoena sinus*. Pp 1,277–1,280 *in: Encyclopedia of Marine Mammals* (eds. W.F. Perrin, B. Würsig, and J.G.M. Thewissen). Academic Press, San Diego, California.

[92] The PBR for the Hawaiian stock is 1.0, and the estimated mortality is 4.4 animals.

the eastern tropical Pacific (eastern central Pacific). Although few quantitative data are available, the magnitude of the cetacean bycatch in coastal and artisanal gillnet fisheries of the eastern tropical Pacific is suspected to be high.[93] Because of the inshore nature of these fisheries, they tend to affect cetaceans that are already subject to other forms of exploitation and habitat degradation.

An exploratory study of artisanal gillnet fishery bycatch levels in relation to estimates of small cetacean abundance in the eastern tropical Pacific estimated overall annual mortality rates of 4.4 percent to 9.5 percent.[94] Even at the bottom end of this range, the mortality would be unsustainable—exceeding the recommended limit of 1 percent to 2 percent of the population abundance.[95] Scientists believe that mortality rates may be even higher for coastal subspecies (e.g., coastal spotted and Central American spinner dolphins (*S. a. graffmani* and *S. l. centroamericana*, respectively) because animals from these populations are likely over-represented, relative to their abundance, in the bycatch.[96] The report estimated that annual incidental mortality in artisanal gillnets was 16,596 in Costa Rica and 3,581 in Panama.[97] Nevertheless, information on bycatch in Guatemala, El Salvador, Honduras, and Nicaragua is still lacking.

These small cetacean species, which are not restricted to U.S. territorial waters, present a particular problem: no cooperative management agreements exist with Mexico to address the bycatch in widely dispersed, artisanal gillnet fisheries. These coastal fisheries involve many relatively small vessels and operate at subsistence or small-scale commercial levels. The same is true for the other Central American nations. The U.S. must work with Mexico, Costa Rica, Panama, Guatemala, El Salvador, Honduras, and Nicaragua, as well as local fishermen, scientists, and nongovernmental groups to jointly undertake abundance and quantitative bycatch estimates for these coastal fisheries. In particular, the U.S. must forge a cooperative management agreement with Mexico, because this is especially important for transboundary cetacean species, given the apparently dynamic nature of geographical stock boundaries. Until these goals are accomplished, the conservation and management actions that the U.S. is taking under the MMPA are at best hindered and at worst severely undermined.

Identified Needs

Information: Monitor abundance and distribution of Maui's and Hector's dolphins.

Monitoring: Observer program to estimate throughout the range of the dolphins.

Mitigation: Allow fishing only with gears and methods that do not catch Maui's dolphins; increase the size of the North Island sanctuary to include the harbors and bays and extend the offshore boundaries of both sanctuaries.

Area 81 Southwest Pacific

Hector's dolphin is endemic to New Zealand. The total size of all populations is

[93] Vidal O., Van Waerebeek K., and Findley L.T., 1994. Ceta[illegible] and the wider Caribbean: a preliminary review. Report of the International Whaling Commission (Special Issue) 15, 221–233.

[94] Palacios, D.M., and Gerrodette, T. 1996. Potential impact of artisanal gillnet fisheries on small cetacean populations in the Eastern Tropical Pacific. Southwest Fisheries Science Center Administrative Report LJ-96-11, La Jolla, California. 15 pp.

[95] Wade, P. 1998. Calculating limits to the allowable human-caused mortality of cetaceans and pinnipeds. Marine Mammal Sci 14: 1–37.

[96] Palacios, *supra*, note 86.

[97] *Id.*

estimated at approximately 7,400, with 7,270 (CV 16.2 percent) distributed around South Island[98] and some 100 individuals (called Maui's dolphins) off the west coast of North Island.[99] The IUCN lists the species as Endangered and the North Island population as Critically Endangered.

Hector's dolphins have been bycaught in gillnets throughout most of their range since gillnetting became widespread in New Zealand waters in the early 1970s. Scientists believe that gillnet mortality is causing continuing declines in all of the populations.[100] The Banks Peninsula Marine Mammal Sanctuary was created in 1988 to reduce bycatch off the Canterbury coastline on the east side of South Island. However, in 1997–1998, the estimated bycatch by commercial gillnetting vessels north and south of Banks Peninsula (fishing outside of the sanctuary area) was 16 Hector's dolphins (CV 39 percent).[101] In view of continued recreational and commercial bycatch north and south of the sanctuary, New Zealand introduced regulations to prohibit recreational gillnetting along the Canterbury coastline from 1 October through 31 March. Commercial fishermen have developed a voluntary code of practice (COP) for reducing bycatch in the Canterbury area as an interim measure while a management plan for the species is prepared. Acoustic deterrents (pingers), specially developed for Hector's dolphin based on field studies of this species, are being used by Canterbury gillnet fishermen as part of the COP.[102] Although there have been no reports of bycatch of Hector's dolphins in any of the nets using pingers, it is difficult to scientifically judge their effectiveness, and thus there is uncertainty about whether the pingers and COP are effective at reducing bycatch.

For Maui's dolphin, the situation is grave. Scientists have concluded that the population has been reduced to such low levels that in order for the North Island population to recover, human-induced mortality must be reduced to zero. In August 2001, the New Zealand Minister of Fisheries created a protected area that prohibits recreational and commercial gillnet fishing within four nautical miles of shore along a 400 km segment of the west coast of North Island. An observer program is also planned for trawlers and Danish seine vessels fishing in the area closed to gillnetting.

While there has been some progress, bycatch continues throughout most of the species range. Bycatch of Hector's and Maui's dolphins in gillnets must be reduced to sustainable levels. It is likely that additional measures will be necessary for Maui's dolphins such as allowing fishing only with gears and methods known not to catch Maui's dolphins (e.g., replace gillnetting or trawling with line fishing). Additionally, New Zealand should consider increasing the size of the existing protected areas—to include the harbors and bays in the North Island sanctuary and

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[98] Slooten, E., Dawson, S., and Rayment, W. 2002. Quantifying abundance of Hector's dolphins between Farewell Spit and Milford Sound. Published Client Report on Contract 3076, funded by Conservation Services Levy. Department of Conservation, Wellington, New Zealand. dsis35.pdf.

[99] Russell, K. 1999. "The North Island Hector's dolphin: a species in need of conservation". Unpublished M.Sc. thesis, University of Auckland.

[100] Martien, K.K., Taylor, B.L., Slooten, E., and Dawson, S. 1999. A sensitivity analysis to guide research and management for Hector's dolphin. *Biological Conservation* **90**, 183–191.

[101] Baird, S.J., and Bradford, E. 2000. Estimation of Hector's dolphin bycatch from inshore fisheries, 1997–1998 fishing year. Published Client Report on Contract 3024, Conservation Services Levy. Available: www.doc.govt.nz/cons/scires/csl.pdf.

[102] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A., and Notarbartolo di Sciara, Giuseppe (compilers). 2003. *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans.* IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139 pp. at 88

extend the offshore boundaries of both sanctuaries. Finally, New Zealand should implement a statistically robust observer program throughout the species range to verify whether and when bycatch has been reduced to sustainable levels, and it should continue to monitor abundance and distribution of Hector's and Maui's dolphins to assess exposure to threats and the effectiveness of management efforts.

Area 87 Southeast Pacific

The dusky dolphin, Burmeister's porpoise, the Chilean dolphin, and possibly southern right whale dolphins and Peale's and Commerson's dolphins are perhaps the most frequently captured species by a variety of fisheries in this area. Scientists have estimated that between 10,000 and 20,000 small cetaceans per year die in Peruvian fisheries, and most of these are dusky dolphins; the bycatch is large enough to cause serious concern for the continued existence of these species.[103] Changes in the catch composition suggest that the regional population of dusky dolphins is depleted.[104] In addition, a growing concern in Peru is the demand for dolphin meat and blubber to be used as shark bait.[105]

Identified Needs

Information: Abundance of Peale's, Chilean, and Commerson's dolphins off Chile and Dusky dolphins and Burmeister's porpoise off of Peru.

Monitoring: In Chile and Peru studies of fishery-related mortality of cetaceans, including the nature, species composition, and levels of bycatch. A coastal port survey for discarded remains and boat-based observers to document entanglement and evaluate current fishery-caused mortality.

Enforcement: In Peru, enforce existing laws; in Chile re-evaluate the extent to which cetaceans are still caught for bait.

Clearly the most important fisheries are the coastal gillnet fisheries, especially the driftnet fisheries that operate along the entire west coast of South America. With the exception of Pucusana in Peru, these fisheries and bycatches are virtually undocumented. Directed take of cetaceans for crab bait may also be an important source of mortality, but recent quantitative information on this is lacking.

In Ecuador, the estimated cetacean bycatch in 1993 for the fleets in Puerto Lopez, Santa Rosa, Manta, and Anconcito was between 2,500 and 5,000.[106] However, if the mortality levels are similar in other

[103] Van Waerebeek, K., Van Bressem, M.F., Alfaro-Shigueto, J., Sanino, G.P., Montes, D., and Ontón, K. 1999. A preliminary analysis of recent captures of small cetaceans in Peru and Chile. International Whaling Commission, Cambridge, UK. Document SC/51/SM17. See also: Van Waerebeek, K., Alfaro-Shigueto, J., Montes, D., Onton, K., Santillan, L., Van Bressem, M.-F., and Vega, D. 2002. Fisheries-related mortality of small cetaceans in neritic waters of Peru in 1999–2001. International Whaling Commission, Scientific Committee Document SC/54/SM10, Cambridge, UK.

[104] Van Waerebeek, K., Alfaro-Shigueto, J., Montes, D., Onton, K., Santillan, L., Van Bressem, M.-F., and Vega, D. 2002. Fisheries related mortality of small cetaceans in neritic waters of Peru in 1999–2001. International Whaling Commission, Scientific Committee Document SC/54/SM10, Cambridge, UK.

[105] Van Waerebeek, *supra*, note 95.

[106] Felix, F., and Samaniego, J. 1994. Incidental catches of small cetaceans in artisanal fisheries of Ecuador. Report of the International Whaling Commission (Special Issue) 15:475480.

artisanal ports in Ecuador, the total bycatch in 1993 may have been two to three times greater.[107] Other scientists place estimated mortality at 6,377 small cetaceans.[108] The most affected species are common dolphins, spotted dolphins, and pilot whales.

In Chile, the hunting of Peale's, Chilean, and Commerson's dolphins for crab bait in southern Chile and the harpooning and net entanglement of various species off central and northern Chile has been a concern. Point-sampling at fishing ports in central and northern Chile in 1998 indicated fishery-related killing—including illegal directed takes—in 80 percent of the specimens found of at least five small cetacean species (Burmeister's porpoise, pygmy sperm whale, long-beaked common dolphin, pygmy beaked whale, and long-finned pilot whale). This deliberate killing combined with bycatch mortality also has contributed to declines in abundance of Commerson's dolphins and Peale's dolphins.

Under an agreement between NMFS and the Fishery Subsecretary of Chile, the Chilean government agreed to take measures to decrease the impacts of crab fisheries on marine mammals.[109] These measures included programs to evaluate the scale of the problem, educate the fishing community concerning the ecological effects of the crab fisheries, and provide alternative sources of bait.[110] Some action has been taken on all of these aspects. Today a proportion of the bait consists of fish or fishery by-products, either obtained by the fishermen themselves or provided through government agencies within a legal framework.[111] The practice of using dolphins and other marine mammals as bait is reported to have declined in recent years, due in part to the fact that legal bait has been more readily available and in part to measures taken by government agencies; however, a certain amount of illegal fishing and baiting is believed to continue.

Nevertheless, there is a clear need for researchers in Chile to initiate or continue studies of fishery-related mortality of cetaceans, including the nature, species composition, and levels of bycatch in order to evaluate the likely implications for cetacean conservation. Researchers should also investigate the geographical distribution, scale, economics, and dynamics of the crab fisheries in southern South America and re-evaluate the extent to which cetaceans are still caught for bait. Field surveys to assess the status. of dolphin populations in the crab fishing areas are needed.

In Peru, cetaceans are still being caught incidentally in gillnets, in purse seines, and with harpoons.[112] Bycatch remains high, presumably unchanged from earlier levels because no bycatch reduction measures have been implemented.[113] Directed take was believed to be increasing from a low immediately after 1990, when a dolphin conservation law was implemented and the Peruvian government officially closed markets for dolphin meat.[114] In

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[107] *Id.*

[108] Palacios, D.M., and Gerrodette, T. 1996 Potential impact of artisanal gillnet fisheries on small cetacean populations in the Eastern Tropical Pacific. Southwest Fisheries Science Center Administrative Report LJ-96-11, La Jolla, California. 15 pp.

[109] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A., and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans.* IUCN/SSC.

[110] *Id.*

[111] *Id.*

[112] Van Waerebeek, *supra,* note 95.

[113] In the period 1990 through1993, the bycatch in Peruvian fisheries ranged from 15,000 to 20,000 small cetaceans.

[114] Van Waerebeek, K., and Reyes, J.C. 1994. Post-ban small cetacean bycatch off Peru: a review. Report of the International Whaling Commission (Special Issue) 15:503–520.

1994, a second, more stringent small cetacean conservation law was enacted that assigned joint responsibility for enforcement to district and provincial authorities. Today there may be an increasing use of cetacean meat as bait in the shark fishery. Dolphins are rarely landed openly on shore; they are instead hidden and sold clandestinely or transferred at sea to shark-fishing boats.[115]

The species of most concern continues to be the dusky dolphin, which is caught in the greatest numbers, and Burmeister's porpoise, a species endemic to coastal southern South America. In the 1990s, in Peru alone, annual directed take of Burmeister's porpoise and dusky dolphin each amounted to 500 to 2,000 animals, based on direct accounts of landings. The continuous decline of dusky dolphins as a proportion of the overall cetacean catch since 1985 (when recording began), with roughly constant fishing effort, is consistent with the hypothesis that abundance of this species has been decreasing off central Peru.[116]

Authorities in Peru remain unconvinced that any action beyond merely outlawing commerce is needed to reduce the mortality of cetaceans in fisheries. Consequently, in Peru there is still a need for reliable estimates of total fishing mortality for each species in Peruvian waters. Scientists need better information on stock structure and reliable estimates of abundance for the affected stocks. Total mortality caused by fisheries should be estimated using an on-board-observer-sampling scheme of some kind, in combination with information about total fishing effort. Reeves et al., recommend an independent observer scheme that consists of a three-part effort:

- A coastal port survey for discarded remains to evaluate current fishery-caused mortality relative to former levels, using the same criteria.
- Boat-based observers in areas where large numbers of porpoises were killed in the past to document entanglement dynamics (gear-related, temporal, and circumstantial factors).
- An estimate of current Burmeister's porpoise bycatch by extrapolation from the observed bycatch per unit of effort, which could be applied to data from the nationwide census of artisanal fisheries in September 2004.
- Compilation, analysis, and publication of substantial existing datasets that are relevant to this problem.

Finally, there is a need for aggressive enforcement of the existing measures. Peru is a disturbing case study for incidences where bycatch of small cetaceans becomes a market in cetacean meat and a gateway to direct harvests. If dusky dolphins and Burmeister's porpoises are to survive, mortality of these species must be drastically reduced and the existing laws fully enforced.

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[115] Van Waerebeek, *supra,* note 95. See also: Van Waerebeek, K., Alfaro-Shigueto, J., Montes, D., Onton, K., Santillan, L., Van Bressem, M.-F., and Vega, D. 2002. Fisheries-related mortality of small cetaceans in neritic waters of Peru in 1999–2001. International Whaling Commission, Scientific Committee Document SC/54/SM10, Cambridge, UK.

[116] *Id.*

CHAPTER 3. U.S. TOOLS FOR INTERNATIONAL CONSERVATION

The Marine Mammal Protection Act of 1972 provides some of the tools necessary to engage in activities to mitigate cetacean bycatch beyond the U.S. EEZ. From the inception of the MMPA, the Congress placed a strong injunction on the Department of State to develop "new arrangements for protection of these animals [marine mammals] and of ocean ecosystems that are significant to their welfare."[117] Congress also acknowledged that "unilateral action by the U.S." affecting any species or subspecies of marine mammals could be fruitless unless other nations involved in the taking of marine mammals work with the U.S. to preserve and protect these creatures."[118]

Marine Mammal Protection Act

Section 101 Embargo Provisions (non-tuna dolphin embargo provisions)

The MMPA requires a general prohibition of "taking" (harassment, hunting, capture, killing or attempt thereof) and importation into the U.S. of marine mammals, except where an exception is explicitly authorized. The act's stated goal is that the incidental kill or serious injury of marine mammals in the course of commercial fishing be reduced to insignificant levels approaching zero.[119] The MMPA is enforced by the National Marine Fisheries Service (NMFS) of the National Oceanic and Atmospheric Administration (NOAA) of the Department of Commerce. The U.S. Customs Service, within the Department of Homeland Security enforces the provisions regarding importation.

Section 101(a)(2) of the MMPA authorizes limited incidental taking of marine mammals by U.S. fishermen in the course of commercial fishing pursuant to a permit issued by NMFS, in conformity with and governed by certain statutory criteria in sections 103, 104, and 118 and implementing regulations. Section 101(a)(2) of the MMPA also states, "The Secretary of Treasury shall ban the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of U.S. standards". This prohibition is mandatory. Subparagraph (A) requires the Secretary to "insist on reasonable proof from the government of any nation from which fish or fish products will be exported to the U.S. of the effects on ocean mammals of the commercial fishing technology in use for such fish or fish products exported from such nation to the U.S."[120]

Outside the tuna-dolphin issue, these provisions have been only used once to bring about reductions in cetacean bycatch or direct harvests. Protecting marine mammals from direct takes, such as for crab bait as discussed in Chapter 2, was the primary focus of discussions during the initiation of a bilateral agreement between the U.S. and Chile in the 1990s. Since those initial meetings, the two sides have discussed conducting joint research on cetaceans and Chile has received information from the U.S. on whale watching regulations. The U.S. has requested information from Chile regarding its marine mammal data collection and research programs.

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[117] Report 92-707 House of Representatives, 92d Congress, 1st Session page 18

[118] Report 92-863 Senate 92d Congress 2d Session page 10

[119] 16 U.S.C 1372 (a)(2)

[120] 16 U.S.C 1372 (a)(2)(A)

Section 108 International Provisions

The MMPA requires the Secretary of Commerce, working through the Secretary of State, to initiate negotiations "as soon as possible" for the development of bilateral or multilateral agreements with other nations for the protection and conservation of all marine mammals covered by the MMPA.[121]

Many of the provisions in section 108 relate to bycatch reduction, calling on the Secretary of State to initiate negotiations with all foreign governments engaged in commercial fishing found to be unduly harmful to any species or population stock of marine mammal to develop bilateral and multilateral treaties with such countries to protect marine mammals.[122] Likewise, this subsection also calls upon the Secretary of State to enter into international arrangements (either through the Inter-American Tropical Tuna Commission or such other bilateral or multilateral institutions) for the conservation of marine mammals caught incidentally in the course of harvesting yellowfin tuna with purse seines.[123]

The final two provisions of section 108(a) call on the Secretary of State to seek to amend any existing international treaty to which the U.S. is a party for the protection and conservation of any species of marine mammal, to make such treaty consistent with the purposes and policies of the MMPA, and to seek an international ministerial meeting on marine mammals by July 1, 1973, to negotiate a binding international convention for the protection and conservation of all marine mammals.[124]

With the exception of the provisions related to the Inter-American Tropical Tuna Commission, these provisions have gone largely unused by either the Department of Commerce or Department of State. Congressional oversight has focused on the incidental capture of dolphins in tuna purse-seine nets and not on other forms of international bycatch. Therefore, with limited resources provided to both agencies, the priority has been action to reduce the bycatch of dolphins in the yellowfin tuna fishery and very little effort has been expended to initiate bilateral discussion, modify existing international treaties, or initiate a new international convention to address other forms of global bycatch.

Magnuson-Stevens Fishery Conservation and Management Act

In 2006 the Congress reauthorized provisions of the Magnuson-Stevens Fishery Conservation and Management Act (M-SFCMA),[125] the law governing how the U.S. manages fisheries within its EEZ. The reauthorization also directed substantial attention on fishing issues outside U.S. waters, particularly illegal, unregulated and unreported fishing (IUU) and bycatch. Although aimed primarily at strengthening U.S. leadership in international conservation and management of fisheries[126] for purposes of leveling the playing field between the U.S. fleet and

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[121] 16 U.S.C. § 1378(a)(1)

[122] 16 U.S.C. § 1378 (a)(2)(A)

[123] 16 U.S.C. § 1378 (a)(2)(B)

[124] 16 U.S.C. § 1378 (a)(4) and (5)

[125] 16 U.S.C. §§1801-1882 (1976), Pub. L. 94-265, as amended by H.R. 5946, Dec. 2006. Signed into law Jan 12, 2007.

[126] Report of the Committee on Commerce, Science & Transportation on S.2012, Magnuson-Stevens Fishery Conservation and Management Act Reauthorization Act of 2005. April 4, 2006. S. Rpt. 109-229. The Senate Report notes that restrictions placed on U.S. vessels to protect endangered or protected species "disadvantage U.S. fleets

those of other nations, the new provisions have strong bycatch language applicable to marine mammals.

The international title of the reauthorization creates a new section in the M-SFCMA, authorizing the Secretary to promote improved monitoring and compliance for high seas fisheries or fisheries governed by international or regional fishery management agreements.[127] Among other provisions, the section calls for improved communication and information exchange among law enforcement organizations, an international monitoring network, an international vessel registry, expansion of remote sensing technology, technical assistance to developing countries and support of a global vessel monitoring system for large vessels by the end of 2008.[128]

Section 403 of the reauthorization's international provisions amends the High Seas Driftnet Fisheries Enforcement Act by adding four new sections: a requirement for a biennial report on international compliance; action to strengthen regional fishery management organizations; identification and listing of nations whose vessels participate in IUU fishing; and identification and listing of nations that "fail to end or reduce bycatch of protected living marine resources by using regulatory measures that are comparable to those of the United States, taking into account different conditions."[129] The amendment defines "protected living marine resource" to mean non-target fish, sea turtles, or marine mammals that are protected under U.S. law or international agreement.[130]

The listing provisions are very comparable to certification under the Pelly and Packwood amendments (see below). The Secretary of Commerce determines whether a nation has taken appropriate corrective action in response to illegal fishing, gives the offending party notice and opportunity for comment, and then certifies to Congress whether it has provided documentary evidence of corrective action.[131] A similar procedure is required for bycatch of protected living marine resources in international waters or of a protected resource shared by the U.S. The certification must demonstrate that:

- the vessels have had bycatch in the prior year,
- the relevant organization has failed to implement measures to reduce such bycatch,
- the nation is not a party to a relevant organization, or
- the nation has not adopted a bycatch reduction program comparable to that of the U.S.[132]

After a notification and consultation process that gives the international community time to respond under relevant agreements, amend existing treaties or develop new instruments, the list of certified nations is provided to Congress and the sanctions of the Driftnet Enforcement Act

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and fail to address the problem" because the harmful fishing practices continue by other fleets in high seas fisheries. S.Rpt. at 43.

[127] Section 207(a)

[128] Section 207(b) (1) – (7).

[129] S.Rpt. 109-229 at 45, H.R. 5946, Sec. 610.

[130] H.R. 5946, Sec. 610(e)

[131] H.R. 5946, Sec. 609.

[132] H.R. 5946, Sec. 610(a)(1)-(3)

may be applied.[133] An alternative procedure allows for certification on a shipment-by-shipment or shipper-by-shipper basis of fish or fish products.

The measure calls for the Secretary of Commerce and Secretary of State to provide assistance to nations or organizations to help them develop gear and management plans that will reduce bycatch.[134]

International Dolphin Conservation Protection Act

The history of the dolphins dying in tuna purse-seine nets is a lengthy one and will not be repeated in this report. This issue was one of the driving forces behind the enactment of MMPA.[135] As stated earlier, the law created a ban upon "the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of U.S. standards." [136] In 1984 and 1988, Congress amended section 101(a)(2) of MMPA to require governments of nations that export yellowfin tuna harvested in the purse-seine fishery in the Eastern Tropical Pacific Ocean (ETP) to provide documentary evidence that the government has adopted a regulatory program governing the taking of marine mammals that is comparable to that of the U.S. and that the average rate of incidental taking of the harvesting nations is comparable to that of the U.S.

Subsequently, Mexico, an embargoed nation, and the EU, an embargoed intermediary nation, requested that a dispute-settlement panel be established pursuant to the General Agreement on Tariffs and Trade (GATT). The GATT panels issued decisions in favor of Mexico and the EU, but the GATT Council did not adopt either decision. This decision precipitated, in 1992, enactment of the International Dolphin Conservation Act of 1992 (IDCA).[137] The IDCA amended the MMPA to (1) impose a five-year moratorium on the harvesting of tuna with purse-seine nets deployed on or to encircle dolphins; and (2) lift the tuna embargo for those nations that made a declared commitment to implement the moratorium and take other steps to reduce dolphin mortality. No nation issued intent to honor the provisions of the IDCA.[138]

In October of 1995, the U.S. and eleven other nations signed the Panama Declaration. In this declaration these nations made commitments to strengthen the protection of dolphins and negotiate a new binding agreement to establish the IDCP, but only if the U.S. amended its laws to (1) lift the embargoes imposed under the MMPA; (2) permit the sale of both dolphin-safe and non-dolphin safe tuna in the U.S. market; and (3) change the definition of "dolphin safe tuna" to mean "tuna harvested without dolphin mortality."

In 1997, Congress enacted the IDCPA, [139] which revised the criteria for banning imports by amending the MMPA. Pursuant to this amendment, nations are permitted to export tuna to the U.S. if a nation provides documentary evidence that it (1) participates in the IDCP and is a member (or applicant member) of the Inter-American Tropical Tuna Commission; (2) is meeting

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[133] H.R. 5946, Sec. 610(c)(5)

[134] S.Rpt. 109-229 at 12.

[135] Pub. L. No. 92-522, 86 Stat. 1027

[136] 16 U.S.C.A. § 1371(a)(2)

[137] Pub. L. No. 102–523, 106 Stat. 3425 (1992).

[138] H.R. Rep. No. 105-74(I), at 14, 1997 U.S.C.C.A.N. at 1632.

[139] Pub. L. No. 105-42, 111 Stat. 1122 (1997).

its obligations under the IDCP and the Inter-American Tropical Tuna Commission; and (3) does not exceed certain dolphin mortality limits.[140]

As a result of amendments to the MMPA made by the IDCPA, the trade restrictions for intermediary countries were eliminated, and provisions were put in place to lift the embargoes on yellowfin tuna harvested by setting purse-seine nets on dolphins in the eastern Pacific Ocean. Since then, the embargoes were lifted for Ecuador, Mexico, and El Salvador. Spain also has been issued an affirmative finding and can export to the U.S. yellowfin tuna caught in the ETP using purse seines. To date the following nations remain embargoed: Belize, Bolivia, Colombia, Guatemala, Honduras, Nicaragua, Panama, Vanuatu, Venezuela, and Peru. Currently, there are no intermediary nations identified by NMFS subject to import prohibitions.[141]

Whaling Convention Act

The Whaling Convention Act of 1949[142] authorizes the Secretary of Commerce to enforce the provisions of the International Convention for the Regulation of Whaling and to issue regulations necessary for this purpose. Regulations can be found at 50 CFR Parts 230 and 351. The Secretary is authorized and directed to administer and enforce all provisions of the convention, this act, and regulations promulgated pursuant to this act. In conducting the duties prescribed under this act, the Secretary of Commerce cooperates with other agencies of the federal government, state governments, or other independent institutions. The Secretary may also cooperate with any agency from any other government of any party to the convention.

Under this act, it is illegal for any person under U.S. jurisdiction to engage in any act prohibited or not do any act required by the convention, this act, or any regulations promulgated by the Secretary of Commerce pursuant to this act. It is also illegal to ship, transport, purchase, sell, offer for sale, import, export, or have in possession any whale or whale products taken in violation of the convention, this act, or any regulation promulgated by the Secretary of Commerce pursuant to this act. The prohibitions of this act do not preclude the taking of whales for scientific investigation, with the approval of the Secretary.

To the extent that the convention applies to the U.S., the Secretary of Commerce issues regulations deemed necessary to further the goals of the convention.

As part of the international program anticipated under the act, Section 917(c) calls for appropriate bilateral agreements with Mexico and Canada for the protection and conservation of whales.[143] Even though no specific bilaterals have ever been negotiated, considerable cooperative research on marine mammals has taken place between the U.S. and Mexico in addition to work conducted under the tuna-dolphin program. Examples include population surveys for vaquita, gray whales, Gulf of Mexico bottlenose dolphins, and cooperative surveys of pinniped populations. Collaborative research has taken place on genetic studies for California sea lions, bottlenose dolphins, and sperm whales. The countries have also exchanged information on marine mammal bycatch from their respective longline observer programs and on coordinating responses to marine mammal strandings.

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[140] Id. at § 4, 111 Stat. at 1123-1124 (codified at 16 U.S.C.A. 1371(a)(2)(B)).

[141] http://swr.nmfs.noaa.gov/psd/embargo2.htm

[142] 16 USC 916-9161; Act of August 9, 1950, as amended

[143] 16 U.S.C. 917(c). However, this provision is generally thought to be superceded by the MMPA.

Endangered Species Act

The U.S. Endangered Species Act (ESA) was enacted in 1973 to provide for the conservation of species "which are in danger of extinction throughout all or a significant portion of their range."[144] The act operates through listings of species as either threatened or endangered, which then triggers action for protection of critical habitat and development of recovery plans. In addition to its provisions for protecting and recovering these species within U.S. jurisdiction, ESA reaches beyond U.S. borders to protect endangered species both through its own provisions and through U.S. implementation of the Convention on International Trade in Endangered Species (CITES). CITES operates primarily by controlling trade of listed species. Species are listed under various appendices, depending on their status. See Chapter 4 for a full discussion of the provisions of the treaty.

International Cooperation under the ESA

The U.S. president, with the foreign country's consent, may use foreign currencies to provide assistance for any listed endangered or threatened species, which may include acquisition of lands, waters or interests therein. These currencies must be used in preference to funds appropriated under §1542 of the Act.

Additionally, the Secretary of Commerce, through the Secretary of State, must encourage foreign countries to provide for the conservation of fish, wildlife and plants, including listed species; enter into bilateral or multilateral agreements for this purpose; encourage and assist foreign persons who take fish, wildlife and plants for import to the U.S. for commercial or other purposes to develop and carry out conservation procedures. Further, the Secretary of Commerce may provide personnel and financial assistance for the training of foreign personnel and for research and law enforcement, and may conduct law enforcement investigations and research abroad as necessary to carry out the Act.[145]

For purposes of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the Secretary of the Interior is designated as the management authority and the scientific authority, with the functions of the authorities to be carried out by the U.S. Fish and Wildlife Service. The Secretary of the Interior must give advice and make determinations under Article IV of CITES based on the best available biological information derived from professionally accepted wildlife management practices, but is not required to make population estimates. If the United States votes against including a species under CITES and does not enter a reservation pursuant to CITES, the Secretary of State must submit a report to the appropriate Senate and House committees.

The Secretary of Interior in cooperation with the Secretary of State and other secretaries, represents the U.S. regarding the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (the Western Convention). The Interior Secretary must take steps to implement the Western Convention, including developing personnel resources and programs, identifying species, habitats, and cooperative measures to ensure that species of migrating birds will not become threatened or endangered, and by identifying measures for the protection of wild plants.

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[144] 16 U.S.C. 1531-1543 (1976), Pub. L. 93-205, 87 Stat. 884, as amended.

[145] 16 U.S.C. 1537.

Agency Action

The MMPA places authority for protection of marine mammals in the Department of Commerce. Since 1972, the management authority has been delegated through NOAA to NMFS, Office of Protected Resources.

Many of the agency's ESA activities involve its duty to develop strategies for the conservation and survival of endangered and threatened species. In the area of marine mammals, the ESA and the MMPA offer similar management authority for endangered and threatened marine mammal species or stocks. Section 4(f) of the ESA requires the development and implementation of recovery conservation plans, while §115 of the MMPA mandates conservation plans modeled after the ESA for listed species. NMFS has recovery or conservation plans in place for North Pacific fur seals, Hawaiian monk seals, Steller sea lions, right whales, blue whales, and humpback whales. Consultations occur on an ongoing basis, under §7 of the ESA, with federal action agencies to avoid or mitigate the impacts of their activities on listed species. NMFS also reviews nonfederal activities that may affect listed species and issues §10 permits for incidental bycatch.

Pelly Amendment

In the years after the signing of the Convention for the Regulation of Whaling, it became clear the convention had no clear mandate for conservation.[146] The U.S. used instead the leverage it could apply through the MMPA, the Pelly Amendment and the Packwood Amendment to the Fishery Conservation and Management Act. Under these laws various official determinations about foreign government policies or production practices are deemed certifications under Pelly and are handled like any other certification. Some of these determinations involve international treaties and some do not.

The 1971 Pelly Amendment to the Fishermen's Protective Act[147] authorizes the U.S. president to prohibit the importation of products from countries that allow fishing operations that diminish the effectiveness of an international fishery conservation program or that engage in trade or taking that diminishes the effectiveness of an international program for endangered or threatened species. Specifically, the Secretary of Commerce, upon determination that foreign nationals are conducting fishing operations in a way that diminishes the effectiveness of international fishery conservation programs, is directed to certify such to the president. The secretary also has the responsibility to certify to the president when foreign nationals are engaging in trade or taking in a manner that diminishes the effectiveness of any international program for endangered or threatened species. Upon receipt of certification, the President may direct the Secretary of the Treasury to prohibit the importation into the U.S. of any products from the offending country for a period of time the President determines and to the extent prohibition is sanctioned by the General Agreement on Tariffs and Trade. The secretary also periodically reviews the activities of the offending nations to determine if the reasons for the certification still prevail. If the reasons no longer prevail, the secretary revokes the certification and publishes a notice thereof in the *Federal Register.*

While the Pelly Amendment is the most noteworthy section of the act for wildlife conservation purposes, the act also provides for federal reimbursement of money paid by owners to secure the release of fishing vessels improperly seized by foreign countries. In

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[146] Bean, M. 1983. *The Evolution of National Wildlife Law*. Praeger. New York. 448 pages, at 265.

[147] 22 U.S.C. 1978

addition, the act sets up a fund to compensate owners for damage to or destruction of their fishing vessel or gear.

Under Section 1821 of the Fishery Conservation and Management Act of 1976, also known as the Packwood-Magnuson Amendment, a certification by the Secretary of Commerce that foreign nationals are “engaging in trade or taking” that diminishes the effectiveness of the International Whaling Convention is deemed a Pelly certification. The only way this provision expands potential application of Pelly is by mandating certification for trade in whales even though they may not be endangered.

Under the MMPA amendments of 1988, the Secretary of Commerce must certify under Pelly any nation whose yellowfin tuna is embargoed whenever the embargo continues for more than six months.

If, under the Fishery Conservation Amendments of 1990, the Secretary of Commerce finds that a nation is engaging in trade in unlawfully taken anadromous. fish or fish products, that finding is deemed a Pelly certification.

History of Pelly Applications Related to Marine Mammals

This subsection provides a short case history of a few Pelly episodes related to marine mammals. For purposes of the following, the authors deem as successful those episodes where the Pelly threat led to a significant concurrent change in the target country’s policy in the direction sought by the U.S. government. Thus a commitment to greater adherence to international standards by a foreign government would be deemed successful.

1974—Japan and Soviet Union

In 1974, the Secretary of Commerce certified Japan and the Soviet Union for exceeding the International Whaling Commission’s (IWC) minke whale quota for 1973–1974. Both countries had objected to the IWC quota, however, and were therefore not legally bound by it. In announcing that he had decided against imposing sanctions, President Ford explained that both countries had voted for the 1974–1975 quotas, which incorporated conservation improvements. He also explained that imposing sanctions against Japan would result in higher prices for American consumers. These episodes are rated as successful because the two countries agreed to the IWC quota for the next year.

1986—Norway

In 1986, the Secretary of Commerce certified Norway for violating the IWC moratorium on commercial whaling. Norway had objected to the zero quotas and was therefore not bound by them. Less than a month after the Pelly certification, Norway announced that it would suspend commercial whaling after the 1987 season and would reduce its catch for that year. President Reagan then decided not to impose sanctions. This episode is rated as successful because Norway agreed to suspend commercial whaling after that season.

1990—Norway

In 1990, the Secretary of Commerce certified Norway for taking minke whales in violation of IWC research criteria. In announcing that he would not impose sanctions, President Bush stated that Norway was making progress in its “program and presentation” and noted current efforts to improve United States–Norwegian scientific consultations. This episode is rated as unsuccessful because Pelly did not affect Norway’s whale-hunting behavior.

1993—Norway

In August 1993, the Secretary of Commerce certified Norway for violating the IWC zero catch limit on minke whales by killing 157 whales. Norway argued that the minke whale was not endangered. The IWC, however, included this whale in its zero catch limit. Moreover, the minke whale is on CITES Appendix I. Norway also argued that it was not legally bound by the zero catch limit because it had entered a reservation under IWC procedures. In October 1993, President Clinton stated that, although "Norway's action is serious enough to justify sanctions," he would nevertheless not impose them. This episode is rated as unsuccessful because Pelly did not affect Norway's behavior.

1996—Canada

In December 1996, the Secretary of Commerce certified Canada for allowing its Inuit to take two bowhead whales from a highly endangered stock in the eastern Canadian arctic. Neither hunt was authorized by the IWC, which had expressed particular concern about whaling in the eastern Canadian arctic, where bowhead stocks are not known to be recovering. Canada was not a member of the IWC, withdrawing in 1982 and stating at the time that it no longer had any direct interest in the whaling industry or in the related activities of the IWC. This episode is rated as unsuccessful because Pelly did not affect Canada's behavior—it did not cease hunting nor did it return to the IWC.

2004—Iceland

In 2003, Iceland announced that it would begin a lethal, research whaling program and planned to take 250 minke, fin, and sei whales for research purposes. On June 16, 2004, the Secretary of Commerce certified Iceland for its lethal research whaling. The U.S. and a majority of the IWC nations questioned the scientific validity of Iceland's research whaling program. Iceland reduced its proposed take to 38 minke whales and actually killed 36 whales. President Bush did not impose trade sanctions on Icelandic products for the whaling activities, but directed U.S. delegations to seek ways to halt these whaling operations in its bilateral discussions with Iceland. This episode is deemed unsuccessful as Iceland announced its intention to resume commercial whaling.

CHAPTER 4. INTERNATIONAL AGREEMENTS RELATED TO BYCATCH

The previous chapter discussed U.S. law and policy that provide mechanisms for action to reduce bycatch of marine mammals in fishing operations. The U.S. is party to numerous international agreements related to marine mammal protection as well as to fishery agreements that have bycatch-reduction provisions. Another source of authority for action or diplomatic initiatives is the collection of regional agreements to which the U.S. is party. The increasing role of regional fishery management organizations in reaching out to both coastal states and fishing nations, whether they are contracting parties or not, may provide an additional venue for discussion of marine mammal bycatch in fisheries. Finally, the 2006 amendments to the Magnuson-Stevens Fishery Conservation and Management Act place a considerable burden on the U.S. to evaluate bycatch in international fisheries and take action to press fishing nations to reduce incidental catch of protected species such as cetaceans.

This report does not describe all of these instruments. The agreements discussed here and in Chapter 5 are included in Appendix B with lists of the parties to each instrument. In 1997, the U.S. Marine Mammal Commission published a *Compendium of Selected Treaties, International Agreements and Other Relevant Documents* related to marine mammal and wildlife conservation. This exhaustive resource provided the basis for much of the material covered. The following section concentrates on a few international tools and the relevant agreements that relate to the “hot spots,” or areas where the most significant incidental bycatch requires urgent action, based on the analysis presented in Chapter 5.

The global framework for conservation of living marine resources includes agreements that apply to all the seas, some that cover specific seas or regions, and some that govern ocean areas that are used by numerous coastal and flag nations. This chapter provides a compilation of agreements that relate directly to cetacean bycatch, or might be applied to actions to reduce cetacean bycatch. It presents global agreements for wildlife, fisheries and the marine environment first then discusses regional agreements for wildlife, fisheries and the environment. Finally, the chapter examines the emergence of an increased role for regional fishery management organizations in bycatch reduction, and the creation of several new regional fishery management organizations (RFMOs) that might be tasked with preventing bycatch of non-target species and protected species in the course of fishing.

Background

For centuries, customary international law and practice embraced the concept of *mare liberum*, freedom of the seas. Many assumptions that flowed from this principle continued until as recently as the 1980s and 1990s: anyone possessing the wherewithal to ply the seas and cast nets was free to fish; anyone wanting to impose restrictions on fishing bore the burden of proof to demonstrate the activity was harmful; fish, like wildlife, belonged to the state, which was the decision-maker on issues of access and other rights in the living resources of the sea. Even the inception of the International Whaling Commission in the 1940s was for the purpose of “regulating whaling,” an activity that was seen as just another kind of fishing.

It was not until the 1970s that international public opinion raised the notion that marine mammals were species of “special concern.” This era saw the beginning of a policy shift toward protecting marine mammals, rather than managing their exploitation.

In addition to agreements that are aimed specifically at protecting marine mammals, it is necessary to examine fishery management in an international context through several important agreements that changed the traditional freedom of seas approach to fisheries and led to the

emergence of the precautionary approach. These include the fishing provisions of the 1982 Convention on the Law of the Sea[148] (UNCLOS), the so-called U.N. Fish Stocks Agreement (UNFSA),[149] and the FAO Code of Conduct for Responsible Fisheries (Code of Conduct).[150] Sections briefly summarize a number of other important international and regional agreements that govern fisheries, including the Convention on the Conservation of Antarctic Marine Living Resources[151], the International Convention for the Conservation of Atlantic Tunas,[152] the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean,[153] and the North Atlantic Fisheries Organization.[154]

The role of regional fishery management organizations is explored as a tool for managing resources that cross jurisdictions and as a means to access decision-making bodies that may be able to influence fishing methods that pose harm to cetacean populations through bycatch. The emerging influence of trade, labeling, certification, product tracking, and similar regimes on international fishery management and their potential for reducing marine mammal bycatch are examined in Chapter 6.

International Tools for Reducing Bycatch

For most of human history people have seen the ocean as a frontier to be explored or a limitless and unchangeable source of fish. Hugo Grotius first expressed the philosophy of freedom of the seas in an anonymously published essay in November 1608 in defense of the rights of the Dutch East India Company to trade in waters claimed by Spain or Portugal.[155] Historically, fishing fleets took advantage of access to the richest fishing grounds—relatively shallow areas on the continental shelf—no matter where they were. It was not until after World War II that within their own waters, states exercised control over who fished and how much they caught. Beyond the territorial zone, access to fisheries continued to remain open and subject only to such regulations as their flag state imposed.[156] In the early nineteenth century, increased exploitation of fisheries led several coastal states to enter explicit bilateral and multilateral

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[148] The Third United Nations Convention on the Law of the Sea, Dec. 10, 1982, 21 I.L.M. 1245. (Entered into force 16 November 1994.)

[149] The Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, *Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conversation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks*. U.N. Doc. A/Conf./164/37.

[150] United Nations Food and Agriculture Organization. Code of Conduct for Responsible Fisheries. Rome. 1995.

[151] Convention on the Conservation of Antarctic Marine Living Resources, 20 May 1980. 33 U.S.T 3476.

[152] International Convention for the Conservation of Atlantic Tunas. Done at Rio de Janeiro, 14 May 1966. 20 U.S.T 2887.

[153] Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. Done at Honolulu, 5 September 2000. Available at http://www.wcpfc.int/. Last accessed 17 November 2006.

[154] The Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries. Done at Ottawa 24 October 1978. Senate Executive Treaty Series 96th Cong. 1st Sess. (Entered into force 1 January 1979.)

[155] Hugo Grotius, *Mare Liberum* or *The Freedom of the Seas or the Right Which Belongs to the Dutch to Take Part in the East Indian Trade*, Oxford University Press (New York 1916).

[156] Burke, The New International Law of Fisheries, 2-6 Clarendon Press (Oxford 1994).

agreements to conserve and manage fisheries.[157] However, even where a multilateral institution was created by such agreements, the fishing nations and the coastal states generally were not willing to confer on such institutions the authority needed to enforce the rules. Therefore, few of the world's fisheries were subjected to meaningful management.[158]

Over the past 40 years, the international law of fisheries has evolved from absolute freedom of the seas and unencumbered access to fishing, through assertion and extension of the rights of coastal states to protect their fisheries and fleets, to some limitations on fishing fleets operating in the zones of coastal states, to consensual limitations on vessels operating on the high seas, and finally to the current situation, where the right of freedom of fishing is restricted.

Attempts at widespread international agreement on fishery management were unsuccessful until the 1982 United Nations Conference on the Law of the Sea (UNCLOS III). With it came recognition of the extension of coastal state jurisdiction to 200 miles, and for the first time, the freedom of fishing on the high seas was circumscribed. In addition to reaffirming the right of coastal states to manage the living marine resources within their 200-mile zones, the convention placed qualifications on the rights of distant water fishing fleets fishing on the high seas.

UNCLOS III: Fishery Management Provisions of the Law of the Sea Treaty (Fisheries Articles 56, 61, 63, 64)

The 1982 UN Convention on the Law of the Sea is the overarching body of law covering every aspect of marine endeavor from transportation to pollution to military issues to scientific research. In its sections on protection of living marine resources, the Convention sets out the rights and responsibilities of coastal states and flag states with regard to fishing. While the Convention conferred economic rights over resources to coastal states, it preserved the traditional notion of freedom of fishing on the high seas. Although the Convention only entered into force in 1994, its provisions and policies have been recognized as customary international law since the late 1980s.[159]

Article 56 of the Convention gives coastal states sovereign rights over resources out to 200 miles.[160] This includes the authority to conserve and manage living resources.[161] The coastal nation must ensure, using best scientific information available and conservation and management measures, that the living resources of the EEZ are not threatened by overexploitation.[162] The Convention adopts MSY as the goal for maintaining or restoring exploited populations.[163] The costal state is to collect, contribute and exchange scientific

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[157] Louis B. Sohn & Kristen Gustafson, The Law of the Sea 115 (1984).

[158] William Burke, Remarks at University of Washington on Fisheries Law, at 3-1 (1992), cited in Iudicello and Lytle (1994).

[159] David Hunter, James Salzman and Durwood Zaelke, "International Environmental Law and Policy," Foundation Press (2002) at 659.

[160] UNCLOS, *supra* note 1 at Art. 56.

[161] *Id.* at Art. 61.

[162] *Id.* at Art. 61(2).

[163] *Id.* at Art. 61(3). "The concept of maximum sustainable yield recognizes that fisheries must be managed so that fish stocks can be sustainably caught year after year without causing the population of fish stocks to decline. 50 CFR

information, catch and effort statistics with other concerned states.[164] Access to the zone by foreign fleets is solely within coastal state discretion and subject to its laws and regulations, including requirements for licensing, observers and other conservation measures; compliance with conservation and management measures is required.[165] The convention directs states to seek coordinated measures necessary to conserve stocks that occur within the zones of two or more coastal states, or adjacent to their zones.[166] With regard to highly migratory species, UNCLOS calls for cooperation through international organizations, and where none exists, for the establishment of such organizations "with a view to ensuring conservation and promoting the objective of optimum utilization of such species throughout the region, both within and beyond the exclusive economic zone".[167] The 1982 conference even imposed new obligations on high seas fishing states. While freedom of fishing on the high seas continues in principle, the Convention can be read as imposing a dual responsibility on fishing nations: conservation and cooperation with coastal states.[168]

Even though the 1982 LOS Convention provided a new framework for better fisheries management, the extended jurisdiction of coastal states to 200 miles was insufficient to protect ocean fisheries.[169] As fleets, technology and the demand for fish and fishery products grew, it became clear by the late 1980s that the world's fish populations could not withstand continuing rapid and often uncontrolled exploitation and development. Reports of violence, confrontations between fishing nations, uncontrolled fishing on the high seas, and—for the first time in history—several consecutive years of declines in world catches led to a series of meetings and conferences where fishery experts called for action to control high seas fishing. In 1991, the Committee on Fisheries (COFI) called for the development of new concepts to foster responsible, sustained fisheries.[170] This was followed by an International Conference on

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602.11(d)(1)…. Scientists assume that population levels at 40% of unfished abundance (or biomass) are close to MSY, and that populations are overfished when levels fall below half the MSY level, roughly 20% of unfished abundance." However, MSY does not necessarily signify healthy fish populations, and should be viewed as a minimum target used in conjunction with precautionary and ecosystem management approaches. See Tim Eichenberg and Mitchell Shapson, "The Promise of Johannesburg: Fisheries and the World Summit on Sustainable Development, 34 Golden Gate University Law Review 587 at 624-626.

[164] UNCLOS, *supra* note 1, at Art. 61(5).

[165] *Id.* at Art. 62.

[166] *Id.* at Art. 63.

[167] *Id.* at Art. 64.

[168] Louis B. Sohn & Kristen Gustafson, The Law of the Sea 115 (1984). UNCLOS imposes duties on all states to take "such measures for their respective nationals as may be necessary for the conservation of the living resources of the high seas," Article 117; to cooperate "in the conservation and management of living resources" of the high seas, Article 118; and to "maintain or restore populations of harvested species at levels which can produce maximum sustainable yield," Article 119.

[169] FAO. The State of World Fisheries and Aquaculture 2004 at Preface. Available at http://www.fao.org/sof/sofia/index_en.htm. Last accessed 9 May 2006.

[170] "The Committee on Fisheries (COFI), a subsidiary body of the FAO Council, was established by the FAO Conference at its Thirteenth Session in 1965. The Committee presently constitutes the only global inter-governmental forum where major international fisheries and aquaculture problems and issues are examined and recommendations addressed to governments, regional fishery bodies, NGOs, fishworkers, FAO and international community, periodically on a world-wide basis. COFI has also been used as a forum in which global agreements and non-binding instruments were negotiated." Available at http://www.fao.org/fi/body/cofi/cofi.asp. Last accessed 3 May 2007.

Responsible Fishing in Cancun, Mexico in 1992, where participants adopted a Declaration stating that "States should cooperate...to establish, reinforce and implement effective means and mechanisms to ensure responsible fishing on the high seas."[171] These efforts culminated in the 1992 UN Conference on Environment and Development in Rio de Janeiro.[172] Ten years later, at the World Summit on Sustainable Development, 191 nations agreed to a series of targets and timetables to restore depleted fish stocks, manage fishing capacity prevent IUU fishing, and create marine protected areas.[173]

UNCED or the "Earth Summit," concluded in June with the adoption of a list of recommendations, including a chapter on the marine environment. Specifically, Chapter 17.C of Agenda 21 called for the UN to find ways to conserve fish populations and prevent international conflicts over fishing on the high seas, consistent with the provisions of the Law of the Sea.[174]

Code of Conduct for Responsible Fisheries

The FAO, recognizing these developments, "recommended the formulation of a global Code of Conduct for Responsible Fisheries which would...establish principles and standards applicable to the conservation, management and development of all fisheries."[175] The FAO Conference adopted the Code unanimously on October 31, 1995. In its 12 Articles, the Code covers both policy and technical matters including fisheries management, fishing operations, aquaculture, coastal area development, research and trade.

The Code is voluntary, and to be adopted by parties through national legislation, but some provisions are binding because of their relation to other legal instruments.[176] The Code is directed toward all persons concerned with conservation, management or development of fisheries, processing, marketing or any "users of the aquatic environment in relation to fisheries."[177] It provides principles and standards for every aspect of fisheries from aquaculture to capture, from research to fishing operations, processing to trade.[178]

For the first time, the Code attaches an obligation to the freedom to fish, and calls for users of living marine resources to use them "in a responsible manner so as to ensure effective conservation and management."[179] Inter-generational equity appears in the fishery context for the first time, as well, with the call for maintaining the diversity of fishery resources for "present and future generations" as well as for "food security, poverty alleviation and sustainable

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[171] International Conference on Responsible Fishing. Declaration of Cancun. Done at Canun, Mexico 8 May 1992.

[172] United Nations Conference on Environment and Development (1992) (hereinafter UNCED).

[173] See generally, www.johannesburgsummit.org, and "Report of the World Summit on Sustainable Development, available at http://ods-dds-ny.un.org/UNDOC/GEN/N02/636/93/PDF/No263693.prf. Although the WSSD set a number of ambitious fishery timetables, it generally fell short of expectations and mechanisms to ensure the timetables are met. See Eichenberg and Shapson, *supra* note 28 at 588 and 624-636.

[174] Agenda 21 (UN Doc. A/CONF.151/26 (Vol. I-III)).

[175] FAO Code of Conduct, *supra* note 141.

[176] *Id.* at Art. I,1.

[177] *Id.* at Art. II, 2.

[178] *Id.* at Art. I, 3.

[179] *Id.* at Art. VI,1.

development."[180] The Code urges effort controls, ecosystem management, the precautionary approach, selective fishing gear, habitat protection, and use of the best scientific information.[181] It calls for not only monitoring and control of flag state vessels, but also cooperation at all levels and among jurisdictions, and cooperation to prevent disputes.[182] In procedural recommendations, as well as substantive ones, the Code is far ahead of traditional fishery agreements. States are urged to conduct transparent decision making processes, education and training, provide safe and fair working conditions, and recognize and protect the rights of subsistence, small-scale and artisanal fishers.[183]

Articles 7 through 12 provide specific guidance to states and interested parties on operational and technical matters. These have been further elaborated by a series of technical guidelines from the FAO. Many of the provisions provide further detail on the principles by setting out how, for example, application of the precautionary approach would occur in fishery management measures.[184]

Management objectives include maintaining or restoring stocks to MSY, avoiding excess fishing capacity, protecting biodiversity and endangered species, assessing and mitigating adverse impacts from human activities, and minimizing pollution, waste, discards, ghost fishing, and bycatch. The Code recommends assessment of whole ecosystems and interrelationships, and directs states to consider the whole stock unit over its entire area of distribution.[185]

Straddling Stocks Agreement

The most significant outcome of the fishery management directives from Agenda 21 was the Straddling Stocks Agreement (UN Fish Stocks Agreement or UNFSA)[186]. This agreement has been called a "sea change" in international fishery management.[187] According to the UN, the agreement is considered to prescribe: "generally recommended international minimum standards" for conservation. As of August 2005, 52 states and the European community had become parties.[188]

Following a conference to address the problems of high seas fishing convened on April 19, 1993, delegates met six times in negotiating sessions over the next two years, concluding a

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[180] *Id.* at Art. VI, 2.

[181] *Id.* at Art. VI, 3-8.

[182] *Id.* at Arts. VI, 10-12; VI,15.

[183] *Id.* at Arts. VI, 13; VI, 16-18.

[184] *Id.* at Art. VI, 5.

[185] *Id.* at Arts II, VIII.

[186] Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982, Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (Status: entered into force December 2001)

[187] David Freestone. "International Fisheries Law: Who is Leading Whom?" The Magnuson Stevens Act: Sustainable Fisheries for the 21st Century? Tulane Law School Symposium, 7-9 Sept 1997. New Orleans, LA.

[188] UN, Chronological List of Ratifications. April 2007. Available at http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm. Last visited 3 May 2007.

document that was open for signing on 4 December 1995. The Agreement establishes detailed minimum international standards for the conservation and management of straddling fish stocks and highly migratory fish stocks. It calls for compatible measures and effective high seas compliance and enforcement. It was the first time an international fishing agreement shifted focus from producing maximum food for humans to sustainable fishing, ecosystem protection, conservation of biodiversity, and the precautionary approach to fishery management.[189] It also is the first agreement to produce an actual methodology for the precautionary approach, setting up reference points, targets, and limits.[190] Most significantly, it denies (for party nations) unqualified access to fish on the high seas.[191]

The guiding principle that governs the 1995 Agreement is the duty to cooperate. This core concept is given specific new meaning, and the coastal nations and distant-water fishing nations of each region are now required to share data and manage the straddling fisheries together. Article 7(2) requires that "[c]onservation and management measures established for the high seas and those adopted for areas under national jurisdiction shall be compatible in order to ensure conservation and management of the straddling fish stocks and highly migratory fish stocks in their entirety" (emphasis added). This duty gives the coastal state a leadership role in determining the allowable catch to be taken from a stock that is found both within and outside its exclusive economic zone, as evidenced by the requirement in Article 7(2)(a) that contracting parties "take into account" the conservation measures established by the coastal state under Article 61 of the Law of the Sea Convention for its EEZ "and ensure that measures established in respect of such stocks for the high seas do not undermine the effectiveness of such measures." This polite diplomatic language indicates clearly that catch rates outside a 200-nautical-mile exclusive economic zone cannot differ significantly from those within the EEZ.

The UN Agreement does all this without creating a new international structure, relying instead on existing regional agreements and organizations, and calling for mechanisms to strengthen them. Where such agreements or organizations do not exist, the Agreement directs states to create them.[192] The Agreement elaborates on the fundamental principle, established in the Convention, that States should cooperate to ensure conservation and promote the objective of the optimum utilization of fisheries resources both within and beyond the exclusive economic zone.[193]

The agreement provided for subsequent conferences to assess the adequacy of the provisions and propose ways to strengthen its implementation. These conferences have resulted in declaration of additional objectives such as considering the regional, subregional and

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[189] The approach includes these general features: identifying precautionary reference points for each stock, identifying in advance what measures will be adopted if reference points are exceeded, adopting cautious management for developing fisheries, monitoring impact on non-target species, and adopting emergency measures if continued fishing would increase the risk of depletion caused by a natural event. Freestone, *supra*, note 178.

[190] Fish Stocks Agreement, *supra* note 177 at Article 6, Annex II.

[191] *Id.* at Article XVIII.

[192] *Id.* at Art. VIII, 5.

[193]United Nations website. Available at http://www.un.org/Depts/los/convention_agreements/convention_overview_fish_stocks.htm. Last accessed 3 May 2007. Despite its many innovations, the Fish Stocks Agreement still suffers some of the limitations similar to other international fishery agreements such as the absence of major fishing nations and reliance on flag state enforcement. Eichenberg and Shapson, *supra* note 154 at 610.

global implementation of the Agreement. Informal consultations of states parties have met annually to continue review and oversight of the implementation of the agreement.[194]

The following is a summary of the provisions of the Straddling Stocks Agreement:

Management Goal: The management goal of the UN Agreement, expressed in Article 2, is "to ensure the long-term conservation and sustainable use" of straddling fish stocks and highly migratory fish stocks.

Precautionary Approach: Article 6 and Annex II describe the precautionary approach. The core of the precautionary approach is to act cautiously but expeditiously when information is "uncertain, unreliable, or inadequate," in the words of the UN Agreement. The UN Agreement describes a process for applying this approach that includes the following general features:

a) identifying precautionary reference points for each stock of fish;

b) identifying in advance management measures that will be adopted if reference points are exceeded;

c) adopting "cautious" management measures for developing fisheries, until information allows setting reference points;

d) monitoring the impact of fishing on non-target species and developing plans to conserve them;

e) adopting emergency measures if continued fishing would increase the risk of depletion caused by a natural event.

Compatibility of Measures: Article 7 requires compatibility between conservation measures on the high seas and those in the exclusive economic zones (EEZ) of coastal States. Among other considerations in determining compatibility, States are to take into account the biological unity of stocks and the distribution of the stocks, the fisheries, and the geography of the region. If compatible measures are not achieved, States are to use the procedures for dispute resolution identified in the UN Agreement.

Elements of Regional Agreements: According to Article 9, regional arrangements are to identify the stocks under management, the area of application, and the way in which a regional regime will obtain scientific advice.

Functions of Regional Regimes: Article 10 identifies 13 specific functions that may be summarized as follows:

- developing conservation measures in a timely manner;
- obtaining scientific advice;
- collecting, analyzing, and disseminating fisheries data;
- monitoring and enforcing conservation measures;
- insuring full cooperation of national agencies in implementation;
- identifying how new members will be accommodated; and
- promoting peaceful settlement of disputes.

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[194] See, e.g. resolutions, report of 2006 conference, ICSP5/UNFSA/REP/INF.1. 26 April 2006. Available at http://www.un.org/Depts/los/convention_agreements/fishstocksmeetings/icsp5report.pdf.

Transparency: Article 12 calls for transparency in decision making by regional regimes and for the participation of intergovernmental and nongovernmental organizations, subject to procedural rules that are not "unduly restrictive."

Membership: Article 17 calls upon State members of regional regimes to request that non-participating States join the regime and to take action to deter activities that undermine the effectiveness of regional conservation regimes.

Flag State Responsibilities: Article 18 enumerates eight obligations of flag States, including maintaining an accessible registry of vessels authorized to fish on the high seas, requirements for vessel and gear marking and for timely reporting of catch and other information, national inspection and observer schemes, and measures to insure transhipment at sea does not undermine conservation measures.

Enforcement: Article 19 enumerates five obligations of flag States in enforcing regional conservation measures. Articles 20-23 describe procedures by which Flag States and other States should collaborate in enforcing regional conservation measures, and provides authority for States to board fishing vessels of other States. Article 21 identifies eight specific activities that qualify as serious violations, including failing to maintain accurate records of catch, fishing in closed areas or seasons, or using prohibited fishing gear. Regional regimes may identify other serious violations.

Developing States: Articles 24-26 of the UN Agreement call for providing financial and technical assistance to developing States for management under the Agreement. Conservation measures are not to place an undue burden on developing States.

Dispute Resolution: Articles 27-32 call for States to settle disputes through peaceful means of their choice, and describe procedures for settling disputes.

Information Collection and Analysis: Article 14 describes five principal obligations of States for collecting and providing information and cooperating in scientific research. Annex I provides specific types of data that should be collected on fisheries and vessels, and describes obligations for frequent reporting by vessels, verification of data, and data exchange.

Other Obligations: Article 5 briefly describes 12 general tasks, some of which are described in greater detail elsewhere in the UN Agreement. Tasks that do not receive significant additional treatment in the UN Agreement include:

- Assess the impacts of fishing and other factors on target, associated, or dependent stocks;
- adopt measures to maintain or restore associated or dependent species above levels "at which their reproduction may become seriously threatened";
- minimize pollution, waste, discards, catch by lost or discarded gear, and bycatch;
- protect biodiversity;
- adopt measures to prevent or eliminate over-fishing and overcapitalization;
- consider the interests of artisanal and subsistence fishermen.

The U.N. Straddling Stocks Agreement has broken significant new ground in defining and refining what had heretofore been lip service to the “precautionary principle.” UNCLOS, the Code of Conduct and the U.N. Straddling Stocks Agreement all anticipate and recommend formation of regional organizations and agreements to carry out their provisions. Because the Code is voluntary, using existing regional regimes and organizations to promote conservation

measures is likely to be the most effective route. Some of the newer organizations created since the Straddling Stocks Agreement went into force go even beyond its groundbreaking provisions.

Finally, although each of the agreements calls for the "best available scientific evidence" as the basis for decision-making, in most cases the information is limited at best. Perhaps the first and most important task for promoting conservation would be to use the provisions of the agreements that promote data collection, information sharing, and scientific research.

The Straddling Stocks Agreement calls explicitly for work to assess the impacts of fishing and other factors on target, associated, or dependent stocks and for members to minimize bycatch and protect biodiversity. The Code of Conduct includes in its management objectives protecting biodiversity and endangered species and minimizing bycatch.

Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas

At the same time the FAO was developing the Code of Conduct for Responsible Fisheries, it was responding to growing concerns, highlighted during the Earth Summit, about incursions on coastal states' EEZs, confrontations between distant water fleets and coastal states, violations of fishing agreements, reflagging to avoid compliance with applicable rules, and general dissatisfaction with increasing fishing pressure on the high seas that was likely to affect stocks or fishing fleets in adjacent EEZs. In November 1993, the parties to the FAO Conference 27th Session adopted the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas.[195] They made clear that the provisions of the agreement were part of the Code, where the Compliance Agreement is referenced as one of the exceptions to the voluntary nature of the Code.[196]

The Compliance Agreement applies to all fishing vessels on the high seas, with a few exceptions for small vessels. Flag States are called upon to ensure that vessels flying their flag do not engage in activity that undermines the effectiveness of international conservation and management measures. The Agreement requires a party to authorize the use of its flag by fishing vessels, and parties may not authorize vessels unless they can exercise control over them, nor may they authorize vessels with previous compliance problems. Significantly, the authorization to fly the flag constitutes an authorization to fish on the high seas, and can be withdrawn: "Where a fishing vessel that has been authorized to be used for fishing on the high seas by a Party ceases to be entitled to fly the flag of that Party, the authorization to fish on the high seas shall be deemed to have been canceled."[197]

Parties are required to ensure that vessels are clearly marked, that they can be identified, and fulfill record keeping and information sharing obligations. Parties are required to take enforcement measures against vessels acting in contravention to the Agreement, and are urged to use serious sanctions, "of sufficient gravity as to be effective in securing compliance...and to deprive offenders of the benefits accruing from their illegal activities."[198]

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[195] Food and Agriculture Organization of the United Nations. Agreement To Promote Compliance with International Conservation and Management Measure by Fishing Vessels on the High Seas. 1993. (hereinafter Compliance Agreement)

[196] FAO Code of Conduct, *supra* note162 at Article I, 1.

[197] Compliance Agreement, *supra* note 54 at Art. III, 4.

[198] *Id.* at Art. III, 8.

Parties are directed to urge non-Parties to adopt consistent measures, and to exchange information about non-Parties whose activities undermine the effectiveness of international conservation and management measures.[199]

International Agreements Relating to Wildlife

The highly migratory nature of cetaceans and the need for multilateral cooperation to protect them was recognized as early as the 1940s. The treaties examined here include two that have provisions that may apply to cetaceans in addition to the International Convention for the Regulation of Whaling.

International Convention for the Regulation of Whaling (IWC)[200]

The International Whaling Commission (IWC) was established under the International Convention for the Regulation of Whaling of 1946. Currently, 71 nations including the United States are parties to the IWC. The purpose of the Convention is to provide for the proper conservation of whale stocks and the orderly development of the whaling industry. (Preamble)

The main duty of the IWC is to keep under review and revise as necessary the measures laid down in the Schedule to the Convention. These govern the whaling conduct of member nations throughout the world. These measures, among other things, provide for the complete protection of certain species; designate specified areas as whale sanctuaries; set limits on the numbers and size of whales which may be taken; prescribe open and closed seasons and areas for whaling; and prohibit the capture of suckling calves and female whales accompanied by calves. The compilation of catch reports and other statistical and biological records is also required.

In addition, the Commission encourages, co-ordinates and funds whale research, publishes the results of scientific research and promotes studies into related matters such as the humaneness of the killing operations.

The IWC currently operates a moratorium on commercial whaling, in force since 1986, although there are exceptions for aboriginal subsistence needs and scientific purposes and parties to the Convention may object to the operation of the moratorium (for example, Norway has entered such an objection and sets quotas for a commercial hunt of minke whales every year).

Small cetaceans occupy a precarious position within the IWC framework. The 1946 Convention does not define a 'whale', although a list of names in a number of languages of a dozen whales was annexed to the Final Act of the Convention. Some governments take the view that the IWC has the legal competence to regulate catches only of these named great whales. Others believe that all cetaceans, including the smaller dolphins and porpoises, also fall within IWC jurisdiction. It is agreed that the Scientific Committee can study and provide advice on the small cetaceans.

Consequently, to date there is no universal agreement on the competency of the IWC to regulate interactions with these animals. Nevertheless, the Scientific Committee has

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[199] *Id.* at Art. V, 1.

[200] International Convention for the Regulation of Whaling, Done at Washington, 2 November1946. 4 Bevans 248, TIAS 1849. For amendments to the schedule see Appendix B.

investigated many species and carried out major reviews of significant directed and incidental catches of small cetaceans, and the mortality of cetaceans in passive fishing nets and traps. The IWC does recognize the need for further international co-operation to conserve and rebuild depleted stocks of small cetaceans.

Each year the Scientific Committee, through its sub-committee on small cetaceans, identifies priority species/regions for consideration by a review. Topics considered include distribution, stock structure, abundance, seasonal movements, life history, ecology, and directed and incidental takes.

Since 1990 the IWC has adopted 17 resolutions directed at small cetaceans, specific small cetacean issues (e.g. baiji, vaquita, Dall's porpoise, striped dolphins and harbor porpoise), and small cetacean bycatch.[201]

Bonn Convention on Migratory Species of Wild Animals[202]

The Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention) seeks to conserve terrestrial, marine and avian migratory species throughout their range. It is an intergovernmental agreement concluded under the aegis of the United Nations Environment Program, concerned with the conservation of wildlife and habitats on a global scale. CMS acts as a framework Convention. Arrangements concluded under it may vary from legally binding treaties (called Agreements) to less formal instruments, such as Memoranda of Understanding, and can be adapted to the requirements of particular regions. The development of models tailored according to the conservation needs throughout the migratory range is a unique capacity of CMS.

The Convention was signed in Bonn on 23 June 1979, came into force on 1 November 1983, and since its membership has grown steadily to include 99 (as of 1December 2006) parties from Africa, Central and South America, Asia, Europe and Oceania (see Appendix B). The U.S. is not a signatory, but has signed a memorandum of understanding for Indian Ocean turtles, a less formal mechanism for meeting the goals of the agreement.

At the heart of the Convention lies the concept that wild animals constitute a common natural heritage for humankind, and should therefore be protected for the benefit of future generations. The CMS recognizes that "each generation of man holds the resources of the earth for future generations and has an obligation to ensure that this legacy is conserved and, where utilized, is used widely"(Preamble). Responsibility for this is vested in the individual States party, who are under an obligation to ensure that such species should be protected as they pass through their national jurisdictions (Article I).

To this end, Article II sets out the fundamental principles of the CMS, which are essentially two-fold:

Parties to the Convention must ensure that they take action specifically to protect those migratory species that are endangered, and those deemed to have an "unfavourable conservation status". This is not confined solely to guarding against the further depletion of the numbers of such species, but also to take individual or collective action to avoid the further degradation of their natural habitats.

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[201] http://www.iwcoffice.org/meetings/resolutions/resolutionmain.htm

[202] Convention on the Conservation of Migratory Species of Wild Animals. Done at Bonn 23 June 1979. 19 ILM 15 (1980).

Article II(2) creates a more general duty to take action to avoid ***any*** migratory species becoming endangered.

Under Article II(3), these aims are to be achieved by requiring the parties to promote, co-operate in and support research in relation to migratory species; endeavor to provide immediate protection for endangered migratory species; and endeavor to conclude agreements to allow for the conservation and management of migratory species classed as having an "unfavorable conservation status".

Migratory species threatened with extinction are listed on Appendix I of the Convention. CMS Parties strive towards strictly protecting these animals, conserving or restoring the places where they live, mitigating obstacles to migration, and controlling other factors that might endanger them. Besides establishing obligations for each State joining the Convention, CMS promotes concerted action among the Range States of many of these species. Additional protection is provided through Article III (5), which prohibits the taking of animals listed in Appendix I—this translates into an absolute ban on the hunting of any Appendix I species.[203]

There are currently six species of cetacean listed in Appendix I, namely the blue whale, humpback whale, bowhead whale, Northern right whale, Southern right whale and Franciscana.

Migratory species that need or would significantly benefit from international co-operation are listed in Appendix II of the Convention. For this reason, the Convention encourages the Range States to conclude global or regional Agreements to protect species listed in Appendix II of the Convention. There are thirty-three species of cetaceans currently listed in Appendix II.

With regard to cetaceans, Article V(4)(f) lays down specific requirements for Article IV(3) Agreements that have been concluded in respect of cetaceans. Under this provision, such agreements should: "at a minimum, prohibit, in relation to a migratory species of the Order Cetacea, any taking that is not permitted for that migratory species under any multilateral agreement and provide for accession to that Agreement by States that are not Range States of that migratory species".

The Agreements according to Article V(5) should include the review of the species' conservation status and coordinated conservation and management plans; research and the exchange of information; maintenance, restoration and protection of habitats; restriction of impediments to migration; co-operative action against illegal taking and emergency provisions to strengthen conservation measures. Although States party have concluded three Article IV(3) Agreements since the Bonn Convention came into force(17), none of these affect cetaceans.

Article IV(4) provides that States party "are encouraged to take action with a view to concluding agreements for any population or geographically separate part of the population of any species or lower taxon of wild animals, members of which periodically cross one or more national jurisdictional boundaries." Article IV(4) agreements are therefore wider and more general than Article IV(3) Agreements. Agreements formed under Article IV(4) are very different to the Agreements envisaged by Article IV(3). For instance, the scope of Article IV (4) Agreements encompasses a wide range of animals; Article IV(4) agreements do not apply to the restricted list of Appendix II species; and the definition of the type of animals subject to such an agreement is far wider than that of a "migratory species" for the purposes of the CMS.

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[203] Article III(5) is subject to exceptions, however, namely if the taking of such animals is for scientific purposes; to enhance the propagation or survival of the affected species (for example capture for breeding programs); to accommodate the needs of traditional subsistence users of such species; or if extraordinary circumstances so require.

To date eight Agreements have been concluded under Article IV(4) of the CMS, of which two are directly relevant to the issue of cetacean conservation. These are the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas, 1991 (ASCOBANS) and the Agreement on the Conservation of Cetaceans of the Mediterranean and Black Seas, 1996 (ACCOBAMS)(*See Sections 2.1.1 and 2.1.2*).

Convention on International Trade in Endangered Species

The Convention on International Trade in Endangered Species of Wild Fauna and Flora[204] (CITES) is a multilateral treaty regarding the export, import and transit of certain species of wild animals and plants. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. The goal of the convention is to prevent overexploitation of listed species whose survival is jeopardized. (Article II)

The convention on International Trade in Endangered Species entered into force July 1, 1975. As of December 2006, 169 nations, including the U.S., were parties. CITES is constructed to use Appendices that list species based on a set of criteria. Parties to CITES are not allowed to trade in species listed in the appendices of the Convention, except in accordance with the Convention. (Article II). Appendix I lists species threatened with extinction, (Article III) and Appendix II lists species that may become threatened with extinction unless trade is subject to regulation. (Article IV) Commercial trade is generally prohibited for Appendix I species, and requires both import and export permits. (Article III, 2) Commercial trade in Appendix II species requires an export permit verifying that trade will not be detrimental to the survival of the species. (Article IV, 2-6) "CITES allows the imposition of bans against the export of listed species to any signatory nation in order to diminish the economic incentives for continued taking" of the species.[205]

More than 20 cetaceans are listed on Appendix I of CITES, and Appendix II includes a zero annual export quota for live specimens from the Black Sea population of *Tursiops truncatus* removed from the wild and traded for primarily commercial purposes. Assessment of marine species has become a priority of the International Union for the Conservation of Nature (IUCN), which began a comprehensive regional assessment of marine species groups in 2006. The IUCN publishes the Red List of Threatened Species, which in 2006 included 65 cetaceans (both marine and freshwater).[206]

Other agreements on environment and wildlife that are not discussed here, but that may have relevance to protection of cetaceans, include the Convention on Biological Diversity, Agenda 21 Oceans Chapter, Convention on the Conservation of the Living Resources of the Southeast Atlantic,

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[204] Convention on International Trade in Endangered Species of Wild Fauna and Flora (Done at Washington 3 March 1973. Entered into force 1 July 1975. 27 UST 1087, TIAS 8249)

[205] Global Marine Biological Diversity: A strategy for Building Conservation into Diversity (Elliot A. Norse ed., 1993) at 209.

[206] IUCN http://www.iucn.org/themes/ssc/biodiversity_assessments/indexgmsa.htm. Last accessed 17 November 2006.

Regional Marine Mammal Agreements

Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS)[207]

As noted above, the thrust of the Convention on Migratory Species is to encourage member nations to conclude regional agreements under the umbrella convention that deal with specific problems. The First Meeting of the CMS Conference of the Parties held in 1985 initiated the development of ASCOBANS by passing a resolution urging CMS Parties to conclude an Agreement for two species of small cetaceans from the Baltic and North Sea: the bottlenosed dolphin (*Tursiops truncatus*) and the harbor porpoise (*Phocoena phocoena*). ASCOBANS was concluded on 13 September 1991 in Stockholm, Sweden, and entered into force on 29 March 1994. (The U.S. is neither a party to the agreement nor signatory to the MOU.)The Agreement applies to species initially considered, as well as all species, subspecies or populations of small cetaceans in the Baltic Sea and North Sea, with the exception of the Sperm whale (*Physeter macrocephalus*). The flagship species of the Agreement is the harbor porpoise.

The Agreement area covers the marine environment of 15 Range States, including the European Community, around the shores of the Baltic and North Seas. The Fourth Meeting of the Parties, held in Esbjerg, Denmark, in August 2003, agreed to extend the Agreement area farther west to cover parts of the North Atlantic and to incorporate waters adjacent to Ireland, Portugal and Spain. Once this amendment to the Agreement enters into force, the extension will close the gap for some species of small cetaceans between the Agreement areas of ASCOBANS and its sister agreement, the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS). (*See below*.)

The ASCOBANS includes a conservation and management plan that briefly describes the conservation, research and management measures that should be applied by the Parties. This plan foresees measures towards the mitigation of marine pollution and the reduction of bycatch, surveys and research about species ecology and population status and the establishment of an international database. Additionally, the plan further calls for Parties to adopt national laws to prohibit the intentional taking and killing of small cetaceans where such regulations are not already in force. General guidelines on public awareness and participation are also included in the plan.

The first major study of small cetaceans in this area took place in 1994, after ASCOBANS came into force, when scientists from the Sea Mammal Research Unit at St. Andrews University launched the SCANS project.[208] SCANS identified nine species of small cetaceans resident within the Convention area[209] (along with four species of whales), and identified three main threats to their survival: bycatch, pollution and environmental change.

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[207] Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas ASCOBANS entered into force in 1994.

[208] Hammond PS, Benke H, Berggren P, Borchers DL, Buckland ST, Collet A, Heide-Jørgensen M-P, Heimlich-Boran S, Hiby AR, Leopold MP, Øien N, 1995a. Distribution and abundance of harbour porpoises and other small cetaceans in the North Sea and adjacent waters. Life, LIFE 92-2/UK/027, European Community LIFE Programme; 242 pp. See also Hammond PS, Heimlich-Boran S, Benke H, Berggren P, Collet A, Heide-Jørgensen MP, Leopold MP, 1995b. The distribution and abundance of harbour porpoises and other small cetaceans in the North Sea and adjacent waters. (SC/47/SM30). (unpublished); 21.

[209] Namely the Harbour porpoise, Bottlenose dolphin, White-beaked dolphin, Atlantic white-sided dolphin, Common dolphin, Striped dolphin, Long-finned pilot whale, Risso's dolphin and Killer whale.

ASCOBANS conservation and management plan prescribes, in general terms, the measures that parties are to introduce. The conservation and management plan is in five parts and States must:

- Introduce conservation and management measures that strive to: prevent the release of substances that constitute a potential threat to small cetaceans, modify fishing gear to reduce bycatch, and prevent fishing apparatus from becoming a hazard to cetaceans, regulate activities affecting food sources and preventing other types of disturbance – especially of an acoustic nature.
- Cooperate in research activities to assess the status and movements of populations, locate areas of special importance to their survival and to identify present and potential threats to small cetaceans.
- Endeavor to establish an effective reporting system for bycatch and strandings.
- Endeavor to establish under national law a prohibition on taking and killing small cetaceans, supported by an obligation to immediately release any animals that have been caught.
- Provide information to the general public to encourage the reporting of sightings and strandings, and to encourage fishermen to report any bycatch of small cetaceans.

The conservation and management plan is implemented through a series of specific Resolutions passed during the Meetings of the Parties. The following resolutions contain measures to reduce bycatch.

- ***The Resolution on the Implementation of the Conservation and Management Plan*** called for Parties to establish an independent observer scheme to assess bycatch, conduct research into feeding habits, and set up a sightings survey for the harbor porpoise population in the Baltic Sea.
- ***The Resolution on the Incidental Take of Small Cetaceans*** set as the immediate short-term objective of the Agreement, to restore or maintain stocks to 80 percent of the carrying capacity, with a view to eventually preventing *all* anthropogenic removals. In the interim, it established a maximum allowable bycatch level at 2 percent of the population abundance estimate, with the possibility that this would be reduced if the population were severely depleted.
- ***Resolution on the Incidental Take of Small Cetaceans 2000*** reduced the bycatch limit for the harbor porpoise to 1.7 percent, with a view towards a further reduction. It also stated that the ultimate goal of ASCOBANS is the reduction of bycatch to less than 1 percent of the best population estimate, in line with the IWC guidelines.
- ***The Jastarnia Plan***, a recovery plan for the depleted harbor porpoise stocks within the convention area establishes guidelines to assist in the recovery of harbor porpoise.

Agreement on the Conservation of Cetaceans of the Black Sea, and the Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)[210]

CMS adopted a regional approach for cetacean conservation in the Mediterranean and Black Seas.[211] ACCOBAMS, concluded in 1996 and entered into force on 1 June 2001, binds the countries of two sub-regions to work together on an environmental problem of common concern. ACCOBAMS covers an area that includes the Black Sea, Mediterranean Sea and the Atlantic coasts of North Morocco and South Portugal. The Agreement area includes 28 Range States. ACCOBAMS covers large and small cetaceans and applies to all cetaceans that have a range that lies entirely or partly within the Agreement area or that accidentally or occasionally frequent the Agreement area.[212] Species covered include the harbor porpoise, striped dolphin, short-beaked common dolphin, false killer whale, killer whale, long-finned pilot whale, Blainville's beaked whale, Cuvier's beaked whale, sperm whale, dwarf sperm whale, Northern right whale, minke whale, sei whale, fin whale and humpback whale.[213]

The Agreement aims to reduce threats to all cetaceans in these waters and to promote closer cooperation amongst Parties with a view to conserving all cetacean species present in the area. ACCOBAMS calls also on its members to enforce legislation to prevent the deliberate taking of cetaceans in fisheries by vessels under their flag or within their jurisdiction, and to minimize incidental catches.

ACCOBAMS' objectives, set out in Article II, state: "Parties shall take coordinated measures to achieve and maintain a favorable conservation status for cetaceans. To this end, Parties shall prohibit and take all necessary measures to eliminate…any deliberate taking of cetaceans and shall co-operate to create and maintain a network of specially protected areas to conserve cetaceans."[214]

Additionally, annexed to the Agreement is a comprehensive conservation plan in Article II (3) that covers six substantive areas:

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[210] Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area. ACCOBAMS entered into force in 2001

[211] The Action Plan for the Conservation of Cetaceans in the Mediterranean Sea was developed, within the framework of the Mediterranean Action Plan, following concerns about the status of cetaceans in the region. The Action Plan was adopted at the seventh Ordinary Meeting of the Parties of the Barcelona Convention, in Cairo, in October 1991. The main objectives of the Action Plan were the protection and conservation of cetacean habitats, including feeding, breeding and calving grounds; and the protection, conservation and recovery of cetacean populations in the Mediterranean Sea Area. Within these two broad objectives, a number of general priorities were recommended, including: prohibition of deliberate taking; prevention and elimination of pollution; elimination of incidental catches in fishing gear; prevention of over-exploitation of fishery resources; protection of feeding, breeding and calving grounds; monitoring, research and data collection and dissemination with regard to biology, behavior, range and habitats of cetaceans; and educational activities aimed at the public at large and fishermen. Although the Action Plan remains an instrument of reference for the Mediterranean coastal States, it is of limited relevance now and has in any case effectively been superseded by the 1996 ACCOBAMS Agreement.

[212] Article I(2).

[213] Defined as "animals, including individuals, of those species, subspecies or populations of Odontoceti and Mysticeti".

[214] Article II(1).

1. *The adoption and enforcement of national legislation.* Parties are to develop and implement measures to minimize the effects of fisheries activities on cetaceans, with a specific ban on the use of driftnets more than 2.5km in length; to introduce regulations to prevent discarded fishing gear becoming a hazard; to conduct impact assessment on activities affecting cetaceans and cetacean-watching; to regulate the discharge of pollutants and to endeavor to strengthen or create institutions to further implement the Agreement.
2. *Assessment and management of human-cetacean interactions.* Parties are required to co-operate in the collection of data and research into activities like fishing, tourism, industry and pollution.
3. *Habitat protection.* Parties must "endeavor to establish and manage specifically protected areas" relating to cetacean feeding grounds and habitats, which should be designated as protected under the framework of the Convention for the Protection of the Mediterranean Sea Against Pollution 1976.
4. *Research and monitoring.* Parties are to take coordinated action to monitor the status and trends in cetacean populations, especially for those species for which there is little scientific data currently available; determine migration routes, feeding and hunting areas to identify localities in which human activities may need to be restricted; evaluate the feeding requirements of cetaceans and adapt fishing activities accordingly; develop research programs for sick and wounded animals and develop passive acoustic techniques to monitor cetacean populations.
5. *Capacity building, collection and dissemination of information, training and education.*. Parties are to co-operate in order to, *inter alia*, develop data collection schemes; prepare lists of national bodies with expertise in cetaceans; list the current and potential protected areas; compile a directory of applicable national and international laws; develop information-sharing initiatives on a sub-regional level; improve public awareness of cetacean issues and develop training programs for cetacean management.
6. *Responses to emergency situations.* Parties are to co-operate whenever possible and necessary to develop and implement emergency measures "when exceptionally unfavorable or endangering conditions occur". In particular they must prepare for an unexpected danger to cetaceans in the area, such as a major pollution incident; evaluate their capacity to rescue sick and wounded animals and prepare codes of practice. The parties may also receive advice from their relevant Co-ordination unit to develop mechanisms to give rapid protection to especially vulnerable cetacean populations should an emergency situation arise.

ACCOBAMS has committed to investigating competitive interactions between dolphins and fisheries; creating a by-catch database; developing pilot conservation and management actions for areas containing critical habitats for cetaceans; developing methods for evaluating habitat degradation; developing conservation plans for cetaceans of the Black Sea and for certain species in the Mediterranean Sea; conducting a survey of sperm whale populations in the Mediterranean; identifying sites of conservation importance for whales in the Mediterranean; and developing training and education schemes.

The International Sanctuary for Mediterranean Mammals

The Sanctuary was created by a tripartite agreement between the Governments of France, Italy and Monaco to mitigate the threats to cetaceans from bycatch (especially from the

increased use of driftnets), maritime traffic or urbanization and industrialization of coastal areas. The Agreement was signed on 25 November 1999 in Rome and entered into force in February 2002.

The agreement forming the Sanctuary coordinates the concerted actions taken by the three countries within the ACCOBAMS Agreement area. To ensure that all Mediterranean countries respect its objectives, the Sanctuary has been designated a Specially Protected Area of Mediterranean Importance under a protocol of the Barcelona Convention. The Sanctuary covers the Tyrrheneo-Corsican-Provencal part of the Mediterranean Sea and includes both littoral and pelagic waters.

Agreement on the International Dolphin Conservation Program (AIDCP)

The Agreement on the International Dolphin Conservation Program was signed in Washington on 15 May 1998 and entered into force on 15 February 1999, following ratification by four States, as required: Ecuador, Mexico, Panama, and the United States. To a large extent the agreement is simply a formalization of two earlier voluntary agreements (the La Jolla Agreement and the Panama Declaration). However, the 1998 agreement developed, extended and formalized the earlier agreements.

The purpose of the AIDCP is to ensure the long-term sustainability of tuna stocks in the eastern Pacific Ocean, as well as living marine resources related to the tuna fisheries; to seek ecologically sound means of capturing large yellowfin tunas not in association with dolphin; progressively reduce the incidental dolphin mortalities in the tuna fishery of the eastern Pacific Ocean to levels approaching zero; and to avoid, reduce and minimize the incidental catch and the discard of juvenile tuna and the incidental catch of non-target species, taking into consideration the interrelationship among species in the ecosystem. [Preamble, Article II].

The Agreement applies to typical dolphins (family *Delphinidae*) associated with the yellowfin tuna fishery in the Agreement Area. [Article I(1) and (2)] In practice, the principal species concerned are spotted and, to a lesser extent, common and spinner dolphins, although other species, including striped and bottlenose dolphins, are also relevant. The convention area included The Eastern Pacific Ocean, specifically as bounded by the coastline of North, Central, and South America and by the following lines: (a) The 40°N parallel from the coast of North America to its intersection with the 150°W meridian; (b) the 150°W meridian to its intersection with the 40°S parallel; and (c) the 40°S parallel to its intersection with the coast of South America. [Article III, Annex I].

A system of dolphin mortality limits (DMLs) is the principal means by which dolphin mortality is reduced under the agreement. These work by setting a basic objective of limiting total incidental dolphin mortality in the purse seine tuna fishery to no more than 5,000 individuals annually and using the basic approach of allocating DMLs to vessels. The Agreement establishes per-stock per-year dolphin mortality caps with the objective of achieving a limit of 0.1 percent of the minimum estimated abundance of stocks (Nmin) from the year 2001 onwards (an objective which was achieved). The Agreement contains various provisions which require parties to manage their DMLs in a responsible manner and provides for the reallocation of DMLs that have either not been used or have been forfeited during a particular year because of irresponsible use.

In addition to the DML system, the Agreement includes provisions for the establishment of a system that provides incentives to vessel captains to continue to reduce incidental dolphin mortality, with the goal of eliminating mortality; the establishment and implementation of a system for the tracking and verification of tuna harvested with and without mortality or serious

injury of dolphins; the exchange of scientific research data collected by the parties pursuant to the Agreement on a full and timely basis; and the conduct of research for the purpose of seeking ecologically sound means of capturing large yellowfin tuna not in association with dolphins.

The Protocol Concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (SPAW)

The SPAW Protocol's purpose is to protect the marine environment of the Gulf of Mexico and Caribbean Sea, including the areas surrounding the U.S. mainland off the coast of Florida and the Gulf States and territories in the Caribbean region. This Protocol is an outgrowth of the Cartagena Convention, and is one of three Protocols called for by and developed under the Cartagena Convention. The Convention establishes general legal obligations for the protection and preservation of the marine environment of the Caribbean region. Geographically, it covers the marine environment of the Gulf of Mexico, the Caribbean Sea and areas primarily within 200 nautical miles of the Atlantic coasts of 20 countries and island territories. Twenty-eight countries of the Wider Caribbean Region are eligible to become Parties to the Cartagena Convention and its Protocols. Currently, 12 countries are Parties to the SPAW Protocol, while five others are non-Party Signatories.

The SPAW Protocol also encompasses internal waters extending up to the fresh water limit, and any related terrestrial areas (including watersheds) that a party may wish to designate. It requires parties to establish protected areas and to take specified protection and management measures therein, as necessary and appropriate to carry out the provisions of the Protocol, and in conformity with national laws and regulations and international law.

The United States ratified the SPAW Protocol on April 16, 2003, with two reservations and an understanding along with ratification. One of the reservations is needed to ensure that our application of Article 11 of the Protocol is consistent with provisions of the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA) that allow for the limited taking of species listed in Annex I and II for the purpose of public display, scientific research, rescue and rehabilitation, or as incidental catch related to fishing operations. The second reservation is to Article 13, which could be interpreted to require environmental assessments for non-Federal activities not covered by the National Environmental Policy Act of 1969, as amended (NEPA). The Understanding would state that the provisions of the Protocol do not apply to non-native species. There are three Annexes that contain the lists of 481 endangered and threatened species of flora and fauna covered by Article 11 of the Protocol. The United States notified the depositary that the Protocol will not apply to six species of fauna and flora that do not require the protection provided by the Protocol in U.S. territory. It is envisioned that the Annexes will be treated separately as an Executive Agreement.[215]

Discussion of Regional Marine Mammal Agreements

The regional agreements relating to cetacean conservation are still very much in their infancy, but it is clear that ACCOBAMS is the superior instrument, in terms of both its scope and its potential for establishing strong and workable conservation measures in relation to cetaceans. Similarly, the U.N. Straddling Stocks Agreement and the conventions and RFMOs that have been created in its model provide the most precautionary, transparent, mandatory

[215] http://www.state.gov/g/oes/rls/rm/2002/9991pf.htm

frameworks. These agreements even provide mechanisms for coastal states to enforce regulations against fishing nations, a tool that gets around the historic weakness of consensual international agreements that have depended on flag state enforcement against its own vessels.

To date, the various ASCOBANS initiatives have proved largely ineffective, with few parties willing to adopt specific national measures to enforce these principles. One possible reason for ASCOBANS weaknesses may be that it was the first agreement of its type to deal with issues of cetacean management. As such, it may be experimental, and its limitations may act to guide the development of future agreements. Nevertheless, imperfect as it is, ASCOBANS should be commended for introducing a new tier of protection for small cetaceans, whose status under international law is vulnerable given the controversy surrounding the IWC's competence to regulate small cetaceans.

ACCOBAMS uses more prescriptive terms, imposes strong obligations on states to conserve *all* cetaceans in this area, requires the use of the precautionary principle, and works to acquire necessary scientific data about cetaceans in these waters. The initial implementation of the ACCOBAMS conservation plan shows a clear determination to introduce effective conservation measures within the convention area. In particular it has established clear and workable targets for bycatch reduction. ACCOBAMS will need to develop effective sanctions to deter noncompliance, especially with regard to fishing regulations where a number of range states have an alarming track record of noncompliance.[216]

As for the future of regional cooperation in relation to the conservation and management of cetaceans, there is cause for tentative optimism. There have been some initial moves toward creation of a similar agreement for small cetaceans in West Africa, although this is a long way from becoming a reality. While the agreements do have the potential to prescribe far-reaching measures, much will depend upon the enthusiasm of the other range states that have yet to join; the current climate of indifference, however, does not auger well for this. Likewise, the expansion of the regional agreements into contiguous areas also looks unlikely, given the current attitudes of Iceland, Greenland, and the Faroe Islands in relation to the exploitation of cetaceans.

One eventual goal for the agreements is that they will form an interlocking series of regional initiatives to protect species of cetaceans around the planet. While there are undoubtedly localities in which the conditions for future expansion are favorable, such as Australasia and parts of South America, real questions remain about whether such Agreements may be concluded in the areas where they are most needed. There are currently moves under the auspices of the Bonn Convention to conclude an agreement for small cetaceans and sirenians in central and West Africa[217] and also for small cetaceans and dugongs of Southeast Asia.[218] At present, regional action would appear to be most needed in Asia where river dolphins are critically endangered, although the range states remain lukewarm to the idea of implementing conservatory measures for small cetaceans in particular. With populations of these animals now feared to have fallen to the low hundreds, the formation of a tessellating system of global minimum standards is arguably now more pressing than ever.

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[216] "Sustaining Small Cetaceans: A Preliminary Evaluation of the ASCOBANS and ACCOBAMS Agreements" in Alan Boyle and David Freestone (eds.) *International Law and Sustainable Development*, (Oxford University Press, 1999) at 233, cited in, The conservation and management of small cetaceans in Europe: an analysis of the ASCOBANS and ACCOBAMS Agreements. Available online at **h**ttp://www.derechomaritimo.info/pagina.

[217] Recommendation 7.3 adopted by the Conference of the Parties at its Seventh Meeting in September 2002.

[218] Recommendation 7.4, adopted at the same meeting.

International Agreements Related to the Marine Environment

UN Resolution Prohibiting Large-Scale Pelagic Driftnet Fishing[219]

Large scale, high seas driftnets were recognized in the 1980's as a significant cause of incidental take of marine mammals, birds, turtles, and non-target fish species. This gear was banned internationally by United Nations resolutions in 1989, 1990 and 1991.[220]

Until they were outlawed, driftnets were used in the North Pacific and on the high seas where single vessels were capable of deploying driftnets ranging from up to 40 miles in length. In the North Pacific in the years from 1976 to 1989, 2 million miles (3.2 million km) of net were set per season.[221] With more than enough netting to encircle the earth set each night, not only were target fish caught (squid, tuna, and billfish) but approximately 100,000 dolphins and porpoises, hundreds of thousands of seabirds, sharks, sea turtles and salmon were also caught. (The Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean significantly reduced pelagic driftnet fishing and is discussed below in the section on regional fishery agreements.)

Although the driftnet fleet operated under requirements set by a multi-national agreement relating to salmon fishing, that agreement did not address incidental take of birds and marine mammals.[222] Additionally, the fleets were frequently found by U.S. enforcement to be catching salmon and steelhead in violation of the provisions of the governing treaty. In 1987, due to continued compliance problems with the Japanese, Koreans and Taiwanese, the U.S. Congress passed the Driftnet Impact Monitoring, Assessment, and Control Act, (Driftnet Act) calling for negotiations with the nations driftnetting in the North Pacific to establish monitoring and enforcement agreements by June 29, 1989.[223] If these nations refused to come to the bargaining table, they risked trade sanctions. The Driftnet Act required further research into the nature and extent of driftnet fishing to facilitate the development of effective solutions to the problem.[224]

The Driftnet Act also addressed the control of driftnet debris. Congress assigned the Secretary of Commerce with three responsibilities: establishment of controls for marking, registry, and identification of foreign driftnets so that the original vessel can be identified if their gear is lost, abandoned, or discarded; development of alternative materials for making driftnets "for the purpose of increasing the rate of decomposition," and the implementation of a bounty

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[219] United Nations General Assembly Resolution 45/197 on Large Scale Pelagic Driftnet Fishing and Its Impact on the Living Marine Resources of the World's Oceans and Seas, New York, 1990. 21 December 1990. Took effect in 1992. Report: A/46/645/ADD.6.

[220] UN Resolution A/RES/45/197, 21 December 1990. See also, UN Resolution A/RES/44/225, 22 December 1989.

[221] Simon P. Northridge with the United Nations Environment Programme. "Driftnet fisheries and their impacts on non-target species; a worldwide review." FAO 1991.

[222] Pacific Salmon Treaty, March 18, 1985, U.S.-Can., 99 Stat. 7.

[223] 16 U.S.C.A. § 1822.

[224] 16 U.S.C.A. § 1826 (f) relating to 22 U.S.C.A. § 1978 authorizing, *inter alia*, the banning of the import of fish products from offending nations.

system, so that people who find, retrieve, and return to the Secretary of Commerce lost, abandoned, or discarded driftnets and other plastic fishing materials may receive payment.[225]

Driftnetting had also become a major concern in the South Pacific. After several nations had banned driftnet fishing in their waters, 20 nations in the South Pacific negotiated and signed the Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific (the Wellington Convention).[226] This Convention endorsed a ban on driftnets as of May 1991, prevented the violators from crossing their waters, and denied access to food, fuel and facilities of the signing nations. The Wellington Convention set the stage for international efforts to end driftnetting.

On December 22, 1989, the United Nations General Assembly passed Resolution 44/225, promoted by the U.S. and New Zealand, calling for an end to driftnetting by June 30, 1992, and an end in the South Pacific by 1991.[227]

Although Resolution 44/225 is non-binding under international law, its strength lies in the fact that it demonstrates a global consensus on the issue. However, it does not carry any sanctions or mechanisms for monitoring driftnet operations.

Throughout early 1990 conflicts continued between driftnet fishing nations and nations opposed to the practice. Reports surfaced of the introduction of driftnets into new areas such as the Caribbean. In December of that year the United Nations passed Resolution 45/197 restating concern about the practice of driftnetting and calling for a report on driftnetting.[228]

In June 1991, the observer data from two previous years of driftnetting were compiled and experts met in British Columbia to discuss the results. The numbers confirmed fears of massive numbers of marine mammals, sea birds, and non-target fish being killed by the driftnet fishery. Armed with the new data, the United States submitted a report to the UN condemning the use of large-scale pelagic driftnets, and soon thereafter introduced a resolution mandating a ban on their use by June 1992. Japan introduced a resolution to study the problem further, again suggesting that there may be 'effective management measures' available to continue the fishery. December 20, 1991 the UN General Assembly passed Resolution 46/215, which stated, without exceptions, that large-scale high seas driftnetting end by 1992.[229] The December 31, 1992 deadline affects the high seas of the world's oceans and seas, including enclosed seas and semi enclosed seas. It should be noted, though, that much driftnetting continues, within EEZs, in many nations including the U.S.

The UN reaffirmed its stance on driftnets in 1995, particularly in the context of unauthorized fishing in national zones, the effects of driftnets on bycatch mortality, and the adoption of the Code of Responsible Fishing, as the General Assembly again passed a driftnet resolution. The resolution reaffirms the global moratorium on high seas driftnet fishing, urges nations to take greater enforcement responsibility and to impose sanctions, refers to the Compliance

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[225] 16 U.S.C.A. § 1822 note, PL 100-220, 1987 HR 3674 Sec 4007 (b), (c).

[226] The Wellington Convention done at Wellington, New Zealand. 17 May 1991. Available at http://www.oceanlaw.net/texts/summaries/wellington.htm. Last visited 3 May 2007.

[227] UN Resolution A/RES/44/225, 22 December 1989.

[228] UN Resolution A/RES/45/197, 21 December 1990.

[229] UN Resolution A/RES/46/215, 31 December 1992

Agreement and states' responsibilities under that convention, and makes a high priority of improvement of monitoring and enforcement.[230]

Convention on the Conservation of Antarctic Marine Living Resources

The principal instrument for management of fisheries in the Southern Ocean is the 1980 Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR).[231] By the time it came into force, CCAMLR had inherited significantly damaged fish stocks—12 of 13 assessed fish stocks were considered depleted.[232] The convention was established mainly in response to concerns that an increase in krill catches in the Southern Ocean could have a serious effect on populations of krill and other marine life; particularly on birds, seals, whales, and fish, which mainly depend on krill for food.

Current members of the Commission are Argentina, Australia, Belgium, Brazil, Chile, the European Union, France, Germany, India, Italy, Japan, Namibia, Republic of Korea, Norway, New Zealand, Poland, Russian Federation, South Africa, Spain, Sweden, Ukraine, United Kingdom, United States, and Uruguay. Bulgaria, Canada, Cook Islands, Finland, Greece, Mauritius, Netherlands, Peru, and Vanuatu have acceded to the convention, so are parties, but not members of the commission.

The purpose of CCAMLR is to ensure conservation of Antarctic marine living resources in the high seas within the area south of 60° S latitude and the Antarctic Convergence.[233] Unlike most other conventions on fisheries, in Article II CCAMLR defines rational use to mean use in accordance with these conservation principles:

- Prevention of decreases in the size of any harvested population to levels below those which ensure stable recruitment;
- Maintenance of ecological relationships among harvested, dependent, and related populations of Antarctic marine living resources and the restoration of depleted populations;
- Prevention of changes or minimization of the risk of changes in the marine ecosystems that are not potentially reversible over two to three decades.[234]

A Commission coordinates research, gathers and analyzes catch and effort statistics, identifies and evaluates conservation measures, adopts conservation measures based on the best scientific evidence, and implements observer and inspection programs.[235] The Commission, not states parties, places observers on fishing vessels. Commission membership is open to the original participants in the negotiations, and countries who have acceded to the

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[230] UN Resolution A/RES/50/25, 4 Jan 1996.

[231] CCAMLR, *supra note* 142.

[232] Kwame Mfodwo, Summaries and evaluations of selected regional fisheries management regimes. Prepared for the Pew Charitable Trusts. Unpublished manuscript. February 1998 (transcript available with the author).

[233] CCAMLR, *supra* note 142 at Article I, II.

[234] *Id.* at Article II (3).

[235] *Id.* at Article X.

convention, upon approval of an application and indication of its willingness to abide by conservation measures that are in force under the convention.[236]

The Commission may designate open and closed seasons, quotas, and regulate gear.[237] Decisions on matters of substance require a consensus. Observers from non-member countries and non-governmental organizations may attend most meetings with few restrictions, and may submit reports and views.

The Antarctic Scientific Committee includes representatives from countries that are members of the Commission. The Committee regularly assesses the status and trends of Antarctic marine living resources, the effectiveness of conservation measures, and has established programs such as developing precautionary measures for krill exploitation, ecosystem monitoring, and acquiring catch and effort data.[238]

In design, CCAMLR is considered one of the most advanced of fisheries conservation regimes in the world.[239] The treaty is consistent in many respects with the UN Agreement on Straddling Stocks. Besides a conservation-based management goal, the treaty also includes significant elements of the precautionary approach, including conservation controls over exploratory and new fisheries.[240] CCAMLR's observer and inspection programs are considered among the most developed in international fisheries management organizations. For example, members may board vessels of other members for the purposes of inspection; if a breach of CCAMLR rules is detected, the flag state must inform CCAMLR of the action it has taken against the offender.[241] CCAMLR also requires flag states to maintain an accessible registry of vessels, to insure that vessels are properly marked, and to report catch and other information in a timely fashion.[242]

CCAMLR has focused significant effort on the assessment and avoidance of incidental mortality of Antarctic marine mammals in commercial fisheries. However, the priority has been the reduction of seabird bycatch in longline fisheries, through establishment of the Ad hoc Working Group on Incidental Mortality Associated with Fishing.[243] As part of its continued efforts to minimize seabird mortality in longline fisheries, in 1996 CCAMLR published an educational book for fishers that promotes practical ways in which longline fishers can reduce incidental catches of seabirds in bottom longline operations.[244] The publication includes the CCAMLR conservation measures that establish seabird bycatch mitigation measures for longline fisheries. To date CCAMLR has not adopted bycatch mitigation strategies for small cetaceans.

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[236] CCAMLR. Website at http://www.ccamlr.org. Last updated May 2006. Accessed 3 May 2007.

[237] *Id.* at Article IX(2).

[238] *Id.* at Articles XIV, XV.

[239] Mfodwo, *supra* note 222.

[240] CCAMLR, s*upra* note 142 at Article IX.

[241] *Id.* at Article XXIV.

[242] *Id.* at Article XX.

[243] CCAMLR. Website at WG-IMAF. Accessed 15 March 2007.

[244]CCAMLR. Website at Fish the Sea, Not the Sky. Accessed 15 March 2007.

Regional Agreements Related to the Marine Environment

South Pacific Regional Environment Program (SPREP) Agreement

SPREP, a regional organization established by the governments and administrations of the Pacific region, has existed for more than twenty years to protect and improve the South Pacific environment and to ensure sustainable development in that region. It has grown from a small program attached to the South Pacific Commission (SPC) in the 1980s into the Pacific region's major intergovernmental organization charged with protecting and managing the environment and natural resources. The U.S. territories of American Samoa, Guam and the Commonwealth of the Northern Mariana Islands, are located within the SPREP region. The State of Hawaii is also closely linked to the Pacific basin by geography, history, economics and politics. SPREP provides for increased cooperation among the United States, Australia, New Zealand, France and twenty-one island States and territories of the South Pacific region in addressing issues affecting the environment and development in the region.

SPREP's mandate is to promote cooperation in the Pacific islands region and to provide assistance in order to protect and improve the environment and to ensure sustainable development for present and future generations. SPREP's focus is on sustaining Pacific islands ecosystems.

In the Solomon Islands, locals hunt dolphins long-snouted oceanic forms, including spinner, pan-tropical spotted, striped, common and rough-toothed dolphins, along with false killer whales and other small cetaceans. The animals are herded into confined bays where they are killed, with the primary objective of obtaining their teeth and meat. Dolphin teeth have long served as currency throughout Malaita and Makira. They are also woven into collars or headbands used in blood bounties. Dolphins are also harvested for the aquarium trade. Dolphins are also captured in the Solomons for traditional shell money and there is the issue of by catch in fishing fleets. At the moment SPREP has no specific requirements for bycatch reduction.

Regional Fishery Management Organizations

Commission for the Conservation of Antarctic Marine Living Resources
Commission for the Conservation of Southern Bluefin Tuna
Commission for Inland Fisheries of Latin America (FAO)
Fishery Committee for the Eastern Central Atlantic
Forum Fisheries Agency
General Fisheries Commission for the Mediterranean
Indian Ocean Tuna Commission
Inter-American Tropical Tuna Commission
International Baltic Sea Fishery Commission
International Commission for the Conservation of Atlantic Tunas
International Pacific Halibut Commission
North Atlantic Salmon Conservation Organization
Northeast Atlantic Fisheries Commission
Northwest Atlantic Fisheries Organization
North Atlantic Salmon Conservation Organization
North East Atlantic Fisheries Commission
North Pacific Anadromous Fish Commission
Pacific Salmon Commission
Latin American Fisheries Development Organization
South Pacific Permanent Commission
Southeast Asian Fisheries Development Center
Southeast Atlantic Fisheries Organization
Southwest Indian Ocean Fisheries Commission
Secretariat of the Pacific Community
Western Central Atlantic Fishery Commission
Western and Central Pacific Fisheries Convention

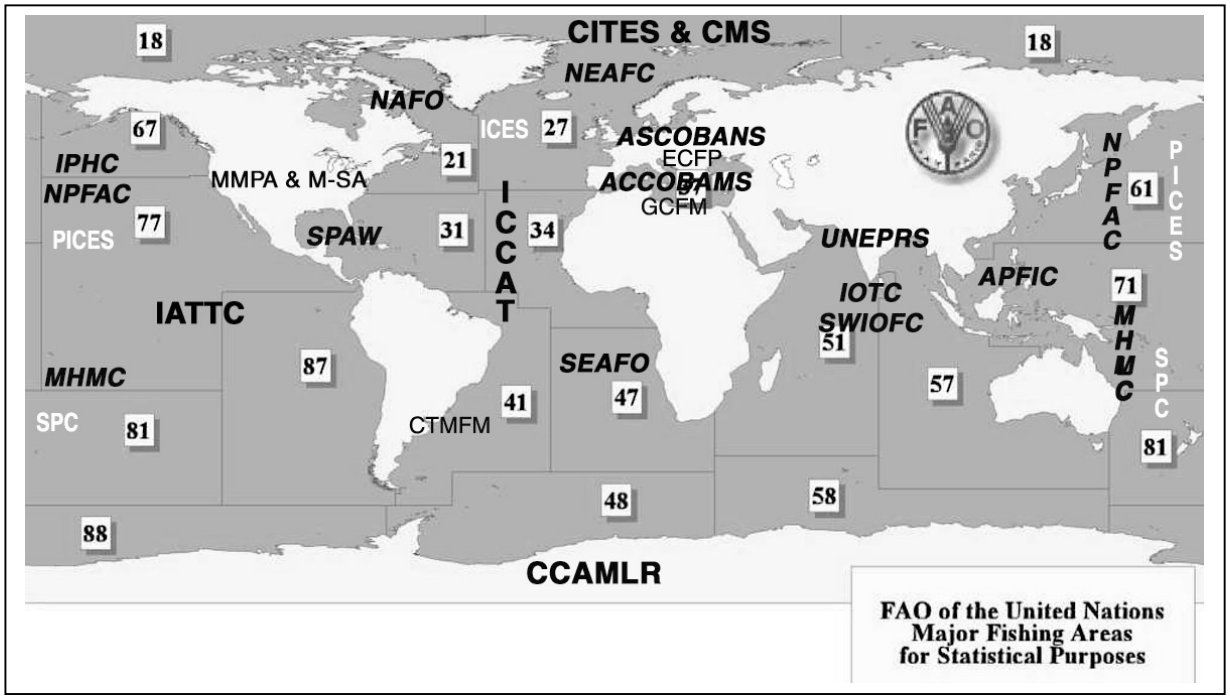
Regional Fisheries Agreements Having Potential to Address Bycatch

Although regional fishery management organizations have existed since the 1940s and earlier, their importance has increased significantly with the adoption of treaties such as the Straddling Fish Stocks Agreement, which call for creation of such bodies. In its Oceans Atlas, FAO editors point out that "under existing international law, and within the current paradigm for the governance of high seas fisheries to regulate straddling, highly migratory and high seas fish

stocks, [Regional Fishery Management Organizations] provide the only realistic mechanism for the enhanced international cooperation in their conservation and management."[245] Specific regional agreements that may have potential to address cetacean bycatch are discussed in Chapter 5. The box lists regional fishery management organizations recognized by the FAO.

As of late 2006, there were 44 regional fishery bodies including RFMOs, advisory bodies and scientific bodies. These organizations have, among other responsibilities, collecting and distributing fishery statistics, stock assessment, setting catch quotas, limiting vessels allowed in the fishery, regulating gear, allocation, research oversight, monitoring and enforcement.[246] Figure 5 shows areas where RFMOs operate.

Figure 5. Map of RFMO Areas of Operation



Although the implementation of many of the regional agreements hinges upon the effectiveness of the relevant RFMO, the success of these organizations has been the exception rather than the rule. The RFMOs are only as strong as the members make them, and rely on flag state enforcement of their provisions. Criticisms and shortcomings of these bodies include inconsistent authority, failure by key fishing interests to join the RFMO or abide by its rules, illegal, unreported and unregulated fishing, lack of equity and disparate interests between developed states and developing states, conflicts of interest among parties, lack of funding and lack of political will.[247]

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[245] Regional Fishery Organizations, Oceans Atlas USES: Fisheries and Aquaculture. http://www.oceansatlas.com/servlet/CDSServlet?status=ND0yOTQ, updated 25 Aug. 2000, accessed 8 May 2006).

[246] Devaney, P.L. Regional Fisheries Management Organizations: Bringing Order to Disorder, in, Papers on International Environmental Negotiation Vol. XIV, L.E. Susskind and W.R. Moomaw, eds. Harvard, 2005. Available at www.pon.org/downloads/ien14_Devaney.pdf. Last accessed 12 November 2006. See also, FAO Oceans Atlas, Regional Fishery Organizations. http://www.oceansatlas.com/servlet/CDSServlet?status=ND0yOTQ. Last accessed 8 May 2007.

[247] *Id.*

Devaney concludes that RFMOs could be made more effective through audits, performance review and improvements through neutral bodies such as the FAO. She recommends a stronger role for port states in enforcement, the use of technology such as vessel monitoring systems to track fishing, and modifying incentives for membership to ensure participation by all interested parties.[248]

The following section describes one or two major regional fishery agreements or organizations in each of the North Atlantic, South Atlantic, North Pacific, South Pacific, Indian and Southern Ocean regions. The discussion is not exhaustive, but is provided as illustrative of agreements that may have potential to address cetacean bycatch. Additional agreements in the ocean regions are listed in boxes.

The Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries

The convention established the Northwest Atlantic Fisheries Organization (NAFO).[249] Although the convention applies to the whole of the northwest Atlantic, the regulatory powers of NAFO include only the high seas beyond the Exclusive Economic Zones of its members.[250] This regulatory area is divided into six sub-areas. NAFO's members are Bulgaria, Canada, Cuba, Denmark, Europe Union (EU), France (in respect of St. Pierre et Miquelon) Iceland, Japan, Korea, Norway, Russia, and the United States.[251]

Atlantic Ocean Agreements and Organizations

Convention for Fisheries & Conservation of Living Resources of the Black Sea

Convention on Conduct of Fishing Operations in the North Atlantic

Convention on Future Multilateral Cooperation in the Northeast Atlantic Fisheries

EU Fisheries Agreement (Common Fisheries Policy)

General Fisheries Council for the Mediterranean

International Convention for the Conservation of Atlantic Tunas

International Convention for the Northwest Atlantic Fisheries

International Council for the Exploration of the Sea

North Atlantic Salmon Conservation Organization

Regional Convention on Fisheries Cooperation Among

A general council oversees the organization and coordinates the legal, financial, and administrative affairs of NAFO.[252] A scientific council serves as a forum for analysis and consultation among scientists from the member states.[253] The Fisheries Commission decides on management and conservation measures, with the purpose of ensuring consistency in the EEZs of member states.[254]

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[248] *Id.*

[249] *Supra*, note 145.

[250] *Id.* at Article I.

[251] Estonia, Latvia, Lithuania, Poland, Portugal, Spain and Germany were contracting parties, but acceded to the European Union. Romania withdrew from the convention. NAFO website at http://www.nafo.int/about/frames/about.html. Last accessed 17 November 2006.

[252] *Supra* note 145 at Article II (a).

[253] *Id* at Article II (b), VI.

NAFO has jurisdiction over all fishes in the Regulatory Area with the exception of salmon, tunas, marlin, and the sedentary species of the continental shelf.[255] NAFO currently provides for the conservation and management of stocks of American plaice, yellowtail flounder, cod, witch flounder, redfish, Greenland halibut, capelin, and squid. Stocks that straddle the Regulatory Area and Canada's EEZ, such as cod, American plaice, redfish, flounder, and Greenland halibut, are regular objects of diplomatic tension.[256] Conflicts also have arisen with the vessels of non-parties, including Chile, Malta, Mauritania, Mexico, Panama, St. Vincent and the Grenadines, and Venezuela. Some of these vessels have reflagged from member states of NAFO to non-member states.[257]

In addition to these regional agreements, there are management regimes for highly migratory species in the Atlantic Ocean, such as salmon and tuna, which cross national boundaries, and for which management requires international cooperation.[258]

International Convention for the Conservation of Atlantic Tunas

The International Convention for the Conservation of Atlantic Tunas (ICCAT), entered into force 21 March 1969.[259] ICCAT was established to provide an effective program of international cooperation in research and conservation in recognition of the unique problems related to the highly migratory nature of tuna and tuna-like species. The Convention area is defined as all waters of the Atlantic Ocean, including the adjacent seas.

The treaty established a Commission to carry out the objectives of the Convention. The Commission is responsible for providing internationally coordinated research on populations of tuna and tuna-like species and such other species of fishes exploited in tuna fishing in the Convention area as are not under investigation by another international fishery organization.[260] Unlike Inter-American Tropical Tuna Commission, ICCAT does not have its own scientific staff.[261] Instead, ICCAT, through its rules of procedure, established a scientific body, the Standing Committee on Research and Statistics, to advise the Commission on research needs, conduct stock assessments, and provide management advice. The SCRS is composed of scientists from the ICCAT membership. Although the Convention provides that the Commission

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[254] *Id.* at Article I (4).

[255] *Id.* at Article I (4).

[256] Mfodwo, *supra* note 222.

[257] *Id.*

[258] In general, highly migratory species (HMS) have a "wide geographic distribution, both inside and outside the 200-mile zone, and … undertake migrations on significant but variable distances across oceans for feeding or reproduction. They are pelagic species (do not live on the sea floor)…" UNCLOS Annex I "includes 11 tuna, 12 billfish species, pomfrets, 4 species of sauries, dolphinfish (Coryphaena spp.), oceanic sharks and cetaceans (both small and large)." FAO, Fisheries and Aquaculture Department. Highly Migratory Species Fact Sheet. Available at http://www.fao.org/fi/website/FIRetrieveAction.do?dom=topic&fid=13686. Last visited 3 May 2007. See also UNCLOS, *supra* note 139 at Annex 1 and Art. 64.

[259] ICCAT, *supra* note 143.

[260] *Id.* At Article IV(1).

[261] Michael L. Weber and Frances Spivy-Weber. "Proposed Elements for International Regimes to Conserve Living Marine Resources. Report in fulfillment of Marine Mammal Commission Contract no. T30916119. NTIS, Springfield, VA, October 1995.

may obtain technical and scientific information or services from any public or private individual or group, the Commission only rarely seeks scientific advice from other sources.[262]

With regard to conservation and management, the Commission may, on the basis of scientific evidence, make regulatory recommendations (Article VIII). With the decline in some large pelagic populations in the Atlantic Ocean, discussion and decisions within the Commission on stock management have become highly politicized.[263]

Promoting the conservation of large pelagics in the Atlantic Ocean under ICCAT can raise practical problems. For example, under the Atlantic Tunas Convention Act, the U.S. legislation that implements the Convention domestically, the U.S. government cannot alter a U.S. quota allocation adopted by ICCAT—even if the quota level agreed by ICCAT has been set at an unsustainable level.[264] The U.S. can adopt more stringent measures, such as higher minimum sizes, larger closed areas, etc., however U.S. fishermen must be allowed the opportunity to catch their ICCAT quota.[265] Although in its earlier years, ICCAT could not take action against non-members,[266] in 2003, ICCAT adopted a comprehensive trade measures resolution that covers both members and non-members.[267] Since the late 1990s, ICCAT has had quota compliance rules on the books that allow for the imposition of penalties, including trade sanctions, against members for quota overharvests in the swordfish and bluefin tuna fisheries.[268] Sanctions have been applied to a member under the quota compliance rules once. The trade measures resolution has not yet been applied against an ICCAT member although several non-members have had sanctions placed against them under the 2003 measure and its predecessors.[269]

Convention on the Conservation and Management of Fishery Resources in the Southeast Atlantic Ocean

Until the late 1990s, there were no regional management regimes for fisheries in the Southeast Atlantic. Angola, Namibia, and South Africa had formed the Southern Africa Development Community (SADC), which includes a Marine Fisheries Policy and Strategy. These three coastal states of the southeast Atlantic negotiated access agreements with distant water fleets. In the late 1990s, Namibia, South Africa, and the United Kingdom began talks on

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[262] *Id.*

[263] Carl Safina. 1997. North Atlantic Fishery Resources at Risk. Prepared for the Pew Charitable Trusts. Unpublished manuscript. December 1997. 54 pages. See also, Carl Safina, Song for the Blue Ocean, Henry Holt and Co. (1997) at 92-99, which describes the difficulties of getting ICCAT members, especially Japan and Canada, to reduce quotas for bluefin tuna in 1992 despite scientific information showing a consistent 15-year decline.

[264] The exact ATCA wording is "…no regulation promulgated under this section may have the effect of increasing or decreasing any allocation or quota of fish or fishing mortality level to the United States agreed to pursuant to a recommendation of the Commission." 16 U.S.C.A. 971(d)(c)(3).

[265] *Id*.

[266] Safina, *supra* note 253.

[267] Resolution 94-9 by ICCAT on Compliance with the ICCAT Conservation and Management Measures (including Addendum). (Transmitted to Contracting Parties: January 23 1995).

[268] Resolution 03-15 by ICCAT Concerning Trade Measures. (Transmitted to Contracting Parties: December 19, 2003).

[269] Personal communication with Mark Wildman, NOAA Office of International Affairs, March 2007.

the formation of a new fisheries organization, called the Southeast Atlantic Fisheries Organization, for the conservation and management of deepwater straddling stocks. Eventually Angola, the European Community, Iceland, Namibia, Norway, Republic of Korea, South Africa, United Kingdom (on behalf of St. Helena and its dependencies of Tristan da Cunha and Ascension Islands) and the United States signed the agreement.[270] States that have participated in the negotiations but have not signed the Convention are Japan, Russian Federation and Ukraine.

The Convention is one of the first regional fisheries agreements negotiated since the adoption of the UN Fish Stocks Agreement, and closely follows that model.[271] The convention seeks to ensure the conservation and sustainable management of the fishery resources of the Southeast Atlantic, and establishes the South-East Atlantic Fisheries Organization as the RFMO to implement the convention.[272]

The convention sets long-term conservation and sustainable use as a goal. Articles 2, 3, and 7 set out principles such as the precautionary approach, ecosystem management, protection of biological diversity, and protection of the marine ecosystem. Recognition of the special position of developing states is taken in Articles 12 and 21. Species covered are all but sedentary species within the coastal states' jurisdiction (Article 1). The geographic coverage of the convention is roughly FAO Statistical Area 47. The convention defines fishing more broadly than earlier instruments, taking in such activities as support operations, mother ships, transshipment and similar activities.[273] The responsibilities of the Commission include setting quotas, allocating fishing rights, determining participants in the fishery and other management duties. The convention also creates a Scientific Committee and a Compliance Committee.[274]

Flag states are responsible for authorizing their vessels to fish in the convention area, for keeping a record of such authorizations, for reporting catches and monitoring compliance. In addition, port states are authorized to develop control measures, conduct inspections and deploy observers.

Other Atlantic Regional Regimes

There is some regional management structure in the southwest Atlantic, but not much. The Joint Technical Commission for the Argentina/Uruguay Maritime Front has regulatory authority to set quotas in the common fishing zone. The South Atlantic Fisheries Commission is a bilateral agreement between Argentina and the United Kingdom that manages fisheries through cooperative unilateral measures.

As in the southeast Atlantic, the principal managing organizations in the southwest Atlantic are national governments. Their programs may be summarized as follows:

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[270] Convention on the Conservation and Management of Fishery Resources in the Southeast Atlantic Ocean. DoneatWindhoek. 20 2001 April. Entered into force April 2003 (hereinafter the Southeast Atlantic Convention). Available at http://www.seafo.org

[271] Hedley, C. The South-East Atlantic Fisheries Organization (SEAFO) Convention: an initial review. OceanLaw On-Line Paper No. 2, April 2001. Internet guide to International Fisheries Law. Available at http://www.intfish.net/ops/2.htm. Last accessed 17 November 2006.

[272] Southeast Atlantic Convention, *supra* note 260 at Art. 5.

[273] *Id.* at Art. 1(h).

[274] *Id* at Article 14.

The United Kingdom manages the fisheries around the Falkland Islands, principally the squid fishery. Management is based upon scientific advice and is carried out through limitations on fishing effort, including area restrictions and bidding for access rights. Fishing effort on the high seas is restrained by linking access to squid within the fishery zone to voluntary restraints on the high seas.

Fisheries in Argentina are managed by the Secretary of Agriculture, Fisheries, and Nutrition. Annual quotas are set based on advice of the National Institute of Fisheries Research and Development. Fisheries in Uruguay are the responsibility of the National Institute of Fisheries. The principal management concern is hake. The Agriculture Ministry in Brazil is responsible for fisheries, although management of fisheries is delegated to the states and municipalities in principle. Although legislation and regulations exist, they have little practical effect on fisheries.

North Pacific Anadromous Fisheries Commission (NPAFC)

Canada, Japan, the Russian Federation, and the United States are the primary states of origin for anadromous stocks in the North Pacific Ocean. Stocks from Asia and North America mix on the high seas, making discrimination among stocks very difficult. Generally, states of origin have claimed salmon from their streams as their property and have insisted that other states must receive their permission to catch these salmon. States whose fisheries within their own EEZ intercept salmon from another State's streams claim they have rights to any fish in their EEZs.

The North Pacific Anadromous Fisheries Convention, which came into force in 1993, replaced the International Convention for the High Seas Fisheries of the North Pacific Ocean, to which the United States, Japan, and Canada belonged.[275] Within the older convention, Japanese fishing for salmon on the high seas was increasingly restricted in order to reduce the capture of salmon from North American streams. [276]In 1989, the Soviet Union announced that, effective in 1992, it was withdrawing permission to fish for salmon in its EEZ that it had granted to Japan since the 17th century.

The Soviets also provided the United States with a draft international agreement to establish a new organization for conserving North Pacific anadromous stocks.[277] This led to a series of negotiations that produced the North Pacific Anadromous Fisheries Convention, which came into force in February 1993. The Convention established the North Pacific Anadromous Fish Commission (NPAFC), whose purpose is to promote the conservation of anadromous stocks of fish throughout their migratory range in the high seas area of the North Pacific Ocean and adjacent seas. The Convention also proposes the conservation of ecologically related species that interact with anadromous fish, including various marine mammals, seabirds, and non-anadromous fish species.

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[275] Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean. Done at Moscow 11 February 1992. Entered into force 16 February 1993. Senate Treaty Document 102-30, 102nd Cong. 2nd Sess. Hereinafter North Pacific Anadramous Fisheries Convention.

[276] Mfodwo, *supra* note 222.

[277] *Id.*

Among other improvements, the new Convention increases at-sea enforcement powers, authorizes strict enforcement at the point of sale, includes all countries of origin and fishing countries under one organization, and incorporates Russian scientific expertise and knowledge of Japanese fishing patterns.[278] The founding members are Canada, Japan, the Russian Federation, and the United States. Non-member parties may join at the invitation of existing member states.

Besides prohibiting fishing for anadromous stocks on the high seas, the Convention also requires minimizing incidental taking of anadromous fish. The member states individually or collectively may take appropriate measures to prevent trafficking in illegally harvested Pacific salmon. The member states also are to intervene with non-parties whose fishing activities may adversely affect North Pacific anadromous fish. Article IV calls for the member states to prevent the reflagging of their fishing vessels.

Pacific Ocean Agreements and Organizations

- Asia Pacific Fishery Commission
- Asia-Pacific Economic Cooperation
- Convention for a North Pacific Marine Science Organization
- Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean
- Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific Ocean
- Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean
- Eastern Pacific Ocean Tuna Fishing Agreement
- Inter-American Tropical Tuna Commission
- International Convention for the High Seas Fisheries of the North Pacific Ocean
- International Pacific Halibut Commission
- Latin American Organization for Fisheries Development
- North Pacific Anadromous Fisheries Convention
- Pacific Salmon Treaty
- Permanent South Pacific Commission
- South Pacific Commission
- South Pacific Forum Fisheries Agency Convention
- Southeast Asian Fisheries Development Center

Impacts on other species, restoration of other species, minimization of pollution, discards, and bycatch, and biodiversity protection all are reflected at least partially. The Convention authorizes timely conservation and the language on enforcement is among the strongest and most advanced in the world. Member states may board the vessels of another member state on the high seas and seize the vessel if it is found in violation of the Convention. Besides providing authority to sanction non-parties that violate conservation measures, the Convention authorizes consultation with non-members.

[278] *Id.*

Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea

The need for the Convention arose out of intensive fishing for pollock in an area of the Bering Sea that is outside the EEZs of the United States and the Russian Federation.[279] Concerns about the impact of this fishing on pollock stocks within the EEZs of the United States and the Russian Federation led to a series of negotiations that began in 1991 and concluded in February 1994 among China, South Korea, Poland, the Russian Federation, and the United States.[280] The convention's objectives are conservation, management, and optimum utilization of Bering Sea pollock, restoration of pollock to levels that will produce maximum sustainable yield, and cooperation in data gathering.

Rather than establishing a separate Secretariat, the Convention calls for annual meetings of the member states, between which the governments of the member states are to perform many of the functions of a Secretariat.[281] The only "internationalized" administrative structure is the Scientific and Technical Committee (STC), which is composed of at least one representative from each member state.[282] The STC is to provide the annual meeting of the member states with the assessments of Aleutian Basin pollock that are the basis for the harvest levels.

Principal functions of the annual meeting include setting the allowable harvest level for pollock in the area covered by the Convention and allocating this quota among the member states. The annual meeting also is to adopt other conservation and management measures, to establish terms and conditions for any trial fishing operations, to discuss cooperative enforcement measures, to review an observer program established by the member states, and to discuss scientific research in the region.[283]

All decisions of substance must be taken by consensus. If a member state considers a matter to be of substance, then it is to be voted upon in that way. Other decisions are taken by simple majority vote.

South Pacific Permanent Commission

The South Pacific Permanent Commission (CPPS) was established by the August 1952 Agreement of the Conference on the Use and Conservation of the Marine Resources of the South Pacific.[284] The Agreement does not define a specific area of jurisdiction. The Agreement does state that the parties to the agreement—Ecuador, Peru and Chile—proclaim that each possesses sole sovereignty over the area of the sea and sea floor within 200 miles of its shores. A 1984 Declaration states that each state has responsibility for conservation and protection of living resources within their jurisdictions and beyond. The agreement applies to all living marine resources.

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[279] Suzanne Iudicello, Background Paper: Major Fisheries at Risk in the North Pacific Ocean. Prepared for the Pew Charitable Trusts. Unpublished manuscript. December 1997. Transcript available with author.

[280] Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea. Done at Washington, D.C. 16 June 1995. Entered into force 8 December 1995. U.S. Treaty Document 103-27.

[281] Mfodwo, *supra* note 222.

[282] *Id.*

[283] Iudicello, *supra* note 269.

[284] 1952 Agreements on the Exploitation and Conservation of the Maritime Resources of the South Pacific. Done at Santiago, Chile, 18 August 1952. Available at http://www.intfish.net/orgs/fisheries/cpps.htm. Accessed June 30, 2007.

CPPS collaborates with FAO in collecting fisheries data for FAO Statistical Area 87. In 1985, CPPS signed an agreement with FAO to collaborate in research on living marine resources, staff training, dissemination of information, and scientific and technical meetings. Subsequent meetings of the parties resulted in an additional protocol, proposals for fishery regulation on the high seas adjacent to member countries, and a call for projects examining both artisanal and industrial fisheries.[285]

Forum Fisheries Agency

The Forum Fisheries Agency (FFA) was established by convention that went into force in July 1979. Members of the South Pacific Forum, as well as other states and territories on the recommendation of the Fisheries Committee, may join FFA.

According to the 1979 convention, the FFA was formed "to secure the maximum benefits from the living marine resources of the region for their peoples and for the region as a whole and in particular the developing countries," and "to facilitate the collection, analysis, evaluation and dissemination of relevant statistical scientific and economic information about the living marine resources of the region, and in particular the highly migratory species."[286] FFA promotes harmonization of fisheries management in the region, cooperation regarding distant water fishing nations, cooperation in enforcement and surveillance, cooperation in marketing and in granting access to exclusive economic zones.

The sphere of influence of the FFA covers about 30 million square kilometers from the Republic of the Marshall Islands to New Zealand, and corresponds roughly to FAO statistical areas 74 and 81. The FFA addresses all living marine resources, but particularly highly migratory species.

In June 1988, the Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States came into force. This agreement had been concluded in 1987 at Port Moresby, Papua New Guinea, and was renewed for ten years in 1993.[287] Under the agreement, fishing vessels from the United States are permitted into the fisheries jurisdictions of the 16 FFA member countries that are party to this treaty. Fees paid for this access are divided among the parties. The treaty was innovative in requiring U.S. vessels to comply with the same reporting and enforcement provisions on the high seas as applied within the exclusive economic zones of the member countries.[288]

Upon discovering large-scale driftnetting operations in the area, a 1989 meeting of the FFA in Kiribati issued the Tarawa Declaration calling for the end of such driftnetting. This led later to the Convention for the Prohibition of Fishing With Long Driftnets in South Pacific, which was concluded at Wellington, New Zealand, in November 1989 and came into force in May 1991.

In July 1992, members of the FFA concluded the Niue Treaty on Cooperation in Fisheries Surveillance in the South Pacific Region, which entered into force in May 1993. The principal purpose of the Niue agreement is to overcome the difficulties of enforcement in so large an area of ocean by, among other things, permitting reciprocal and joint enforcement and surveillance of

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[285] *See*, Galapagos Agreement. Available at http://www.intfish.net/orgs/fisheries/cpps.htm. Accessed June 30, 2007.

[286] Basic convention documents and agreements are available at FFA Website. http://www.ffa.int/node/266 Last accessed June 30, 2007.

[287] Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America. Done at Port Moresby, 2 April 1987. Entered into force 15 June 1988. TIAS 11100.

[288] *Id.* Articles 3-4.

measures adopted by individual countries. Subsequent agreements, annexes and projects have addressed tuna fishing, longline gear, surveillance and monitoring.

Asia Pacific Fishery Commission

The Asia Pacific Fishery Commission is an outgrowth of an agreement to establish the Indo-Pacific Fisheries Council in 1948 under the FAO. The commission, created in 1994, is to "promote the full and proper utilization of living aquatic resources by the development and management of fishing and culture operations."[289] The APFIC's jurisdiction includes a large part of the area, the Asia-Pacific (FAO Statistical Area 71). Members include Australia, Bangladesh, Cambodia, China, France, India, Indonesia, Japan, Korea, Malaysia, Myanmar, Nepal, New Zealand, Pakistan, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America, and Vietnam. Membership in the APFIC is widely open.

APFIC acts as consultative forum that works in partnership with other regional organizations and arrangements and members. It provides advice, coordinates activities and acts as an information broker to increase knowledge of fisheries and aquaculture in the Asia Pacific region to underpin decision-making. Among its functions, the commission is to review the state of fishery resources and to recommend measures and carry out programs to increase the efficiency of the fishing and aquaculture industries. The Commission also is to conserve and manage resources and protect them from pollution.

The Asia Pacific Fishery Commission has yet to make the transition from fishery development and promotion to stock conservation and rebuilding. It has not amended its charter to undertake management or conservation actions, but relies on the governments of member countries to do so. In the area under the commission's purview, there is no management structure for adjacent, or straddling stocks of fish.

Convention for the Conservation of Southern Bluefin Tuna

The Commission for the Conservation of Southern Bluefin Tuna[290] arose from annual trilateral meetings among Australia, Japan and New Zealand (Weber 1998). The three countries had operated under a voluntary management agreement, but negotiated the formal convention in response to continued heavy fishing that had resulted in significant declines of mature fish throughout the 1980s.[291]

Indian Ocean Agreements & Organizations

- Indian Ocean Fishery Commission
- Indian Ocean Tuna Commission
- Southwest Indian Ocean Fisheries Commission
- Western Indian Ocean Tuna Organization

Concerned that activity of non-party nations in the fishery was reducing the effectiveness of members' conservation and management measures, the parties in 1996 asked Taiwan, South Korea and Indonesia to become parties. On 17 October 2001 the Republic

[289] APFIC Website at http://www.apfic.org/

[290] Convention for the Conservation of Southern Bluefin Tuna. Done at Canberra, May 1993. Entered into force 20 May 1994 (hereinafter CCSBT).

[291] Commission for the Conservation of Bluefin Tuna. Website available at www.ccbt.org/docs/about.html. Last accessed 17 November 2006.

of Korea joined the Commission. The Fishing Entity of Taiwan's membership of the Extended Commission became effective on 30 August 2002.[292]

In 2003, the commission created membership status for countries with an interest in the fishery to participate in its activities as formal cooperating non-members. These parties must comply with the management and conservation objectives and agreed catch limits of the convention and may participate in discussions, but cannot vote. The Philippines was accepted as a formal cooperating non-member in 2004, and parties continue discussions with Indonesia and South Africa.[293]

The convention goal is conservation and optimum utilization of bluefin tuna.[294] Though the scope of the agreement limits its attention to bluefin tuna, definitions include consideration of all "ecologically related species."[295] By definition, the convention covers not just fishing activity, but support operations as well. States parties are required to enforce the provisions of the agreement, provide information including scientific and catch statistics and effort data, exchange scientific and fishing information, and report fishing by non-parties. Member countries are legally bound by decisions on total allowable catch and other conservation and management measures. Enforcement is by the parties on their flag vessels. Significantly, the treaty requires parties to take action to prevent vessels from transferring registration to avoid compliance with Commission decisions[296] Member countries also must act to deter non-parties from activities that undermine the objectives of the treaty. The measures adopted by the CCSBT are not limited to the high seas, but apply to the EEZs of all member countries.

The commission's duties include gathering and disseminating scientific information, statistical data, and legal information. It adopts regulations, sets catch limits, allocates catch, and operates a monitoring system.[297] All decisions are by unanimous vote.[298] The convention created a Scientific Committee, and allows both non-party and NGO observers at meetings.

The Convention for the Establishment of an Inter-American Tropical Tuna Commission

The IATTC convention[299] defines its area of competence as the Eastern Pacific Ocean, but does not further define the area, although conservation and management measures contain their areas of application, generally out to 150°W. The IATTC focuses on skipjack tuna, yellowfin tuna, and fish used as bait, although staff has studied bigeye tuna, black skipjack, bluefin tuna, albacore tuna and billfishes, as well as dolphins, turtles and sharks. Members are Costa Rica, Ecuador, El Salvador, France, Guatemala, Japan, Mexico, Nicaragua, Panama, Peru, Republic of Korea, United States, Vanuatu and Venezuela. Belize, Canada, China, Cook

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[292] CCSBT *supra* note 280.

[293] *Id.*

[294] *Id.* at Article III.

[295] *Id.* at Article II.

[296] Mfodwo *supra* note 222.

[297] CCSBT *supra* note 280 at Article VIII.

[298] *Id.* at Article VII.

[299] The Convention for the Establishment of an Inter-American Tropical Tuna Commission. Done at Washington, 31 May 1949. Entered into force 3 March 1950. 1 UST 230, TIAS 2044. (hereinafter IATTC).

Islands, the European Union, Honduras and Chinese Taipei are Cooperating Non Parties or Cooperating Fishing Entities.[300]

The IATTC is authorized to make recommendations to its members regarding measures that will maintain the fishes covered by the convention at levels that will permit maximum sustained catch. The Convention also calls for the IATTC to collect, analyze, and disseminate information regarding the catches and operations of vessels in the fishery. Unlike other tuna management regimes, the IATTC maintains an independent scientific staff that collects catch and other information and prepares recommendations for the member governments. IATTC has also carried out a program to estimate bycatch of non-target fishes and dolphins in the fishery.

At a September 1990 meeting in Costa Rica, representatives of Chile, Colombia, Costa Rica, Ecuador, El Salvador, France, Honduras, Japan, Mexico, Nicaragua, Panama, Spain, the United States, Vanuatu, and Venezuela agreed that the IATTC was the appropriate body to coordinate technical aspects of the program to reduce the incidental capture and mortality of dolphins in their exclusive economic zones and the adjacent high seas during purse seine operations. At a 1995 meeting, the member countries of the IATTC adopted a Declaration on Strengthening the Objectives and Operation of the IATTC, which called for implementing the UN agreement on straddling fish stocks and highly migratory fish stocks.

For comparison, see the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean.[301] One of the first treaties developed after the UN Fish Stocks Agreement, it was the culmination of complex negotiations among 25 nations including small island nations and developed countries with active distant water fleets.[302] As of November 2004, Australia, China, Cook Islands, Federated States of Micronesia, Fiji Islands, Korea, Kiribati, Marshall Islands, Nauru, New Zealand, Niue, Papua New Guinea, Samoa, Solomon Islands, Tonga and Tuvalu had ratified or acceded to the Convention.[303]

Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean

The Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean creates the kind of regional organization foreseen in the Straddling Stocks Agreement.[304] The 2000 Honolulu Convention covers much of the Pacific Ocean and governing territorial seas and exclusive economic zones as well as high seas areas. It creates a commission with authority to set catch limits and allocate catch quotas to fishing nations both within and outside the exclusive economic zones of coastal and island nations. Most significantly in relation to incidental capture of marine mammals, this fairly new treaty requires fishing of migratory species in the high seas to be compatible with the regulations that apply within adjacent exclusive economic zones. It relies on the precautionary approach as its basic foundation throughout. It is one of the new instruments that enables both flag-state and

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[300] IATTC website at http://www.iattc.org/HomeENG.htm. Accessed 17 November 2006.

[301] *Supra* note 144.

[302] *See generally* Violanda Botet, *Filling in one of the Last Pieces of the Ocean: Regulating Tuna in the Western and Central Pacific Ocean,* 41 VIRGINIA JOURNAL OF INTERNATIONAL LAW 787-813 (2001).

[303] WCPF Convention*, supra* note 144.

[304] Mfodwo *supra* note 222.

port-state enforcement, boarding and inspection rights, obligatory transponders on all high-seas fisheries, and regional observers on the vessels. President Bush requested advice and consent to ratification in May 2005,[305] and the Senate Foreign Relations Committee held a hearing on it on September 29, 2005.[306] Pending ratification, the U.S. has attended meetings in recent months as a "cooperating nonmember."

The objective of the Convention is to ensure, through effective management, the long-term conservation and sustainable use of highly migratory fish stocks in the western and central Pacific Ocean, in accordance with the 1982 LOS Convention and the 1995 UN Fish Stocks Agreement. The Convention applies to the Western and Central Pacific Ocean.

The Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean was opened for signature in September 2000, and entered into force on 19 June 2004. The Convention applies to all species of highly migratory fish stocks (as defined as in Annex I of the Law of the Sea Convention) or otherwise decided by the Commission.

The Convention provides a list of general principles that are closely modeled on the general principles contained in the Fish Stocks Agreement. These principles, inter alia, are: adopt measures to ensure long-term sustainability of highly migratory fish stocks and promote their optimum utilization; maintain or restore stocks at levels capable of producing maximum sustainable yield, taking into account fishing patterns, the interdependence of stocks; apply the precautionary approach; assess the impacts of fishing, other human activities and environmental factors on target stocks, non-target species, and species belonging to the same ecosystem or dependent upon or associated with the target stocks; adopt measures to minimize waste, discards, catch by lost or abandoned gear, pollution originating from fishing vessels, catch of non-target species, both fish and non-fish species, in particular endangered species and promote the development and use of selective, environmentally safe and cost-effective fishing gear and techniques; protect biodiversity in the marine environment; and take measures to prevent or eliminate over-fishing and excess fishing capacity. The general principles are to be applied by coastal States within areas under national jurisdiction in the Convention Area in the exercise of their sovereign rights for the purpose of exploring and exploiting, conserving and managing highly migratory fish stocks.

The Commission is also required to develop a regional observer program to collect verified catch data and other information, which is to consist of independent and impartial observers authorized by the Secretariat. All vessels which fish in the Convention Area, other than those which operate exclusively within waters under the national jurisdiction of the flag State, must be prepared to accept an observer from the regional observer program, if required by the Commission.

The Commission on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific has taken action to reduce the bycatch of non-target fish, seabirds and sea turtles, but has taken no action to reduce any small cetacean bycatch.

The U.S. was heavily involved in the negotiation of this convention, and in December 2006 received Senate advice and consent to ratification and secured implementing legislation through Congress.

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[305] Press Release, George W. Bush, Message to the U.S. Senate Regarding WCPF Convention (May 16, 2005), available at <http://www.whitehouse.gov/news/releases/2005/05/20050516-7.html> (visited Sept. 4, 2005).

[306] 151 Cong. Rec. S D990 (daily ed. Sept. 29, 2005)

Regional Scientific Organizations

ICES

The International Council for the Exploration of the Sea (ICES) was established in 1902, and provides scientific advice to member states in the North Atlantic in both European and North American regions. The organization annually analyzes about 70 stocks of commercially exploited fishes (Marashi 1996). ICES is considered the premier international organization researching marine living resources through its Advisory Committee on Fishery Management (ACFM). ICES also conducts research on pollution through its Advisory Committee on Marine Pollution.

Current members are Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Netherlands, Norway, Poland, Portugal, Spain, Sweden, United Kingdom, the United States, Russian Federation, Latvia, Lithuania, and Estonia.

ICES depends upon its members for much of the information that it collects, although there is no legal obligation on member states to provide information (Mfodwo 1998). It regularly conducts assessments of the state of the most important fish and shellfish stocks in the effective ICES area, the northeast Atlantic, including the Baltic but excluding the Mediterranean.

The principal decisionmaking body of ICES is the Council to which each member state may send two representatives. Member states provide most of ICES funding based on annual budgets approved by a majority vote. A Secretariat manages the day-to-day business of the commission and serves as a data center. ICES databases include a wide range of information on fisheries, including catch and effort data, discards, independent surveys, tagging data, and other matters.

ICES generally is viewed as a well-functioning organization with the capability of providing significant input into fisheries management where an appropriate political framework exists (Mfodwo 1998). It also has a highly developed ability to integrate environmental considerations into its fishery stock assessments, as through the recently established Working Group on the Ecosystem Effects of Fishing Activities. ICES also has begun evaluating the impacts of gear on the seabed of the northeast Atlantic and on marine mammals, seabirds, and benthic organisms.

PICES

After more than a decade of stop-and-start discussions, the Convention for a North Pacific Marine Science Organization (PICES) was established in December 1990. PICES's area of concern is the temperate and sub-Arctic region of the North Pacific Ocean northward of 30°N latitude. The purposes of PICES are:

- to promote and coordinate research on living resources in the North Pacific, including intereactions with land and atmosphere, climate change, ecosystems, and the impacts of human activities;
- to promote collection and exchange of information.

Founding members are Canada, China, Japan, the Russian Federation, and the United States. Each member state appoints two delegates to the Governing Council, whose roles are as follows:

- to identify research priorities and problems as well as methods for the resolution of problems;
- to recommend coordinated research programs undertaken by the member states;
- to promote the exchange of scientific data, information, and personnel; and

- to consider requests to develop scientific advice.

The Governing Council may invite other states, organizations, and experts to attend scientific meetings as it wishes. Decisions are to be by consensus--considered as the absence of a formal objection--and where consensus is not possible, by a three-quarters majority vote. Constraints on the effectiveness of PICES include the non-binding nature of their recommendations and conflicts among the agendas of different member states.

SPC

The South Pacific Commission was established by an agreement signed at Canberra, Australia in 1947. The agreement came into force in 1948, was amended in 1952, 1954, and 1964, and was supplemented by protocols of understanding in 1974 and 1976. In November 1986, a Convention for the Protection of the Natural Resources of the South Pacific Region was adopted. In August 1995, the Convention came into force after Niue became the tenth party to ratify the agreement.

The Canberra agreement defined the area of competence as all those areas in the Pacific administered by the participating governments that lie wholly or in part south of the Equator, east from and including the Australian territory of Papua and the Trust Territory of New Guinea (now Papua New Guinea and Irian Jaya), and Guam and the Trust Territory of the Pacific Islands.

The Convention for the Protection of the Natural Resources of the South Pacific Region will apply to the 200-mile zone of 23 self-governing island nations and island territories, as well as those areas of high seas that are enclosed from all sides by these 200-mile zones.

The basic principle of the SPC has been "development relevant to need." Although the SPC addresses a wide range of issues, including agriculture and plant protection, rural development, education, health information and cultural exchanges, fisheries is its largest single activity. The SPC does not make management recommendations, although it does provide scientific advice to its members. It also provides a regional forum for discussion. Two Commission programs deal exclusively with tunas and billfishes, while five others deal with coastal fisheries. Many of these programs such as the observer program are carried out in cooperation with other entities.

The SPC has collected and analyzed catch statistics, and conducted research on tuna and billfish. The program includes observer activities, port sampling, collecting catch and effort data, and population assessment. The commission monitors catches of tuna and performs biological analysis of these data. It maintains a regional oceanic fisheries data base, and assesses interaction among regional oceanic fisheries, studies the population dynamics of ocean species, monitors the level of exploitation of tunas and billfishes and baitfishes, and assists countries in building expertise. TBAP also provides observers for foreign flag vessels.

CHAPTER 5. RISK ASSESSMENT ANALYSIS OF INTERNATIONAL SMALL CETACEAN BYCATCH AND TOOLS TO REDUCE BYCATCH

In this chapter, we attempt to further classify and rank problems and potential action mechanisms according to a set of criteria and to provide a clear rationale for each problem assigned high priority for funding and intervention. The problems are presented by region, as surfaced by the review of each of the FAO statistical areas evaluated in Chapter 2 and Appendix A. The tools also are presented by region and are drawn from the domestic tools presented in Chapter 3 and agreements evaluated in Chapter 4. Table 5.1 summarizes the analysis by showing species at risk in each statistical area. Species at risk are those species where the bycatch represents between one and two percent of the population estimate. The narrative in Chapter 5 focuses on those species where the bycatch is unsustainable—where the bycatch exceeds two percent of the population estimate. Table 5.1 also summarizes gaps in abundance and bycatch information, gaps in management frameworks and gaps in implementation or enforcement of existing measures. The following species are at risk:

- Northwest Atlantic—harbor porpoise, northern right whale
- Northeast Atlantic—harbor porpoise, common and striped dolphins
- Western Central Atlantic—tucuxi
- Eastern Central Atlantic—humpback dolphin
- Mediterranean and Black Sea—striped and common dolphins, sperm whale, and harbor porpoise
- Southwest Atlantic—tucuxi, dusky and Commerson's dolphins, Franciscana
- Western Indian Ocean— Indian humpback dolphin, bottlenose dolphin, spinner dolphin, Risso's dolphin
- Eastern Indian Ocean—Ganges river dolphin and Irrawaddy dolphin
- North Pacific—Dall's porpoise and finless porpoise
- Sea of Japan—finless porpoise
- East and South China Seas and inland waters of Yangtze River—finless porpoise
- Yangtze River—baijis
- Western Central Pacific—bottlenose and spinner dolphins, Fraser's dolphin, Indopacific humpback dolphins and Irrawaddy dolphin
- Mekong River, Mahakam River, Songkhla Lake, and Ayeyarwady River—Irrawaddy dolphins
- Eastern Central Pacific—False killer whale and Vaquita
- Southwest Pacific—Hector's dolphin and Maui's dolphin
- Southeastern Pacific—Dusky dolphin and Burmeister's porpoise

Analytical Approach

In our criteria we considered the following: (1) the level of risk—whether a species' or population's survival is unsustainable, approaching an unsustainable level, or at risk from bycatch; (2) available legal mechanisms for action—whether the problem is being addressed effectively through national legislation, bilateral agreements, or international conventions; (3)

feasibility of intervention, based on institutional capacity within the country or region to effectively implement bycatch mitigation strategies and quantitative assessments to verify the risk; and (4) fisheries in which a currently available solution (technical, socio-economic, or a combination) appears feasible. Also, in this chapter, we have noted where the U.S. has capacity to participate or where it is not a party nation to applicable agreements and may need to find alternative approaches such as training and technical assistance, scientific support, grants, or economic incentive approaches.

As we undertook our analysis, a number of issues and problems emerged that apply to several regions. First, in areas where developing nations have instituted legislation making bycatch illegal, monitoring becomes increasingly difficult because fishermen dispose of bycaught cetacean carcasses clandestinely rather than bringing them to shore. Furthermore, in many regions, bycaught cetaceans have acquired a market value and are therefore brought ashore and sold for human consumption or bait, blurring the distinction between bycatch and direct harvests. This may occur despite prohibitions against the sale of cetacean products.[307]

Except for North America, western Europe, Australia, and New Zealand, very few nations have observer programs designed to monitor cetacean bycatch; consequently, the evidence for or estimates of bycatch tends to be anecdotal or non-quantitative, consisting of stranding reports, interviews, port monitoring, self-reporting by countries, and opportunistic observations by scientists and fishery observers.[308] Such information can result in underestimates of bycatch. Innovative, rigorous analyses are necessary in all regions to secure credible estimates of bycatch levels and trends. Finally, in areas where there is intensive fishing effort, but little or no basic information on presence of cetacean species or their population abundance, bycatch may pose a serious conservation threat, yet the lack of quantitative observations makes it difficult to assess risk. Moreover, the fisheries in such areas are often small-scale and decentralized, making it difficult to evaluate fishing effort or to estimate or monitor cetacean bycatch rigorously.[309] Adding to the intractability of this problem is the fact that where fisheries are coastal, local, or artisanal, international or even bi- or multi-lateral agreements do not provide mechanisms for action because these activities are solely within the purview of the coastal states.

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[307] Van Waerebeek, K., and Reyes, J.C. 1994. Post-ban small cetacean bycatch off Peru: a review. Report of the International Whaling Commission (Special Issue) 15:503–19. See also Van Waerebeek, K., Van Bressem, M.-F., Félix, F., Alfaro-Shigueto, J., García-Godoes, A., Chávez-Lisambart, L., Ontón, K., Montes, D., and Bello, R. 1997. Mortality of dolphins and porpoises in coastal fisheries off Peru and southern Ecuador in 1994. Biological Conservation 81:43–49. Leatherwood, S., and Reeves, R.R., 1989. Marine mammal research and conservation in Sri Lanka 1985–1986. United Nations Environment Programme, Nairobi, Marine Mammal Technical Report 1, 138 pp. Dolar, M.L.L., Leatherwood, S.J., Wood, C.J., Alava, M.N.R., Hill, C.L., and Aragones, L.V. 1994. Directed fisheries for cetaceans in the Philippines. Report of the International Whaling Commission 44:439–449.

[308] Leatherwood, S., and Reeves, R.R. 1989. Marine mammal research and conservation in Sri Lanka 1985–1986. United Nations Environment Programme, Nairobi, Marine Mammal Technical Report 1, 138 pp. See also Zerbini, A.N., and Kotas, J.E. 1998. A note on cetacean bycatch in pelagic driftnetting off southern Brazil. Report of the International Whaling Commission 48:519–24. Bordino, P., and Albareda, D. 2004. Incidental morality of franciscana dolphin *Pontoporia blainvillei* in coastal gillnet fisheries in northern Buenos Aires, Argentina. International Whaling Commission, Cambridge, UK. Scientific Committee Document SC/56/SM11.

[309] Donovan, G.P., 1994. Developments on issues relating to the incidental catches of cetaceans since 1992 and the UNCED conference. Report of the International Whaling Commission (Special Issue) 15:609–613.

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS[310] IUCN	CITES	CMS	AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES[311] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
ATLANTIC OCEAN, MEDITERRANEAN & BLACK SEAS										
AREA 21-NORTHWEST ATLANTIC										
PHOCOENA PHOCOENA - HARBOR PORPOISE										
Gulf of Maine/Bay of Fundy	89,700		55/year (2000-2004)		NE (VU-over all)		II	BILATERAL	US-Canada	Pingers
EUBALAENA GLACIALIS NORTHERN RIGHT WHALE										
	300		1.2/year		E	I &II	I&II	BILATERAL	US-Canada	
AREA 27-NORTHEAST ATLANTIC										
PHOCOENA PHOCOENA - HARBOR PORPOISE										
Northern and Central North Sea	61,335		2,700/4.1%		VU		II	Regional	CS/FS/PS	
Kattegat and Oeresund	36,046 (20,276-64,083)		83/0.2%		VU		II	Regional	CS/FS/PS	
Skagerrak	4,738		114/2.4%		VU		II	Regional	CS/FS/PS	Pingers
Kattegat	4,009		50/1.2%		VU		II	Regional	CS/FS/PS	
Kiel & Mecklenburg Bight	588 (240-1,430)				VU		II	Regional	CS/FS/PS	
Southwestern Baltic proper	599 (200-3,300)		13/2.1%		VU		II	Regional	CS/FS/PS	
Northern North Sea	98,564 (66,679-145,697)		5,000/5%		VU		II	Regional	CS/FS/PS	Pingers (DMK) gillnet fishery

[310] For IUCN Red List, Categories are: LC, Least Concern; LR, Lower Risk, NT Near Threatened; NE, Not Evaluated; DD, Data Deficient; VU, Vulnerable; EN, Endangered; CR, Critically Endangered. LR/cd, Conservation Dependent (cd). Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years. If listed on CITES, the Appendix is indicated as I, II or both. For the Convention on Migratory Species, Appendix II listings are shown.

[311] The parties to the international, regional and bi-lateral agreements discussed in Chapters 4 and 5 and summarized in this table are listed in Appendix B.

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS[310] IUCN	CITES	CMS	AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES[311] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
										Aug - Oct
Southern & Central North Sea	169,888 (124,121-232,530)		7,493/4.3%		VU		II	Regional	CS/FS/PS	
Celtic Sea	36,280 (12, 828-102,604)		2,200/6.2%		VU		II	Regional	CS/FS/PS	
North Sea	268,800		3,410/1.3%		VU		II	Regional	CS/FS/PS	
DELPHINUS DELPHIS-COMMON DOLPHINS										
Celtic Sea	75,449 (22,900 - 284,900)				LC	nl	II	Regional	CS/FS/PS	
Bay of Biscay	61,888 (35,461 - 108,010)		410-419 /0.67%		LC	nl	II	Regional	CS/FS/PS	Driftnet fishery banned
Celtic Sea & Western Waters	101,205 (55,125 – 185,802)		356-835312 61313-200314/ 0.6-1.1%		LC	nl	II	Regional	CS/FS/PS	
STENELLA COERULEOALBA-STRIPED DOLPHINS										
Bay of Biscay	73,843		1193-152315 /1.6-1.56%		LR/cd	nl	II	Regional	CS/FS/PS	
Celtic Sea & Western Waters	66,825		136-528316 44317/ 0.27-0.79%		LR/cd	nl	II	Regional	CS/FS/PS	
AREA 31-WESTERN CENTRAL ATLANTIC										
SOTALIA FLUVIATILIS TUCUXI										
Cananeia estuary	156-380				DD	I&II	II	Regional	CS (US)	Marine Mammal

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS[310] IUCN	CITES	CMS	AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES[311] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
	No estimate for rest of range									Action Plan under SPAW Protocol
AREA 34-EASTERN CENTRAL ATLANTIC										
SOUSA TEUSZII-ATLANTIC HUMPBACK DOLPHIN										
Dakhla Bay	Considered small				DD	I&II	II	Int'l/Regional	CS	
Parc National du Banc d' Arguin in Mauritania.	Considered small				DD	I&II	II	Int'l/Regional	CS	
Saloum delta, Senegal	100				DD	I&II	II	Int'l/Regional	CS	
Canal do Geba-Bijagos	< 1,000 animals				DD	I&II	II	Int'l/Regional	CS	
South Guinea					DD	I&II	II	Int'l/Regional	CS	
Cameroon					DD	I&II	II	Int'l/Regional	CS	
Gaboon Estuaries					DD	I&II	II	Int'l/Regional	CS	
Angola	Considered small				DD	I&II	II	Int'l/Regional	CS	
AREA 37-MEDITERRANEAN AND BLACK SEA										
STENELLA COERULEOALBA – STRIPED DOLPHINS										
Alboran Sea	14,736 (6,923 – 31,366)		145-201/1.2%		LR/cd	nl	II	Int'l/Regional	CS/FS/PS	Swordfish driftnet fishery banned
Corsican/Ligurian Sea	25,614 (15,377 – 42,685)		51-326 (+/-146) 0.19 – 1.3%		LR/cd	nl	II	Int'l/Regional	CS/PS	Swordfish driftnet fishery banned
Western Mediterranean	117, 880 (68,379-214,800)		14-15/0.006%		LR/cd	nl	II	Int'l/Regional	CS/FS/PS	
DELPHINUS DELPHIS -COMMON DOLPHINS										
Alboran Sea	14,736 (6,923 – 31,366)		145-201/1.2%		LC	nl	II	Regional	CS/FS/PS	Swordfish driftnet fishery banned
PHYETER MACROCEPHALUS—SPERM WHALE										
Mediterranean			7-14/year		VU	I	II	Regional	CS/FS/PS	Swordfish driftnet

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS[310] IUCN	CITES	CMS	AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES[311] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
										fishery banned
PHOCOENA PHOCOENA – HARBOR PORPOISE										
Azov Sea in total	2,922 (1,333–6,403I)				DD		II	Regional	CS/FS/PS	
Kerch Strait	54 (12–245)				DD		II	Regional	CS/FS/PS	
NW, N and NE Black Sea within Ukrainian and Russian territorial waters	1,215 (492–3,002)				VU		II	Regional & National (EC Directive)	CS/FS/PS	
SE Black Sea < Georgian terr waters	3,565 (2,071–6,137)				VU		II	Regional	CS/FS/PS	
Central Black Sea> waters Ukraine/Turkey	8,240 (1,714–39,605)				VU		II	Regional	CS/FS/PS	
AREA 41-SOUTHWEST ATLANTIC										
SOTALIA FLUVIATILIS-TUCUXI										
Cananéia estuaryBrazil	156-380				DD	I&II	II			
Southwest Atlantic			141		DD	I&II	II			
LAGENORHYNCHUS OBSCURUS – DUSKY DOLPHIN										
Patagonian coast	7,252		70-200/ .96%-2.7%		DD	nl	II			
Punta Ninfas and Cabo Blanco, Argentina	6,628				DD	nl	II			
CEPHALORHYNCHUS COMMERSONII – COMMERSON'S DOLPHIN										
Southwest Atlantic	21,000		141-212/		DD	nl	I			

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS[310] IUCN	CITES	CMS	AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES[311] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
			.67%-1.0% 25-170/ .1%-.8%							
Tierra del Fuego	14,000		5-30/.03%-.2%		DD	nl	I			
PONTOPORIA BLAINVILLEI FRANCISCANA										
FMA I			110		DD	nl	I&II			
FMA II			375		DD	nl	I&II			
FMA III	42,078 (33,047 – 53,542)		1,374 (694-2,215) 3.2%		DD	nl	I&II			
FMA IV	34,131 (16,360-74,397)		651 (398-1097) 1.9%		DD	nl	I&II			

PACIFIC AND INDIAN OCEANS										
AREA 51 – WESTERN INDIAN OCEAN										
SOUSA CHINENSIS – INDIAN HUMPBACK DOLPHIN										
Natal coast	200		7.5/3.75%		DD	I&II	II	Regional	CS/FS	
Zanzibar (Tanzaniza)	71		5.6%		DD	I&II	II	Regional	CS/FS	
TURSIOPS TRUNCATES – BOTTLENOSE DOLPHINS										
Indian Ocean coast south of Natal SAfrica	250		20-23/8-9%		DD		II	Regional	CS/FS	
Indian Ocean coast north of Natal S Africa	1,000		11-14/1-1.4%		DD		II	Regional	CS/FS	
TURSIOPS ADUNCUS – BOTTLENOSE DOLPHINS										
Zanzibar (Tanzania)	161		8%				II	Regional	CS/FS	

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS[310] IUCN	CITES	CMS	AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES[311] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
GRAMPUS GRISEUS – RISSO'S DOLPHIN										
Western Indian Ocean	5,500 to 13,000		1,300/24% - 10%		DD		II	Regional	CS/FS	
AREA 57 – EASTERN INDIAN OCEAN										
ORCAELLA BREVIROSTRIS – IRRAWADDY RIVER DOLPHIN										
Chilka Lake, India	20-30				DD		II	Regional	CS/FS	
PLATANISTA GANGETICA GANGES RIVER DOLPHIN.										
Ganges River	600-700				EN	I&II	I&II	Regional	CS/FS	
AREA 61 – NORTHWEST PACIFIC										
PHOCOENOIDES DALLI – DALL'S PORPOISE										
Western N Pacific	141,800		643-4,187/0.4-3.0%		LR		II	Regional	CS/FS	
NEOPHOCAENA PHOCAENOIDES – FINLESS PORPOISE										
Inland Sea Japan	4,900		84/1.7%		DD EN	I&II	II	Regional	CS/FS	
LIPOTES VEXILLIFER - BAIJI										
Yangtze	100-300		5/1.6-5.0%		CR	I&II				
AREA 71 – WESTERN CENTRAL PACIFIC										
TURSIOPS ADUNCUS – BOTTLENOSE DOLPHINS										
Northern Australia	700-1000		1700		nl	nl	II	Int'l/Regional	CS/FS/PS	
STENELLA LONGIROSTRIS – SPINNER DOLPHINS										
Northern Australia			1000		LR	nl	II	Int'l/Regional	CS/FS/PS	
Sulu Sea	30,000		1,500-3,000/5-10%		LR	nl	II	Int'l/Regional	CS/FS/PS	
LAGENODELPHIS HOSEI—FRASER'S DOLPHIN										
Eastern Sulu Sea	8,700				DD	nl	II	Int'l/Regional	CS/FS/PS	
SOUSA CHINENSIS—INDO-PACIFIC HUMPBACK DOLPHIN										
Northern Australian—Central Section Great Barrier Reef	200		11-100/5.5-50%		DD	I&II	I	Int'l/Regional	CS/FS/PS	

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS[310] IUCN	CITES	CMS	AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES[311] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
ORCAELLA BREVIOSTRIS – IRRAWADDY (SNUBFIN) DOLPHIN										
Mahakam River, Indonesia	34-50		3/6-8%		CR		II			
Malampaya Sound, Palawan Philippines	77		2-5/2.5-6.5%		CR		II			
Mekong River	69		4/5.8		CR		II			
AREA 77 – EASTERN CENTRAL PACIFIC										
PSEUDORCA CRASSIDENS – FALSE KILLER WHALES										
Hawaiian stock	236		4-6/1.6-2.5%					Reg'l/Nat'l legisl	FS (US)	
PHOCOENA SINUS – VAQUITA										
	567		35-39/6.2-6.9%		CR	I&II		Bilateral US/Mex	CS/FS(US)	Biosphere reserve
AREA 81 – SOUTHWEST PACIFIC										
CEPHALORHYNCHUS HECTORI – HECTOR'S DOLPHIN										
South Island east	1,900		16/.8%		EN			National legis.	CS	Sanctuary regs, voluntary pingers
South Island west	5,400							National legis	CS	Regs, pingers
CEPHALORHYNCHUS HECTORI MAUI – MAUI'S DOLPHIN										
North Island	100-150		3/3-2%		CR			National legis.	CS	Protected area
AREA 87 – SOUTHEAST PACIFIC										
LAGENORHYNCHUS OBSCURUS – DUSKY DOLPHIN										
			500-1,800		DD		II	Nat'l leg/Regional	CS/FS	
PHOCOENA SPINIPINNIS – BURMEISTER'S PORPOISE										
			450-200		DD		II	National legisl.	CS/FS	

Atlantic Ocean

Major (in the top 20 for global, wild-capture landings) fisheries in the Atlantic include Atlantic herring, skipjack tuna, chub mackerel, Atlantic cod, Argentine shortfin squid, European pilchard, Gulf menhaden, European sprat, Atlantic mackerel, and European anchovy. Major fishing nations in the Atlantic are the U.S., Norway, Iceland, Denmark, Spain, and Canada. In the Atlantic Ocean, the major bycaught species and gear types in which this bycatch occurs are north Atlantic right whales off eastern North America, trap lines and gillnets; harbor porpoises in the North Sea, Celtic Sea, and Baltic Sea, gillnets; tucuxis in Caribbean coastal waters, gillnets; humpback dolphins in West Africa, coastal gillnets; sperm whales, striped dolphins, and short-beaked common dolphins in the Mediterranean, pelagic driftnets and gillnets; harbor porpoises in Black Sea, coastal gillnets; tucuxis in eastern South American coastal waters, gillnets; dusky and Commerson's dolphins in Argentina, coastal gillnets and midwater trawls and franciscanas in coastal gillnets.

Northwest Atlantic

In the Northwest Atlantic, the focal species for action is the North Atlantic right whale. The U.S. and Canada have developed a recovery plan for the species and have implementation teams; nevertheless, there is still a need for the U.S. to engage in bilateral discussions with Canada to achieve greater protection for the species. In addition, competent fishery bodies in the region that could play a role include the North Atlantic Fisheries Organization (NAFO) and the International Convention for the Conservation of Atlantic Tunas. Canada and the U.S., as well as fishing nations who operate in the area and might encounter right whales, are party to both those agreements[318] in the event of documentation of incidental catch outside the EEZs of U.S. and Canada. NAFO recently passed a resolution related to documentation of marine turtle bycatch in the region's fisheries[319] and might perform a similar function for additional documentation of cetacean bycatch.

Northeast Atlantic

In the Northeast Atlantic, harbor porpoise bycatch in bottom-set gillnets is estimated at nearly 15,000 animals per year. Of particular concern are harbor porpoise mortality levels in the Celtic Sea, where more than 6 percent of the minimum population estimates are killed annually as bycatch; in the Northern and central North Sea, Northern North Sea, and Southern and central North Sea where bycatch is at unsustainable levels amounting to 4.1, 5.0, and 4.3 percent, respectively, of the population estimates for those areas.

In this area, ASCOBANS provides a regional management framework for cetaceans. After its scientific documentation of bycatch problems, members of the agreement took a variety of actions to regulate fishing operations. Under the authority of the European Community Common Fisheries Policy, the EU imposed numerous bycatch reduction measures. In EU waters, closure of the albacore *(Thunnus alalunga)* driftnet fishery in the Bay of Biscay, Celtic Sea, and west of Ireland; prohibition of driftnets from 1 January 2004 (except in the Baltic Sea); and prohibition of

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[318] U.S., Japan, Canada, France, Russia, United Kingdom, European Community, Iceland, Norway, Nicaragua, Guatemala, Senegal, Belize, Syria, St. Vincent, and the Grenadines.

[319] http://www.nafo.int/publications/frames/general.html

tuna purse-seine fishing on dolphins represent important measures to reduce bycatch.[320] Denmark implemented a mandatory pinger program in certain North Sea bottom-set gillnet fisheries after undertaking rigorous studies of harbor porpoise *(Phocoena phocoena)* bycatch levels and conducting pinger trials.[321] In March 2004, the European Commission introduced a new regulation (Council Regulation [EC] No. 812/2004) aimed at reducing the bycatch of harbor porpoises in bottom-set gillnets and entangling nets. Beginning in the summer of 2005, pinger use was to become mandatory on bottom-set gillnets or entangling nets in the North Sea and the Skaggerak and Kattegat region of the Baltic deployed from vessels greater than 12 m in length. Similar rules were to apply to the western English Channel and South Western Approaches from January 2006, and to the east English Channel from January 2007. This regulation also made provision for the monitoring of dolphin bycatch in trawl fisheries from January 2005 in the English Channel, Irish Sea and off western Britain and Ireland, and from January 2006 in the North Sea and west Scotland.

However, within its framework for cooperation and research, ASCOBANS does not provide authority for actual regulation of fishing operations, even though it has documented how those operations affect cetacean bycatch. Action is up to individual parties of ASCOBANS for measures within their EEZs. Region-wide policy must come from the European Commission. Outside the EEZs of European countries, the North East Atlantic Fisheries Commission (NEAFC) and ICCAT govern fishery operations in international waters of the region. But these management regimes do not reach into coastal areas with documented bycatch. ICES, the International Commission for Exploration of the Seas, is the scientific arm for various management agencies in the Northeast Atlantic region; it assesses living marine species and monitors the health of the regional marine environment.

In order to address bycatch under a legally binding, Europe-wide management framework, either the EC or the members of ASCOBANS would have to establish legally accepted bycatch limits and enforcement strategies. Scientists generally agree that a PBR-type approach, incorporating the ASCOBANS management goal of maintaining stocks at 80 percent of the carrying capacity, is a useful means to determine critical bycatch mortality limits.[322] However, this would require the development of species-specific critical mortality limits for species other than harbor porpoises. More research investigating stock structure and maximum population growth rates is crucial to achieve this objective.

Scientists agree that it is necessary to carry out comprehensive surveys to estimate cetacean abundance, stock structure, and population growth rates in ASCOBANS waters at regular intervals.[323] Additionally, monitoring cetacean entanglement is urgently needed for all bottom-set gillnet, single and pair pelagic trawling operations in British, French, Dutch, Danish, Norwegian, and German fisheries. Scientists within ASCOBANS recommend observer coverage

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[320] Kaschner, K. 2003. Review of small cetacean bycatch in the ASCOBANS area and adjacent waters – current status and future actions. Submitted to the Fourth Meeting of the Parties to ASCOBANS, Esbjerg, Denmark, 19–22 August 2003. Document MOP4/Doc.21 (S). Unpublished.

[321] Vinther, M. 1999. Bycatches of harbour porpoises (*Phocoena phocoena* L.) in Danish set-net fisheries. *Journal of Cetacean Research and Management* **1**, 123–135. See also Larsen, F., and Rye Hansen, J. 2000. On the potential effects of widespread pinger use for the Danish North Sea gillnet fishery. IWC paper SC/52/SM27.

[322] CEC, 2002. Incidental catches of small cetaceans. Report of the second meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC (2002) 1134, Brussels, BL, Commission of the European Communities; 63.

[323] *Id.*

of 5–10 percent of total fishing effort for all bycatch monitoring programs. Only then can the effectiveness of the various mitigation measures be evaluated and, if necessary, modified.

Given the existing mandated mitigation measures and the existence of ASCOBANS, U.S. action may not be necessary and indeed would be difficult because the U.S. is not party to any of the relevant agreements. Nevertheless, the Office of International Affairs staff could attend and observe the ASCOBANS meetings, serving in an advisory capacity, providing technology or information transfer from U.S. experience with similar problems (e.g., approaches developed through the MMPA's incidental bycatch–reduction teams).

Western Central Atlantic

In the Western Central Atlantic, it is difficult to assess the magnitude of the threat posed to cetacean populations in the wider Caribbean region as a consequence of fisheries operations. Published information on bycatch is scarce. There is a great need for a systematic survey effort in the Caribbean and tropical Atlantic to acquire cetacean population estimates and to identify the species most frequently involved in fishery interactions.

UNEP's Caribbean regional seas program has recently promulgated a regional marine mammal action plan. In addition, it has also established a Regional Activity Centre in Guadeloupe for implementation of the protocol on Specially Protected Areas and Wildlife (SPAW). The U.S. became a party to the agreement in 2003. It could work through SPAW to ensure the effective implementation of the marine mammal action plan, specifically those parts related to documenting the range and abundance of cetaceans and the impacts of fishery bycatch and directed catches on cetacean populations in the wider Caribbean. Particular emphasis should be given to investigating tucuxis (*Sotalia*) along coastal waters of Honduras, Nicaragua, Costa Rica, Panama, Colombia, Venezuela, Guyana, Surinam, and French Guyana. A recent study of bycatch in the mouth of the Amazon indicated a kill of more than 1,050 tucuxis in a single year. Along with franciscanas, tucuxis are the most commonly caught cetaceans in Brazilian coastal gillnet fisheries.[324] The tucuxi may also be the cetacean most commonly caught as bycatch in coastal fisheries of the southern Caribbean Sea.

As a member of the agreement, the U.S. could encourage incorporation into the marine mammal action plan the objective of acquiring additional information on populations, fishing effort, and level of incidental bycatch. At this early stage, in the development of the agreement, emphasis on improving marine mammal science, technology transfer, and information sharing would be useful. The U.S. could hold a regional workshop to bring together scientists and managers within the wider Caribbean to specifically develop an action plan to assess cetacean populations and to document bycatch.

In addition, the U.S. is a member of the West Central Atlantic Fisheries Commission (WCAFC). This body was created in 1973 under FAO auspices, and in 1999 responded to an FAO review to take actions to strengthen its functions and responsibilities.[325] It is advisory only, but the U.S. could encourage revamping this body or creating a new one in the Caribbean

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[324] Beltrán, S., 1998. "Captura accidental de Sotalia fluviatilis (Gervais, 1853) na pescaria artesanal do Estuário Amazônico". M.Sc. thesis. Universidade do Amazonas, Manaus, Brasil. 100 pp. [In Portuguese] See also: Siciliano, S., 1994. Review of small cetaceans and fishery interactions in coastal waters of Brazil. Report of the International Whaling Commission (Special Issue) 15, 241–250.

[325] FAO. 1999. Progress Report on the Implementation of Conference Resolution 13/97 (Review of FAO Statutory Bodies and the Strengthening of FAO Regional Fishery Bodies) COFI/99/4. During this review the FAO abolished the Regional Fisheries Advisory Committee for the Southwest Atlantic (CARPAS) and the Inland Fishery Committee for Latin America and the Caribbean (COPESCAL). Available at http://www.fao.org/docrep/meeting/x0361e.htm

region in accordance with more recent trends for regional fishery management organizations, incorporating more of the principles of the Straddling Stocks Agreement. The Secretariat of the Caribbean Community made such a recommendation in 2003.[326] The international provisions of both the MMPA and the M-SFCMA call for this type of leadership to increase the tools available to bring fishing into compliance with the most recent international standards. A successor to the WCAFC could be a venue to advance a resolution on cetacean bycatch similar to what has been done for sea turtles in other fisheries organizations.

Should any documentation arise related to incidental bycatch of cetaceans during fishing on highly migratory stocks such as tuna or swordfish in the region, provisions of the Straddling Stocks Agreement might be raised in the ICCAT forum.

Eastern Central Atlantic

In the Eastern Central Atlantic, the clymene dolphin (Ghanaians call it the "common dolphin"), bottlenose, pantropical spotted, Risso's, long-beaked common, and rough-toothed dolphins; short-finned pilot whale, melon-headed whale, dwarf sperm, and Cuvier's beaked whale [327] may all be caught in large-meshed drift gillnets targeting tuna, sharks, billfish, manta rays, and dolphins. But the species most threatened by bycatch in West Africa is the Atlantic humpback dolphin. There is a significant need to document the bycatch of humpback dolphins in West African countries, especially in the coastal fisheries in Ghana and Togo, which have failed to yield a single record because of the severely depleted population.[328] Research is needed to establish the range, distribution, natural history, taxonomy, abundance, and fishery interactions of Atlantic humpback dolphins. A high priority area for dedicated field investigations is Ghana's Volta River region and western Togo. The Convention on Migratory Species could be used to encourage the Ghana and Togo fisheries and wildlife departments to ban or at least limit commerce in cetacean products (e.g., restrict consumption to local fishing communities). Additionally, Ghana should be encouraged to protect humpback dolphins by adding this species to the conservation program of Ada Sanctuary at the mouth of the Volta (Songhor RAMSAR site) and perhaps declare this site closed to gillnet fishing.

The U.S. is a party to the (relatively) new Convention on the Conservation and Management of Fishery Resources in the South East Atlantic Ocean (SEAFO). This is one of the new agreements done in the model of the Straddling Stocks Agreement. It incorporates key measures such as the precautionary approach, ecosystem conservation, and bycatch reduction. It gives port states authority to develop control measures, conduct inspections, and deploy observers. That means the U.S. could place observers on vessels in these fisheries. The agreement calls for research to assess effects of fishing on non-target species. The U.S. could use this forum to advance a resolution requiring parties to document cetacean population abundance and bycatch and report back to the secretariat.

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[326] CARICOM Secretariat. 2004. A Common Fisheries Regime for the Caribbean Sea. July 2004.

[327] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A. and Notarbartolo di Sciara, Giuseppe (compilers). (2003). Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans. IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139 pp.

[328] Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Drammeh, F., Jallow, A., Ndiaye, E. and Samba Ould Bilal, A.O. 2001a. Conservation efforts and field research on cetaceans in Senegal and The Gambia. Report to UNEP/CMS Secretariat, Bonn, Germany. See also Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Jallow, A.O., Ndiaye, E., Samba Ould Bilal, A.O., and Bamy, I.L. 2004. Distribution, status and biology of the Atlantic humpback dolphin *Sousa teuszii* (Kükenthal, 1892). Aquatic Mammals 30: 56–83.

Additionally, since at least the late 1960s, it has been speculated that dolphins are involved in the tuna purse-seine fishery in the eastern tropical Atlantic Ocean. The tuna vessels are registered in several countries, including France, Spain, and the U.S. as well as several West African countries. The levels of mortality, stock sizes, and even exact species involved are not known with certainty, and there is conflicting information on the extent of the problem. It has been suggested that dolphin mortality in this fishery could be very high, as many as 30,000 or more animals per year.[329] The species involved likely include several species of the genus *Stenella*, as well as common dolphins (*Delphinus* spp.)[330] Tuna-whale interactions are also known to occur, and baleen whales are considered to be good indicators of tuna schools.[331] Despite claims to the contrary, there is reason to suspect a serious problem that has been neglected for more than 30 years. Independent observer data on the composition and extent of the bycatch need to be obtained and published. Although observer programs may already exist in this fishery, adequate information to assess the cetacean bycatch is currently lacking. Section 16 USC 1385 (d)(1) of the MMPA sets up the conditions and documentation required in order to label tuna as "Dolphin Safe". Fisheries outside the eastern tropical Pacific Ocean must provide certain documentation to import tuna into the U.S. if the "Secretary [of Commerce] has determined that a regular and significant association occurs between dolphins and tuna."[332] The purpose of this language was to require the Secretary to investigate instances—such as the tuna-whale interactions suspected in the eastern tropical Atlantic where fisheries may be intentionally encircling, injuring, and possibly killing cetaceans—and use this information not only to govern the labeling of tuna, but also to bring about additional investigation and mitigation of any potential problem in forums such as ICCAT. Therefore, the U.S. can use both ICCAT and SEAFO to document the occurrence of intentional encirclement and, if necessary, devise and implement mitigation measures to bring the bycatch into compliance with the MMPA.

Mediterranean and Black Seas

In the Mediterranean, the focal species most affected by interactions with fisheries appear to be striped dolphin, common dolphin, harbor porpoise, and sperm whale. Both the Mediterranean and Black seas are covered by the ACCOBAMS agreement, and both have programs under the auspices of the UNEP Regional Seas Program. The Mediterranean UNEP program has more action plans and resources for cetacean conservation than does the Black Sea program, which is primarily focused on reversing decades of environmental degradation from pollution.

Incidental mortality of large numbers of sperm whales is known to have occurred in the high-seas driftnet fishery for swordfish, possibly reducing their abundance in the Mediterranean. Entanglement in high-seas swordfish driftnets kills between 7 and 14 sperm whales per year.[333]

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[329] Alverson, F.G., 1991. Tuna purse seine and gill/drift net fisheries in the oceans of the world and their relationship to tuna-dolphin, tuna-whale and tuna-whale shark associated schools. Unpublished Report Submitted to the CANAINPES Seccion Especializada en Pesca de Atun Programa Atun-delfin, Camara Nacional de la Industria Pesquera. 110 pp.

[330] Maigret, J. 1981. Introduction à l'étude des rapports entre les cétacés et la pêche thonière dans l'Atlantique tropical. *Bull. du Centre Natl. Rech. Oceanogr.* Pêches Mouadhibou **10**, 89–101.

[331] Alverson, *supra* note 321. F.G.,1991.

[332] Section 1385(d)(1)(B)(i).

[333] International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15:1–72. See also: Pace, D.S., Miragliuolo, A., Mussi, B. 2005. Behaviour of a nursery group of entangled sperm whales *(Physeter macrocephalus)* off Capo Palinuro (Southern

With no estimates available, surveys are needed to assess the abundance and distribution of sperm whales in the Mediterranean and the impact of this mortality on the Mediterranean sperm whale population.

Likewise, large numbers (perhaps approaching the thousands) of striped dolphins have been killed incidentally in the high-seas driftnet fishery for swordfish, possibly reducing their abundance in the Mediterranean. Incidental mortality may approach 1 percent of the population in the Alboran Sea and the Corsican–Ligurian Sea.[334]

Short-beaked common dolphins in the Mediterranean and Black seas have undergone a dramatic decline in abundance during the last few decades and have almost completely disappeared from large portions of their former range, including the northern Adriatic Sea, Balearic Sea, Provençal basin, and Ligurian Sea.[335] No credible information exists on the abundance of common dolphins (and other cetaceans) in the Black Sea. Other than the reported bycatch of 145 to 200 common dolphins in the Spanish swordfish driftnet fishery in 1993–1994, the threats posed to common dolphins by accidental killing in fishing gear are virtually undocumented.

The Black Sea population of harbor porpoises is classified as vulnerable on the IUCN Red List. These animals are threatened by accidental killing in large-mesh bottom-set gillnets for turbot, sturgeon, and dogfish. Mortality estimates are not available. However, available data indicate that the annual level of harbor porpoise bycatch may be in the thousands.[336]

The Black Sea needs a comprehensive effort to determine distribution patterns and estimate abundance of harbor porpoise as well as an effort, through interview surveys, visits to fish markets and landing sites, and on-board observer programs, to evaluate incidental catch

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Tyrrhenian Sea, Italy). Abstracts, 19Th Annual Conference of the European Cetacean Society, La Rochelle, France, 2–7 April 2005:69.

[334] International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15:1–72. See also: Pace, D.S., Miragliuolo, A., Mussi, B. 2005. Behaviour of a nursery group of entangled sperm whales *(Physeter macrocephalus)* off Capo Palinuro (Southern Tyrrhenian Sea, Italy). Abstracts, 19Th Annual Conference of the European Cetacean Society, La Rochelle, France, 2–7 April 2005:69.

[335] UNEP/IUCN. 1994. Technical report on the state of cetaceans in the Mediterranean. Mediterranean Action Plan Technical Reports Series No. 82, United Nations Environment Programme (UNEP), Regional Activity Centre for Specially Protected Areas, Tunis. 37 pp.

[336] Commercial hunting of Black Sea cetaceans, including harbor porpoises, was banned in 1966 in the former U.S.SR (present Georgia, Russia and Ukraine), Bulgaria, and Romania and, in 1983, in Turkey. The riparian states assumed international obligations to protect Black Sea cetaceans as contracting parties of the Convention on Biological Diversity (CBD), Convention on the Conservation of Migratory Species of Wild Animals (CMS), Convention on the Conservation of European Wildlife and Natural Habitats (Berne Convention), Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, Appendix II), and the Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS). The harbor porpoise, *P. phocoena*, is mentioned in Annex II of the EC Directive No.92/43/EEC on the conservation of natural habitats of wild fauna and flora. In 1996, the Ministers of Environment of Black Sea countries adopted cetacean conservation and research measures within the framework of the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea (paragraph 62). The harbor porpoise is included as Data Deficient in the regional Black Sea Red Data Book (1999). However, in 2002, it was listed as Endangered in the Provisional List of Species of the Black Sea Importance, an annex to the Black Sea Biodiversity and Landscape Conservation Protocol of the Bucharest Convention.

and illegal hunting. Results of the population and threat assessments should lead to the development of a basin-wide conservation plan.

Work should be undertaken to determine the distribution and abundance of sperm whales and common and striped dolphins in the Mediterranean and Black seas and their connecting waters and efforts should be made to evaluate the extent and risk posed by incidental mortality in fishing operations. There may be several avenues to accomplish this basic assessment work.

Potential avenues for basic assessment work may exist under the UNEP Regional Seas, Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (Entry into Force: 12 December 1999). Through the UNEP Regional Seas, the Mediterranean Program has linkages with the FAO and a host of other entities that have responsibility for fisheries, protected species, biodiversity, and migratory species. They all have action plans.[337] The ACCOBAMS Secretariat and Mediterranean Action Programme (SPA/RAC) signed a memorandum of understanding to coordinate the joint implementation of ACCOBAMS and the Barcelona Convention Action Plan on cetaceans.[338] In addition, the Secretariat of ACCOBAMS is on the advisory committee for the Strategic Action Program for Biodiversity (SAP BIO) to provide coordination for protection of threatened Mediterranean marine species and species management. Other frameworks that could provide support to Mediterranean coastal states for the acquisition of data and implementation of Action Plans, conservation of threatened species, and for species management include RAMSAR, the Bonn Convention and CITES.

ACCOBAMS has the authority to address bycatch of cetaceans in the Mediterranean and Black seas. ACCOBAMS came into force only in 2001 and therefore is still in its early stages of development. In the near future, ACCOBAMS Secretariat should work with national agencies and scientists to undertake the needed abundance surveys and to monitor incidental mortality to develop accurate bycatch estimates. It should establish scientifically sound bycatch limits and enforcement strategies. Without such estimates and a management framework, ACCOBAMS' ability to effectively regulate incidental mortality and develop conservation plans and measures will be severely diminished. Although the U.S. is not a party nation to ACCOBAMS[339], it could monitor progress and provide advice as the convention develops the conservation and management framework needed to address the threat of fisheries bycatch.

The high mortality of cetaceans in large-scale drift gillnet fisheries on the high seas has been largely eliminated, at least in some ocean regions, through decisive action by the United Nations General Assembly, which declared a global ban beginning in 1993 (See Chapter 3). However, the reach of this driftnet ban did not extend to several key areas such as the

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[337] For example, FAO cooperates with MAP in relation to responsible fishing through the General Fisheries Commission for the Mediterranean (GFCM); they have a memorandum of cooperation signed in 2000 with the Convention on Biological Diversity Executive Secretary for the harmonized implementation of the CBD and SPA Protocol in the Mediterranean and for the better implementation of the CBD program on the conservation and sustainable use of marine and coastal biological diversity. See also programs for assessments (e.g., NATURA).

[338] http://www.unep.org/regionalseas/Programmes/UNEP_Administered_Programmes/Mediterranean_Region/default.asp. Accessed 15 January 2006.

[339] The U.S. declined to join either ACCOBAMS or the Bonn Convention that underlies it because of concerns about the federal-state management relationship related to migratory waterfowl in the U.S. It has, however, become a member of specific protocols or MOUs negotiated under the Bonn Convention. Pers. Comm., NOAA OIA, March 2007.

Mediterranean Sea[340] and EEZs where cetacean bycatch remains significant and where illegal driftnet fishing poses a major threat to all of these species.

Pelagic driftnets have been prohibited in Spain since 1995. On 8 June 1998, the EU Fisheries Council adopted Council Regulation 1239/98 banning the use of driftnets by 1 January 2002 in all waters falling within the jurisdiction of Member States, as well as outside those waters. The EU driftnet ban entered into force on 1 January 2002. On 26 November 2003, ICCAT adopted, at its 18th Annual Meeting in Dublin, Ireland, Recommendation (03-04), which prohibits the use of driftnets in fisheries for large pelagic species in the Mediterranean by its Contracting Parties, Cooperating Non-Contracting Parties, Entities, and Fishing Entities. In practical terms, the recommendation prohibits driftnet fishing on the high seas or in territorial waters and closes a driftnet fishing loophole that could be used by countries that are members of ICCAT but not the EU. At the 20th Session of the General Fisheries Commission for the Mediterranean (GFCM) on 21–25 February 2005, the Commission adopted, as Recommendation GFCM/2005/3(A), ICCAT Recommendation 03-04 prohibiting the use of driftnets for fisheries of large pelagics in the Mediterranean Sea.

Despite these restrictions several nongovernmental organizations (NGOs) continued to assert that as many as 600 vessels with driftnets from 7–9 km in length, were operating throughout the Mediterranean Sea. World Wildlife Federation (WWF)–International claimed that the Moroccan driftnet fleet, with 177 vessels, was killing thousands of dolphins and other vulnerable species such as sharks and sea turtles in the Alboran Sea and around the Straits of Gibraltar. The WWF also alleged that Italian, French, Turkish, and most probably other fishing fleets were using driftnets in breach of existing legislation and the United Nations driftnet moratorium.[341]

In 2005, the U.S. confirmed the existence of a Moroccan driftnet fleet and began to work with the country on a plan to phase out Morocco's driftnet fleet. The U.S. has earmarked funds to help with some aspects of Morocco's driftnet elimination program. That same year, the EU and Morocco signed a new fisheries partnership agreement whereby 119 EU vessels were to be allowed to fish in Moroccan waters in exchange for EU compensation of approximately $42 million per year, the proceeds of which are designed to fund the conversion of the Moroccan driftnet fleet to more sustainable fishing activities.

Turkey, on the other hand, is still fishing in violation of the ICCAT and GFCM driftnet ban, administering a fleet of fewer than 100 driftnet vessels, each less than 15 meters long with fishing nets that are 800–1,000 meters long, targeting swordfish off the southwest corner of Turkey. In order to accede to the EU, Turkey must, as a prerequisite, agree to adopt the common rules, standards, and policies that make up the body of EU law —this would include terminating its driftnet fleet.

Following an order of the U.S. Court of International Trade, the U.S., on 19 March 1999, identified Italy as a nation for which there was reason to believe its nationals or vessels were conducting large-scale driftnet fishing beyond the EEZ of any nation, pursuant to the U.S. High Seas Driftnet Fisheries Enforcement Act (the Act). This marked the second time the U.S.

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[340] Tudela, S., Guglielmi, P., El Andalossi, M., Kai Kai, A. and Francesc Maynou, A.H. 2003. Biodiversity impact of the Moroccan driftnet fleet operating in the Alboran Sea (SW Mediterranean). WWF Mediterranean Programme Office, Rome.

[341] Imbert, G., Gaertner, J.-C., and Laubier, L., 2001b. Prevention a l'aide de repulsifs acoustiques des captures de dauphins par les thonailles. 10e Conference International sur les cetaces Mediterranee de la RIMMO. Juan-les Pins 16–18 Nov. 2001 (Abstract)

identified Italy pursuant to the Act (the first identification was in 1996). As a result of the identification, the U.S. began consultations with the government of Italy on 17 April 1999 to obtain an agreement to bring about the immediate termination of such activities. In July 1999, an agreement was reached. The 1999 driftnet agreement reiterated Italy's commitment to full implementation of the measures to combat large-scale high-seas driftnet fishing contained in the 1996 U.S.–Italy driftnet agreement. As a result of Italy's driftnet vessel conversion program (a product of the 1996 agreement), about 85 percent of Italy's driftnet fleet of 679 vessels were converted to other fishing methods or scrapped by March 2000. The Government of Italy expected the remaining vessels to continue to fish in Italian waters until the EU driftnet ban entered into force in 2002 (Italy is a member of the EU).

In 2003, the Italian government enacted legislation that required "compulsory dismissal or conversion" (boats could be scrapped or converted to another gear type) of the driftnet fishing licenses of the remaining 89 licensed driftnet vessels that did not participate in Italy's earlier driftnet conversion program. The legislation also seized and sealed the driftnets from all 89 vessels, cancelled the driftnet portions of the fishing licenses of all of the 89 remaining vessels, and deleted the names of those vessels from the EU Vessel Registry, which contains a unique registration number for each vessel.

Nevertheless, environmental groups continued to claim that Italian vessels were still fishing with driftnets in Mediterranean waters in 2005. In March 2005, the Royal Society for the Prevention of Cruelty to Animals (RSPCA) and the Humane Society International (HSI) reported that nine Italian driftnet vessels were fishing illegally (three may have been fishing in international waters). Additionally, in 2004, they identified in Ischia harbor 15 Italian vessels equipped with driftnets estimated to range in length from 9 to 84 kilometers. Of all of the vessels detected, five had the same registration numbers as vessels that had accepted the EU conversion buyout funds prior to the EU ban on driftnet fishing. Meanwhile, Oceana identified 37 Italian fishing vessels in six Italian ports and at sea with driftnets on board. Oceana reported that 18 of the 37 had previously received subsidies from the government of Italy to stop using driftnet gear.

Based on this information, the U.S. embarked on a series of bilateral and multilateral efforts to address this issue. In response, Italy told the U.S. that it strongly opposes illegal driftnet activities and that it is working with the GFCM to ban the use of driftnets in the Mediterranean Sea by non-European countries. Italy submitted a report to the U.S. detailing more than 189 driftnet violations and the seizure of 402 km of driftnets through the end of July 2005.

On the multilateral level, the U.S. appealed to the EC to take appropriate steps to strengthen enforcement of its driftnet ban. At the U.S.–EC high-level fisheries bilateral meeting in Washington, D.C., on 27 June 2005, the representative of the Directorate-General assured the U.S. delegation that the EC was actively engaged on this issue.

To date, the U.S. has continued to apply the provision of the High Seas Driftnet Fisheries Enforcement Act that denies entry of Italian large-scale driftnet vessels to U.S. ports and navigable waters. Since 29 May 1996, it has also required Italy to provide documentary evidence pursuant to the Dolphin Protection Consumer Information Act (16 USC 1371(a)(2)(E)) that certain fish and fish products it wishes to export to the U.S. are not harvested with large-scale driftnets on the high seas.

While the U.S. remains concerned by reports from conservation organizations in 2004 and 2005 that some Italian vessels and nationals may still be engaged in large-scale high-seas driftnet fishing; diplomatic actions and the threat of Pelly sanctions have not been effective at either deterring illegal driftnet fishing or bringing about Italy's full compliance with the various

international regulations banning driftnet fishing. The U.S. must continue efforts to work with Italy, the EC, and ICCAT to address this situation, but it should consider taking more aggressive action to sanction Italy under section 101 of the MMPA.

Southwestern Atlantic

The franciscana *(Pontoporia blainvillei)* is the most threatened species of small cetacean in the southwestern Atlantic Ocean. The tucuxis, dusky, and Commerson's dolphins also experience relatively high levels of incidental mortality; again, the impact on these populations is unknown. An estimated one to 10 percent of the population of franciscana is incidentally killed in gillnet fisheries (1,500–2,000 animals per year); most are juveniles aged one through three years.[342] There is still a great need to gather biological information on ecology, genetics, and mortality rates of franciscana. Additionally, range states should be encouraged to monitor and mitigate franciscanas bycatch.

Tucuxi are entangled in beach seines, shrimp and fish traps, and, more frequently, in set gillnets and driftnets throughout their range. They are frequently entangled in fishing gear, especially coastal gillnets in Brazil, and their flesh is used as bait in shark fisheries. Bycatch of tucuxis has been reported in gillnets in the Gulf of Venezuela. An estimated 938 animals were caught in drift nets from the port of Arapiranga during the summer of 1996 and an additional 125 caught during the winter.[343] In 1999, the IWC estimated 141 tucuxis were incidentally caught in fisheries.[344] Finally, pelagic trawls incidentally kill an estimated one percent to two percent of the populations of Commerson's and dusky dolphins, respectively.

There is a clear need for detailed information on fleet characteristics and dynamics and on the numbers and species composition of the bycatch. On-board observers are essential to assessing bycatch and must be made a priority. Moreover, the impacts of fishery mortality on cetacean populations can only be assessed if abundance estimates are available. Consequently, further research is needed to identify and delineate cetacean management units and acquire up-to-date abundance estimates for all populations in this region. Range states should develop and test devices to prevent dolphins from entering trawls and, if possible, assess the effectiveness and feasibility of using pingers to reduce dolphin mortality in the gillnet fisheries.

An FAO advisory committee (CARPAS) was established in the region in the 1970s, but was abolished in 1997 because of a long period of inactivity. A bilateral joint commission exists for the fisheries off Uruguay and Argentina to conduct assessments, fishery research, and other activities for the two nations' EEZ fisheries that operate off the coast seaward of the Rio de Plata—the Joint Permanent Commission for the Argentina/Uruguay Maritime Front (CTMFM).[345] This bilateral joint commission may be an avenue to encourage information collection under the auspices of this organization. Given the absence of any regional fishery management organization, the region may be a candidate for creation of a new RFMO under the standards of the Straddling Stocks agreement or an agreement for the region similar to ASCOBANS or ACCOBAMS. Certainly the fisheries in the area in question migrate along the EEZs of Uruguay, Argentina, and Brazil. Finally, the U.S. has recently instituted a trawl bycatch reduction team to

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[342] Culik, B.M., (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.

[343] IWC (2000)Annex K: Report of the Sub-Committee on small cetaceans, IWC, Cambridge, 2000

[344] IWC (2003) Annex K: Report of the Sub-Committee on small cetaceans, IWC, Cambridge, 2003

[345] http://www.ctmfm.org/

develop mitigation measures to reduce the serious injury and mortality of pilot whales and other pelagic dolphin species in trawl fisheries to levels approaching the zero mortality rate goal. The measures adopted by the trawl bycatch reduction team may provide the foundation for bilateral discussion with Argentina whereby the U.S. might provide technical and financial assistance to further test and implement these measures in the Argentine trawl fishery.

Pacific Ocean (Including Indian Ocean)

Major (in the top 20 for global, wild-capture landings) fisheries in the Pacific include Peruvian anchovy, Alaska pollock, skipjack tuna, chub mackerel, Japanese anchovy, Chilean jack mackerel, largehead hairtail, blue whiting, yellowfin tuna, capelin, Araucanian herring, and Akiami paste shrimp. Major fishing nations in the Pacific are China, Peru, Japan, Chile, U.S., Indonesia, Russian Federation, India, Thailand, Republic of Korea, Philippines, Malaysia, Mexico, Vietnam, and Taiwan.

Western Indian Ocean

In the western Indian Ocean, the incidental mortalities of spinner (4,000), spotted (1,500), common (1,000), and Risso's dolphins (1,300); pygmy sperm whales (2,700); dwarf sperm whales (2,700); and bottlenose dolphins (500–1,250) are particularly high in the Sri Lankan fisheries. With the exception of the Risso's dolphin, the magnitude of this bycatch for each of these species unknown because abundance estimates do not exist. The bycatch of Risso's dolphins is unsustainable, representing between 10-24 percent of the population.

The accidental mortality of bottlenose and humpback dolphins in anti-shark nets used to protect bathers along the Natal coast is unsustainable, amounting to 11–23 and 7–8 animals, respectively, per year or 9 percent of the bottlenose and 4 percent of the humpback dolphin population.[346] Additionally, off the coast of East Africa, observer programs estimated that the annual incidental fishing mortality was 8 percent and 5.6 percent of the estimated number of Indo-Pacific bottlenose dolphins and humpback dolphins in the area, respectively.

Sri Lanka and India fisheries deploy more than 1.5 million gillnets and incidentally entangle more than 12,000 to 27,000 cetaceans annually.[347] In 1993, Sri Lanka instituted legal protections for cetaceans, but poor enforcement of these laws has made them virtually meaningless.[348] Incidental mortality in fisheries is thought to be a significant conservation problem; thus, continued monitoring of the entanglement of dolphins along the Sri Lankan and Indian coast is very important as the expanding coastal gillnet fishery may greatly affect these dolphin species.

Reliable and current data on cetacean populations and mortality rates are nonexistent, for all practical purposes, making it impossible to assess the magnitude of the problem in this area

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[346] Jefferson, T.A., and Karczmarski, L., 2001. *Sousa chinensis*. *Mammalian Species* (American Society of Mammalogists) **655**, 9 pp. See also Cockcroft, V.G., 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. *South African Journal of Wildlife Research* **20(2)**, 44–51.

[347] Leatherwood, S., 1994. Report of the workshop on mortality in passive fishing nets and traps. Annex D. Re-estimation of incidental cetacean catches in Sri Lanka. In: W.F. Perrin, G.P. Donovan, and J. Barlow *(eds). Gill-nets and Cetaceans. Reports of the International Whaling Commission, Special Issue 15*, pp. 64–65. Cambridge, UK: International Whaling Commission.

[348] Ilangakoon, A., 1997. Species composition, seasonal variation, sex ratio and body length of small cetaceans caught off west, south-west and south coast of Sri Lanka. *Journal of the Bombay Natural History Society* **94**, 298–306.

and to establish clear priorities for conservation. What is needed is a comprehensive program to study cetacean populations and the impacts from hunting and fishing activities in the western Indian Ocean. Finally, efforts are needed to assess populations, habitats, and bycatch in rivers or portions of rivers where the Ganges River dolphin occurs.

Eastern Indian Ocean

In the eastern Indian Ocean, recent information on marine mammal–fishery interactions is lacking entirely. A now-terminated Taiwanese shark and tuna gillnet fishery operating off Northern Australia caught bottlenose dolphin, spinner dolphin, spotted dolphin, humpback dolphin, and false killer whale; other gillnet fisheries likely catch finless porpoise and Irrawaddy dolphin. The driftnet fisheries operating further offshore in the Bay of Bengal and the southern Indian Ocean may catch spinner dolphin, spotted dolphin, spectacled porpoise, southern right whale dolphin, and common dolphin.

On the eastern coast of India, as far south as Vishakhapatnam, is the westernmost range of the Irrawaddy dolphin and the only known freshwater population—in Chilka Lake India. This population is caught in gillnets and drag nets and may number as few as 50 remaining individuals. Consequently, there is a need for cetacean abundance surveys in rivers, lakes and along the east coast of this region as well as a rigorous monitoring program to document all cetacean mortality (especially of Irrawaddy dolphins in Chilka Lake). In general, this area would benefit from a regional management organization similar to ACCOBAMS, but for the entire Indian Ocean.

The Ganges River dolphin is listed as endangered by the IUCN and numbers 600-700 animals. Construction of 50 or more dams and barrages within the Ganges dolphin's historic range has drastically altered its habitat and fragmented the metapopulation. Deliberate killing of Ganges dolphins for meat and oil occurs in the middle Ganges near Patna, in the Kalni-Kushiyara River of Bangladesh, and in the upper reaches of the Brahmaputra.[349] Bycatch estimates are not available and the demand for these products means that there is little incentive for fishermen to reduce the bycatch or to release dolphins that are still alive when found in nets. A particular problem is the use of dolphin oil as an attractant for catfish.

A regional management body could take the lead in coordinating efforts to assess cetacean populations, estimate bycatch, establish science-based bycatch management frameworks, research promising new bycatch mitigation technologies, and contribute to the enforcement of cetacean protective laws. However, no such instrument exists in the region. The UNEP Regional Seas Programme has a set of action plans for the South East Asian region, which includes the Indian Ocean, but there is no convention yet, and the action plans to date have concentrated on building capacity in the region and on sustainable development in the coastal zone. The work plan does not even include a nominal mention of biodiversity conservation or species protection.

A new regional fishery management organization—the South West Indian Ocean Fisheries Commission—was constituted under the auspices of the FAO in 2004, and its mandate is to concentrate on coastal fisheries of the region. In February 2006, parties were expected to

[349] Smith, B.D. and Reeves, R.R. (eds.) 2000a. Report of the second meeting of the Asian river dolphin committee, 22–24 February 1997, Rajendrapur, Bangladesh. Pp.1–14 *in: Biology and Conservation of Freshwater Cetaceans in Asia* (eds. R.R. Reeves, B.D. Smith, and T. Kasuya). IUCN/SSC Occasional Paper No. 23, Gland, Switzerland and Cambridge, UK.

complete negotiations on an agreement for governing high-seas fisheries in the southern Indian Ocean (other than tuna, which are managed by the Indian Ocean Tuna Commission). The organization has set data collection as its highest priority, and it has responsibility for all living marine resources, not just fish. The organization will operate by the principles set out in the Code of Conduct for Responsible Fishing, including ecosystem approaches. The area of competence for the body, however, does not extend into the areas of the Indian Ocean adjacent to Sri Lanka, India, or other areas with critical issues of incidental bycatch.

Northwest Pacific

In the Northwest Pacific, incidental mortality in fisheries threatens Dall's porpoise, finless porpoise, and the Baiji. In the 1980s, the Japanese, Taiwanese, and South Korean squid driftnet fishery killed thousands to tens of thousands Dall's porpoise—reducing the Bering Sea population of Dall's porpoise to between 78 percent and 94 percent of its pre-exploitation size, and the Western Pacific population to between 66 percent and 91 percent of its original size.[350] Today, large numbers of Dall's porpoises still die in driftnets within national waters of Japan and Russia, where the U.N. ban on driftnets does not apply. The estimated bycatch in the Japanese salmon driftnet fishery operating in the Russian EEZ totaled close to 12,000 for the period 1993 to 1999, ranging from 643 to 3149 on an annual basis.[351] In addition, more than 17,168 small cetaceans are caught by Japan each year in direct harvests. Dall's porpoise, Baird's beaked whale, pilot whales, and bottlenose and Risso's dolphins are all caught in directed fisheries. The IWC Scientific Committee has expressed concern over the level of harvests of Dall's porpoise (14,992 from 1998 through 2002). These harvests highlight the need for an international agreement that regulates the direct harvests of small cetaceans.

Fisheries incidental mortality in the Yangtze River threatens the continued existence of the baiji. Electrofishing is the greatest threat to this species where 5 of 12 documented deaths in the 1990s have been attributed to the practice.[352] Previously, the main cause of mortality was the use of a snagline fishing gear called "rolling hooks." While some types of rolling hooks are illegal, their use continues within the limited remaining range of the baiji. Efforts are needed to end electrofishing and eliminate all forms of rolling hooks within the baiji's range.

In the Yangtze, electrofishing also threatens finless porpoises. Additionally, China's extensive fishing fleets use gear such as gill and trawl nets, known to kill cetaceans, with the bycatch of finless porpoises being especially high.[353] From 1985 through 1992, 114 finless porpoises were found off the coast of western and northeastern Kyushu, including part of the western inland sea of Japan: 84 were incidentally killed by fisheries—bottom gillnets killed 58;

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[350] Mangel M., 1993. Effects of high seas driftnet fisheries on the northern right whale dolphin *Lissodelphis borealis*. Ecol App 3: 221–229.

[351] IWC. 2002c. Report of the standing sub-committee on small cetaceans. *Journal of Cetacean Research and Management* **4** (Supplement), 325–338.

[352] Zhang, X., Wang Ding, Liu, R., Hua, Y., Wang, Y., Chen, Z., and Wang, L. 2001. Latest population of the baiji (*Lipotes vexillifer*) and its conservation in the Yangtze River, China. Pp. 41–53 *in:* [Proceedings of] Conference on Conservation of Cetaceans in China, March 2001, Shanghai. Published by Ministry of Agriculture, P.R. China.

[353] Parsons, E.C.M., and Wang, J.Y., 1998. A review of finless porpoises (*Neophocaena phocaenoides*) from the South China Sea. Pp. 287–306 *in:* The Marine Biology of the South China Sea. Proceedings of the Third International Conference on the Marine Biology of the South China Sea, Hong Kong, 28 October–1 November 1996 (ed. B. Morton). Hong Kong University Press.

surface gillnets killed 17; trapnets killed 7; trawl nets killed 1; and drifting ghost nets killed 1.[354] Finless porpoises were also incidentally captured most frequently in the coastal waters of China—totaling about 2,132 individuals in trawl, gillnet, and stow nets.[355] There is a tremendous need for a systematic abundance survey throughout the range of the finless porpoise and for better estimates of bycatch for this species.

Overall, given the large and growing fisheries of Japan, China, Korea, and Taiwan, there is a desperate need for both systematic bycatch assessments in these diverse fisheries and up-to-date abundance estimates. The region needs a competent management organization that could take the lead in coordinating efforts to assess cetacean populations, estimate bycatch and direct harvest, establish science-based bycatch and direct harvest management frameworks, research promising new bycatch mitigation technologies, and contribute to the enforcement of cetacean protective laws. Two scientific bodies and several regional advisory bodies might provide venues for basic assessment efforts or information exchange. The North Pacific Marine Science Organization (PICES) provides similar services to those of ICES in the North Atlantic. The Secretariat for the Pacific Community operates in the southern hemisphere, and likewise maintains data, collects scientific information, fishery data and so forth. Depending on U.S. interests and relationships, advisory bodies that might provide access include the Asia-Pacific Fisheries Commission, the South Pacific Forum Fisheries Agency, and the Asia Pacific Fisheries Commission. None of these bodies follows the currently preferred Straddling Stocks paradigm. This would be a region that deserves scrutiny under the rubric of the 2006 amendments to the M-SFCMA, either as a location where the U.S. would seek improved communication and information exchange, or identification and listing as nations that "fail to end or reduce bycatch of protected living marine resources by using regulatory measures that are comparable to those of the United States."[356]

Western Central Pacific

Roughly 1,700 bottlenose dolphins and 1,000 spinner dolphins are incidentally caught at unsustainable levels in gillnet, driftnet, and purse-seine fisheries in the western central Pacific off the coast of Australia. Perhaps 5 t0 50 percent of the population of Indo-Pacific humpback dolphins are incidentally captured in offshore driftnets and in inshore gillnets set to protect bathers from sharks north of Brisbane Australian and along the central section of the Great Barrier Reef. However, because poor population and bycatch estimates these percentages are suspect.

Spinner and Fraser's dolphins experience substantial bycatch in Philippine fisheries. In the Philippines, scientists estimated that about 2,000 dolphins—primarily spinner, pan-tropical spotted, and Fraser's—were being killed each year, probably at unsustainable levels, by a fleet of five tuna purse-seiners using fish-aggregating devices.[357] Scientists estimate that even more cetaceans may be caught in round-haul nets; one estimate for the eastern Sulu Sea was

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[354] Kasuy, T., 1999. Finless porpoise—*Neophocaena phocoenoides* (G. Cuvier, 1829). *in:* Handbook of Marine Mammals (Ridgway, S.H., Harrison, S.R., eds.) Vol. 6: The second book of dolphins and porpoises, pp 411–442 .

[355] Yang G., Zhou, K, Xu, X, Leatherwood, S., 1999. A survey on the incidental catches of small cetaceans in coastal waters of China. Yingyong Shengtai Xuebao 10: 713–716.

[356] S.Rpt. 109-229 at 45.

[357] Dolar, M.L.L., 1994. Incidental bycatch of small cetaceans in fisheries in Palawan, central Visayas and northern Mindanao in the Philippines. Rep. Int. Whal. Commn (Special Issue) 15:355–63.

2,000–3,000 per year.[358] Directed fisheries for small cetaceans were also reported, with as many as 200–300 dolphins caught annually in San Francisco and smaller numbers caught for bait in shark and chambered nautilus (*Nautilus pompilius*) fisheries in Palawan.[359] Currently there are no total bycatch estimates for the Philippines, but preliminary analyses of cetacean abundance surveys indicate that current bycatch is not sustainable.[360]

Incidental mortality in fisheries (e.g., gillnets, explosives) is likely the principal cause of depletion of Irrawaddy dolphins. The species has been seriously depleted in parts of Thailand and the Philippines.[361] Recent surveys indicate dramatic declines in range and abundance of the Mekong and Mahakam freshwater populations.[362] Irrawaddy dolphins in the Mahakam River, Indonesia, number fewer than 50 individuals and are listed as Critically Endangered under IUCN. An average of three dolphins per year die from gillnet entanglements, representing between 6 percent and 8.8 percent of the population.[363] The Irrawaddy dolphins living at the head of Malampaya Sound in Palawan, Philippines, number approximately 77 individuals (CV 27.4 percent). Between February and August 2001, five dolphins were accidentally killed in bottom-set nylon gillnets used to catch crabs (called *matang quatro* nets locally).[364] These levels of bycatch are unsustainable and are threatening the existence of Irrawaddy dolphins in Malampaya Sound—the only known population of the species in the Philippines.

Scientists have recommended that Irrawaddy dolphin mortality be eliminated or at least drastically reduced in these fisheries. This will require the development of socio-economic alternatives to help promote the conservation goal of reducing entanglement and that alternative gear or employment options be provided to gillnet fishermen. These efforts must be accompanied by long-term monitoring of dolphin abundance and mortality in these areas.

Scientists believe that there may have been a dramatic decline in the abundance of Irrawaddy dolphins in the Mekong River, and the Mekong population is a high priority for Red List assessment.[365] In the Mekong River from 2001 through 2003, an average of four deaths per

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[358] Dolar, M.L.L., 1994. Incidental bycatch of small cetaceans in fisheries in Palawan, central Visayas and northern Mindanao in the Philippines. Rep. Int. Whal. Commn (Special Issue) 15:355–63.

[359] *Id.*

[360] Dolar, M.L.L., 1999. Abundance, distribution and feeding ecology of small cetaceans in the eastern Sulu Sea and Tañon Strait, Philippines. Ph.D. dissertation, University of California, San Diego. Xxv + 241 pp. See also Perrin, W. F., 2002. Problems of marine mammal conservation in Southeast Asia. Proceedings of International Symposium 70th Anniversary of the Japanese Society of Fisheries Science. Fisheries Science 68, Supplement 1:238–242.

[361] Andersen, M., and Kinze, C.C., 2000. Review and new records of the marine mammals and sea turtles of Indochinese waters. *Natural History Bulletin of the Siam Society* **48**, 177–184.

[362] IWC. 2001a. Report of the standing sub-committee on small cetaceans. *Journal of Cetacean Research and Management* **3** (Supplement), 263–291.

[363] Kreb, D., 2002. Density and abundance estimates of the Irrawaddy dolphin, *Orcaella brevirostris*, in the Mahakam River of East Kalimantan, Indonesia: a comparison of survey techniques. *Raffles Bulletin of Zoology*, Supplement, 85–95.

[364] Dolar, M.L.L., Perrin, W.F., Gaudiano, J.P., Yaptinchay, A.A.S.P., and Tan, J.M.L., 2002. Preliminary report on a small estuarine population of Irrawaddy dolphins *Orcaella brevirostris* in the Philippines. *Raffles Bulletin of Zoology,* Supplement, 155–160.

[365] Baird, I.G., and Mounsouphom, B., 1997. Distribution, mortality, diet and conservation of Irrawaddy dolphins (*Orcaella brevirostris* Gray) in Lao PDR. *Asian Marine Biology* **14**, 41–48.

year were attributed to gillnet entanglement, representing 5.8 percent of a population estimated to number only 69 individuals.[366]

Finally, this area needs further research efforts to collect basic information. In the Philippines, Indonesia, Thailand, and elsewhere in the western central Pacific, relatively little is known about abundance, distribution, and bycatch levels of cetaceans such as the Irrawaddy dolphin, Indo-Pacific humpback dolphin, Indo-Pacific bottlenose dolphin, finless porpoise, and spinner dolphin (and its dwarf form). Comprehensive cetacean abundance and bycatch surveys are needed in order to develop effective mitigation strategies. This region needs a regional management body that could take the lead in coordinating efforts to undertake such assessments, as well as establish science-based bycatch management frameworks, research promising new bycatch mitigation technologies, and contribute to the enforcement of cetacean protective laws. There is also the need for capacity building, especially in the U.S. territories and small island nations, to sustain efforts to assess cetacean abundance, evaluate bycatch, and promote fishery conservation and management. The Western and Central Pacific Fisheries Commission may provide a mechanism to address and possibly mitigate the bycatch that has been documented in the tuna purse-seine fishery in the Philippines. Additionally, U.S. may make progress in documenting cetacean bycatch in the Western and Central Pacific through passage of a cetacean bycatch resolution with the Western and Central Pacific Fisheries Commission (See Appendix C).

Eastern Central Pacific

In the Eastern Central Pacific, the vaquita suffers the most significant incidental mortality in coastal gillnet fisheries and the false killer whale in longline fisheries.

The vaquita is threatened with extinction by gillnet fisheries. This porpoise, endemic to the upper Gulf of California, Mexico, numbers only in the low to mid-hundreds and may be declining as commercial and artisanal fisheries in the upper Gulf kill 35 to 40 vaquitas per year—6 percent to 7 percent of the population. The designation, in 1993, of a Biosphere Reserve in the Upper Gulf of California and Colorado River Delta has done little to protect vaquitas—despite the management plan calling for a ban on commercial fishing in its “nuclear zone.” Even the recommendations of the International Committee for the Recovery of the Vaquita have gone unheeded.

More recently the International Committee recommended that the southern boundary of the Biosphere Reserve be expanded to incorporate the known range of the vaquita. Other recommendations were that gillnets and trawlers be phased out in the entire Biosphere Reserve, effective enforcement of fishing regulations begin immediately, acoustic surveys for vaquitas be initiated, research on alternative gear types be started, public outreach and education be developed, consideration be given to the compensation of fishermen for lost income, research be initiated on vaquita habitat, and international and nongovernmental cooperation be fostered.[367]

Many scientists believe that banning gillnets in the entire range of the species is the single measure most likely to prevent extinction. This ban must be accompanied by socio-economic alternatives for the people whose incomes are affected by any restrictions. In its bilateral talks with Mexico, the U.S. must develop an intergovernmental plan or bilateral agreement to

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[366] Beasley, I., Chooruk, S., and Piwpong, N., 2002. The status of the Irrawaddy dolphin, *Orcaella brevirostris*, in Songkhla Lake, southern Thailand, Raffles Bulletin of Zoology, Supplement 10: 75–83.

[367] Rojas-Bracho, L., and Jaramillo-Legorreta, A.M., 2002. Vaquita *Phocoena sinus*. Pp. 1277–1280 *in: Encyclopedia of Marine Mammals* (eds. W.F. Perrin, B. Würsig, and J.G.M. Thewissen). Academic Press, San Diego, California.

implement the recommendations of the International Committee. The U.S. will have to provide the necessary financial assistance to implement and enforce the agreement. The Commission on Environmental Cooperation (CEC) under the North American Free Trade Agreement (NAFTA) promotes the effective enforcement of environmental law in Canada, Mexico and the U.S. as part of its mandate under a side agreement to NAFTA, the North American Agreement on Environmental Cooperation. Until 2003, the Commission had a grants fund, but it is no longer operational. The CEC has been called upon to step in to compel the three North American nations to follow their own or cooperative environmental laws. In one case, citizens groups asked the CEC to make a determination about whether Canada was enforcing its own law regarding species at risk. The case is still open and under consideration by the CEC Secretariat.[368]

The impact of the longline fisheries off Hawaii is emerging as a potential problem for several species. NMFS recognizes three stocks of false killer whales in the central Pacific: a Hawaiian stock within U.S. waters surrounding the Hawaiian archipelago, a Palmyra stock within U.S. waters surrounding Palmyra Atoll, and an undefined stock throughout international waters and the rest of the Pacific Islands Region. Mortality and serious injury from the Hawaiian and Palmyra stocks have exceeded sustainable levels (1.6 percent to 2.5 percent of the population).[369] Of even greater concern is the undocumented number of false killer whales caught by international fisheries—a bycatch that may be significant. The U.S. must use both the Inter-American Tropical Tuna Commission and the Western-Central Pacific Fisheries Commission Tuna Treaty, as well as the MMPA, to advocate documentation of the problem and take measures to reduce the incidental mortality of false killer whales in tuna longline fleets. Whatever mitigation strategies are developed through research or bycatch reduction teams should be implemented internationally through these two regional fisheries management organizations. International bycatch provisions of the 2006 amendments to the M-SFCMA also provide a mechanism to initiate discussions with flag states in this region.

In the eastern tropical Pacific portion of the Eastern Central Pacific, what few quantitative data are available, indicate the magnitude of the cetacean bycatch in coastal and artisanal gillnet fisheries of the eastern tropical Pacific is high.[370] Due to the inshore nature of these fisheries, they tend to affect cetaceans that are already subject to other forms of exploitation and habitat degradation. An exploratory study of artisanal gillnet fishery bycatch levels in relation to estimates of small cetacean abundance in the eastern tropical Pacific estimated overall annual mortality rates of 4.4–9.5 percent.[371] Scientists believe that mortality rates may be even higher for coastal subspecies (e.g., coastal spotted and Central American spinner dolphins, *S. a. graffmani* and *S. l. centroamericana*, respectively) because animals from these

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[368] Species at Risk. Submmission ID: SEM-06-005, Party concerned: Canada. Date filed: 10/10/2006 Status: Open Latest update: 8 Feb. 2007. Available online at http://www.cec.org/citizen/submissions/details/index.cfm?varlan=english&ID=114. Last accessed 14 March 2007.

[369] The PBR for the Hawaiian stock is 1.0, and the estimated mortality is 4.4 animals.

[370] Vidal, O, Van Waerebeek K. and Findley L.T., 1994. Cetaceans and gillnet fisheries in Mexico, Central America and the wider Caribbean: a preliminary review. Report of the International Whaling Commission (Special Issue) 15, 221–233

[371] Palacios, D.M., and Gerrodette, T., 1996 Potential impact of artisanal gillnet fisheries on small cetacean populations in the Eastern Tropical Pacific. Southwest Fisheries Science Center Administrative Report LJ-96-11, La Jolla, California. 15 pp

populations are likely overrepresented, relative to their abundance, in the bycatch.[372] A NOAA–SWFSC report estimated annual incidental mortality in artisanal gillnets were 16,596 in Costa Rica and 3,581 in Panama.[373] Information on bycatch in Guatemala, El Salvador, Honduras, and Nicaragua is still lacking.

These small cetacean species that are not restricted to U.S. territorial waters, and for which no cooperative management agreements exist with Mexico to address the bycatch in their coastal fisheries, present a particular problem. These artisanal gillnet fisheries are widely dispersed, involve many relatively small vessels, and operate at subsistence or small-scale commercial levels. The same is true for the other Central American nations. The U.S. must work with Mexico, Costa Rica, Panama, Guatemala, El Salvador, Honduras, and Nicaragua; and local fishermen, scientists, and nongovernmental groups to jointly undertake abundance and quantitative bycatch estimates for these coastal fisheries. In particular, the U.S. must forge a bilateral agreement with Mexico to cooperatively manage some of these cetacean species—especially the trans-boundary species. Additionally, the U.S. should consider developing a regional management organization of the "Americas" to conserve and manage cetaceans in Central and South America.

The U.S. should use its bilateral discussions with these nations, the existing Inter-American Tropical Tuna Commission (especially under the new provisions of the Antigua Convention) to advance proposals and resolutions to document cetacean abundance and bycatch. The U.S. should consider undertaking joint cetacean abundance surveys in Mexican waters and elsewhere throughout Central America. The U.S. could look for opportunities to engage in technology transfer and capacity building by partnering the staff of the Inter-American Tropical Tuna Commission, national universities, and the staff of NMFS Southwest Fisheries Science Center to conduct the need cetacean research and outreach to the fishing community.

Southwest Pacific

In the southwest Pacific, Hector's dolphins number around 7,400, with 7,270 (CV 16.2 percent) distributed around New Zealand's South Island[374] and some 100 individuals (called Maui's dolphins) off the west coast of North Island, New Zealand.[375] According to IUCN, the species is listed as Endangered and the North Island population as Critically Endangered. In the South Island, the population is declining. The Banks Peninsula Marine Mammal Sanctuary, created in 1988 to reduce bycatch off the Canterbury coastline, has not achieved its goal—16 Hector's dolphins (CV 39 percent) were captured in 1997–1998.[376] Scientists have estimated

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[372] Palacios, D.M., and Gerrodette, T., 1996 Potential impact of artisanal gillnet fisheries on small cetacean populations in the Eastern Tropical Pacific. Southwest Fisheries Science Center Administrative Report LJ-96-11, La Jolla, California. 15 pp

[373] *Id.*

[374] Slooten, E., Dawson, S., and Rayment, W., 2002. Quantifying abundance of Hector's dolphins between Farewell Spit and Milford Sound. Published Client Report on Contract 3076, funded by Conservation Services Levy. Department of Conservation, Wellington, New Zealand. http://csl.doc.govt.nz/dsis35.pdf.

[375] Russell, K. ,1999. "The North Island Hector's dolphin: a species in need of conservation". Unpublished M.Sc. thesis, University of Auckland.

[376] Baird, S.J., and Bradford, E., 2000. Estimation of Hector's dolphin bycatch from inshore fisheries, 1997/98 fishing year. Published Client Report on Contract 3024, Conservation Services Levy. Available: www.doc.govt.nz/cons/scires/csl.pdf.

that, to meet the PBR-standard of the U.S., the north and south boundaries of the sanctuary must be extended 30 to 60 nautical miles.

For Maui's dolphin the situation is grave. Because Maui's dolphins have been reduced to such low levels, scientists concluded that human-induced mortality must be reduced to zero (from a bycatch of roughly three animals per year) to allow the North Island population to recover. In August 2001, the New Zealand Minister of Fisheries created a protected area that prohibits recreational and commercial gillnet fishing within four nautical miles of shore along a 400 km segment of the west coast of the North Island. An observer program is also planned for trawlers and Danish seine vessels fishing in the area closed to gillnetting. Even though Hector's and Maui's dolphins are species of concern, given the national laws and actions taken to date, there appears to be no role for the U.S. to take to promote greater conservation of this species.

Southeast Pacific

In the southeast Pacific, the dusky dolphin, Burmeister's porpoise, the Chilean dolphin, and possibly southern right whale dolphins and Peale's and Commerson's dolphins are the species most frequently captured by a variety of fisheries. Scientists have estimated that between 10,000 and 20,000 small cetaceans per year die in Peruvian fisheries, and most of these are dusky dolphins—this bycatch is large enough to cause serious concern for the continued existence of these species.[377] The Peruvian bycatch of dusky dolphins and Burmeister's porpoise highlight the blurred boundaries between strictly incidental mortality and direct harvests for dolphin meat and blubber to be used as shark bait.[378] Despite the Peruvian government's closure of markets for dolphin meat and other conservation laws, there is still an increasing use of cetacean meat as bait in the shark fishery. Dolphins are rarely landed openly on shore; instead, they are usually hidden and sold clandestinely or transferred to shark-fishing boats at sea.[379]

The species of most concern continue to be the dusky dolphin, which is caught in the greatest numbers, and Burmeister's porpoise. In the 1990s, in Peru alone, the annual directed harvest of Burmeister's porpoise and dusky dolphin each amounted to 500 to 2,000 animals, based on direct accounts of landings. Over a 15-year period dusky dolphins have fallen from 78 percent of the total catch to only 40 percent.[380] This continuous decline of dusky dolphins as a proportion of the overall cetacean bycatch, with roughly constant fishing effort, is consistent with the hypothesis that abundance of this species has been decreasing off central Peru.[381]

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[377] Van Waerebeek, K., Van Bressem, M.F., Alfaro-Shigueto, J., Sanino, G.P., Montes, D., and Ontón, K. 1999. A preliminary analysis of recent captures of small cetaceans in Peru and Chile. International Whaling Commission, Cambridge, UK. Document SC/51/SM17. See also: Van Waerebeek, K., Alfaro-Shigueto, J., Montes, D., Onton, K., Santillan, L., Van Bressem, M.-F., and Vega, D., 2002. Fisheries related mortality of small cetaceans in neritic waters of Peru in 1999–2001. International Whaling Commission, Scientific Committee Document SC/54/SM10, Cambridge, UK.

[378] *Id.*

[379] *Id.*

[380] Van Waerebeek, K., Alfaro-Shigueto, J., Montes, D., Onton, K., Santillan, L., Van Bressem, M.-F., and Vega, D., 2002. Fisheries related mortality of small cetaceans in neritic waters of Peru in 1999–2001. International Whaling Commission, Scientific Committee Document SC/54/SM10, Cambridge, UK.

[381] Van Waerebeek, *supra* note 369.

Authorities in Peru remain unconvinced that any action beyond merely outlawing commerce is needed to reduce the mortality of cetaceans in fisheries. Consequently, in Peru there is still a need for reliable estimates of total fishing mortality for each species in Peruvian waters and for better information on stock structure and reliable estimates of abundance for the affected stocks. Finally, there is a need for aggressive enforcement of the existing measures. Peru is a disturbing case study for incidences where bycatch of small cetaceans becomes a market in cetacean meat and a gateway to direct harvests. If dusky dolphins and Burmeister's porpoises are to survive, the mortality of these species must be drastically reduced and the existing laws fully enforced.

The existing intergovernmental organizations in the region include the IATTC and the Permanent Commission for the South Pacific (CPPC). The Permanent Commission does have action plans for conservation of biodiversity and protection of marine mammals. It is difficult to ascertain the effectiveness of this action plan, but the U.S could inquire about it and seek more details either in its bilateral discussions with Chile or within the IATTC. The Pacific in general, but also the west coast of Central and South America is in need of a regional management body that could require and coordinate efforts to assess cetacean populations, estimate bycatch, establish science-based bycatch management frameworks, research promising new bycatch mitigation technologies, and contribute to the enforcement of cetacean protective laws. This regional management body should be developed along the model of the Straddling Stocks Agreement. The U.S. could use its M-SFCMA mandate to make international efforts to reduce bycatch as a mechanism to participate in such a regional organization. Finally, given Peru's reluctance to undertake additional measures, the Office of International Affairs might consider taking action under the embargo provisions under section 101 of the MMPA or making Peru aware of its obligations under the new provisions of the M-SFCMA.

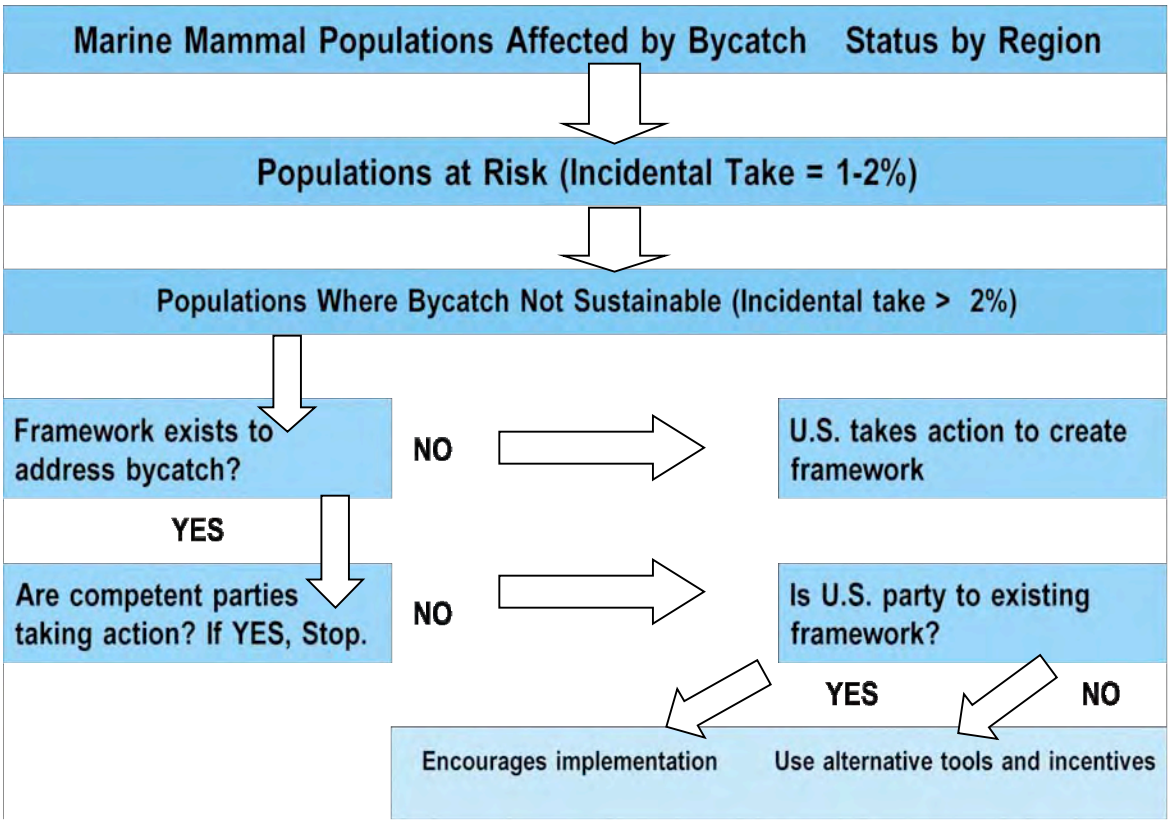
CHAPTER 6. RECOMMENDATIONS – ACTION PLAN

In Chapter 2, a review of the scientific literature summarized issues where incidental catch of marine mammals in fisheries is affecting populations already at risk. This summary highlighted needs that have been identified by scientific and management bodies such as national management agencies, the International Whaling Commission Scientific Committee, and nongovernmental organizations such as the IUCN. Chapter 5 further narrowed the scope of critical issues on a regional basis to populations where bycatch is unsustainable, where no regime exists to take action to reduce bycatch, or where measures exist, but have not been taken.

Table 5.1 points up where gaps occur in basic knowledge about abundance and bycatch, as well as gaps in the framework for management measures or implementation and enforcement of measures where a framework exists. Using the example of harbor porpoise in the Kiel & Mecklenburg Bight, it becomes clear that this animal has been assessed as vulnerable by the IUCN, but there is no recent abundance estimate, no estimate of bycatch mortality, and no mechanism to monitor bycatch in fisheries. Even though a regional agreement is in place, and though bordering states are parties to the agreement, no action has been taken to mitigate the effects of bycatch.

As illustrated by the above example, the analysis thus far has attempted to narrow the scope of possible U.S. action by starting with a description of all marine mammal problems that have been identified around the world, then examining the highest risk populations and the threats they face then focusing on threats posed by fishery bycatch. Further narrowing takes place by identifying whether competent parties are taking action, and if not, whether there is a role for the U.S. to play. Figure 6 illustrates how the narrowing of scope takes place.

Figure 6. Narrowing the Scope of Action Options



This chapter takes the gap analysis produced in Chapter 5, and examines the issues against legal pathways, rather than geographic regions, by posing the following questions:

- Does the United States have authority or capacity to act?
- Can the United States encourage action by relevant parties?
- Can the United States advocate amendment of an existing agreement or development of a new one?
- Can the United States use training and technical assistance, scientific cooperation, and similar actions in lieu of (or in addition to) legal action?

The recommendations provided in Chapter 6 are those of the authors, although they may also have been advocated by others and identified in Chapter 2. These recommendations represent actions to address not necessarily the most urgent problems, but the most urgent problems the U.S. has competence and capacity to address. Some of the recommendations have general application to the cetacean bycatch problem, and others are directed at specific areas and fishery interactions. The authors have made no assessment of whether fiscal resources exist to accomplish these actions.

The following narrative sections describe actions the U.S. could take to fill the gaps by using its own authority under MMPA or M-SFCMA, by engaging with its partners under international, bilateral or multilateral agreements, by encouraging the development of new agreements or new bycatch approaches under existing frameworks, and finally, where no treaty structure exists, by using incentives or other tools such as technology transfer. Proposed actions in the first sections have national mandates, legislative authority or U.S. policy behind them. The remaining set of proposals is a list of possibilities for actions that lie outside U.S. governmental authority, but might be advanced through the international community, diplomatic circles or public-private partnerships.

Without a doubt the one consistent need that permeates all species in all regions is the need for cetacean abundance and bycatch estimates. Estimates of total bycatch or bycatch rate are difficult to obtain, especially in developing countries where extensive coastal or artisanal fisheries account for most of the bycatch. Additionally, very low bycatch rates are difficult and costly to measure. Likewise, it is difficult and costly to obtain precise abundance estimates in low cetacean density areas. Capturing this information will require that fishery agencies, parties to international fisheries treaties, and regional fisheries management organizations incorporate bycatch monitoring and bycatch reduction measures into existing and future management regimes. Proposals for how this might be done are described below.

Actions Under MMPA Section 108

Section 108 (a)(1) of the MMPA calls upon the Secretary of Commerce through the Secretary of State to initiate negotiations as soon as possible for the development of bilateral or multinational agreements with other nations for the protection and conservation of all marine mammals covered under the MMPA.

Actions to propose new international bycatch treaties or multilateral agreements

Section 108 (a)(2)(A) calls upon the Secretary of State to initiate negotiations with all foreign governments engaged in commercial fishing found to be unduly harmful to any species or population stock of marine mammals to develop bilateral and multilateral treaties with such countries to protect marine mammals. There are several areas that would benefit from a regional management agreement similar to ASCOBANS or ACCOBAMS. Such an agreement should be based on the precautionary approach and should establish internationally the goal

and objectives of Sections 117 and 118 of the MMPA. Any international agreement should contain provisions to: (a) estimate the population and stock discrimination/structure of cetaceans within an agreement area, (b) estimate cetacean bycatch (including information on the sex, relative age, or life-stage of bycaught animals) through an independent observer program, (c) document and monitor fishing effort and areas and times of operation, (d) provide mechanisms to test and develop new technologies to reduce bycatch, (e) institute mechanisms for participation of all stakeholders in the development and review of conservation and management measures, (f) establish a risk-averse science-based method for setting bycatch limits (g) develop effective means for enforcement, and (h) incentives and disincentives to bring about compliance.

Three areas are high priorities for action: the Indian Ocean, Pacific Ocean, and North, Central, and South America (the Americas).

Indian Ocean

As discussed in Chapter 5, the commercial fisheries in the Western and Eastern Indian Ocean capture spinner dolphins, Risso's dolphins, bottlenose dolphins, hump-backed dolphins, Ganges river dolphins, and Irrawaddy dolphins at unsustainable rates. Moreover, there are few national laws and virtually no international protection. There is an overwhelming need to assess the various marine mammal populations, estimate bycatch throughout the entire Indian Ocean, establish science-based bycatch management frameworks, research promising new bycatch mitigation technologies, contribute to the enforcement of cetacean protective laws, estimate fishing effort, and describe the spatial and temporal characteristics of the fishery.

A regional management body could take the lead in coordinating and undertaking such efforts. The UNEP Regional Seas Programme does have a set of action plans for the South East Asian region, which includes the Indian Ocean. But there is no convention yet, and the action plans to date have concentrated on building capacity in the region, and on sustainable development in the coastal zone. The work plan does not even include a nominal mention of biodiversity conservation or species protection.

The greatest challenge to the development of an Indian Ocean regional cetacean agreement is the lack of any role for the U.S. because it is not a range state for such an agreement. With limited U.S. involvement, creation of such an agreement could fall to Australia and would require careful collaboration to achieve an agreement.

There are fishery agreements in the region, but most relate to high seas fisheries such as tuna, and do not apply to the nearshore areas where much of the bycatch of cetaceans occurs. However, to the degree that any of the offshore fisheries had interactions with cetaceans, either the Straddling Stocks Agreement or provisions of the M-SA would provide the U.S. leverage to begin discussions with flag and coastal states.

Pacific Ocean

The Pacific Ocean is ripe for a regional multilateral treaty to protect cetaceans. In this region, Dall's porpoise, finless porpoise, baiji, spinner dolphins, Fraser's dolphins, Irrawaddy dolphins and false killer whales are threatened by commercial fisheries and in some cases, directed harvests. The western Pacific presents a particular challenge as it is a mixture of driftnet catches off Russia and Japan, directed harvests for Dall's porpoise off Japan, and small-scale incidental captures of critically endangered species such as the baiji in the Yangtze River of China. For the most part, the coastal fisheries of Japan, China, Korea, and Taiwan have not

been described in any detail. Moreover, bycatch estimates reported to the International Whaling Commission are suspect and possibly underreported.

The western central Pacific presents its own set of challenges. Here the coastal fisheries of the Philippines and other south Pacific islands capture thousands of spinner, spotted and Fraser's dolphins in commercial fisheries; further complicating matters are the directed harvests of other cetacean species. In a completely different habitat, the Irrawaddy dolphins of the freshwater rivers of the Mekong, Mahakam, and Malalmpaya Sound are critically endangered and continually threatened by entanglement in small gillnet fisheries.

In addition, incidental mortality in fisheries in the central Pacific, Eastern central Pacific, Southwest Pacific, and the Eastern Tropical Pacific (discussed below) could potentially be regulated as part of a Pacific regional cetacean multilateral agreement. Such an agreement would need to call upon parties to conduct comprehensive cetacean stock assessments throughout the entire Pacific, provide annual estimates of bycatch in all fisheries, provide annual reports of the number of cetacean captured in directed harvests, and provide detailed fisheries data including the number of vessels, gear, landings, area and times of operation.

There are several fishery management agreements that apply in the region, including some to which the U.S. is a party. These provide linkage either through the bycatch prevention directives of the Straddling Stocks Agreement or might be fisheries to evaluate and possibly list under the M-SA. Nevertheless, this area may benefit from a Pacific-wide regional management agreement dedicated to addressing the threats to cetaceans.

The Americas (Atlantic and Pacific)

The incidental capture of cetaceans on both the Pacific and Atlantic coasts of South America is cause for concern. Along the Pacific coast of South America, dusky dolphins and Burmeister's porpoise, Chilean dolphins and Commerson's dolphins are captured in large numbers. The Peruvian laws that prohibit the sale of small cetaceans go virtually unenforced. The scope of the take is probably underestimated since port surveys alone cannot provide an accurate bycatch estimate given the clandestine sale or undisclosed transfer of carcasses at sea. Bait fisheries in Chile and Peru still exist and incidental mortality in Ecuadorian coastal fisheries is poorly documented but is thought to number in the thousands. Off Mexico and Central America, the incidental mortality of cetaceans in coastal fisheries is undocumented but preliminary estimates for some areas such as Costa Rica number more than ten thousand.

On the Atlantic coast of South America, tucuxis, dusky dolphins and Commerson's dolphins are taken in coastal gillnet and trawl fisheries; and Atlantic coast estimates of both cetacean abundance and bycatch are completely lacking for Mexico and Central America.

A regional agreement for North, Central, and South America would promote international scientific research, technology transfer (e.g. pingers and trawl bycatch reduction measures), and better compliance with national laws. For example, franciscanas range across the borders of Brazil, Uruguay, and Argentina and although protected by law in all three countries, a regional agreement would ensure consistency in addressing the bycatch problem. In 1991, the governments of Colombia, Chile, Ecuador, Panama, and Peru approved an Action Plan for the Conservation of Marine Mammals in the Southeast Pacific; but it appears little progress has been made in implementing this plan. Overall, Central and South America are in need of improved abundance estimates, stock delineation, and bycatch estimates for all cetaceans that inhabit Central and South America. In addition, better descriptions of fishing effort, operational time and areas are still needed for much of this region.

There is little in the way of regional cooperation in fishery management in this region,

and most of the action is taken at a national level. If the U.S. determines that these nations have bycatch of protected species, it could use the M-SA listing provisions to certify and leverage discussions for action.

Area/Issues That Would Benefit From A Bilateral Approach

The MMPA calls upon the Secretary of Commerce through the Secretary of State to initiate negotiations with foreign governments which are engaged in or which have persons or companies engaged in commercial fishing operations which are found by the Secretary of Commerce to be unduly harmful to any species or population stock of marine mammal, for the purposes of entering into bilateral and multilateral treaties with such countries to protect marine mammals…(16 U.S.C. 1378(a)(2)(A)). The Office of International Affairs should use its bilateral discussions to develop such agreements to reduce marine mammal bycatch. As a matter of priority are the bilateral discussions with Canada and Mexico.

U.S. – Mexico for vaquita and coastal gillnet fisheries

Since 1983, NMFS, NOAA, and the predecessor agency to the Mexican Secretaría de Mexico Ambiente, Recursos Naturales, y Pesca (SEMARNAP) have met annually to discuss bilateral fisheries issues. The countries have negotiated two active and one inactive memoranda of understanding (MOUs) between NMFS and SEMARNAP: (1) MEXUS-Gulf research program, (2) MEXUS-Pacífico research program, and an information exchange under an inactive MOU. The discussions have focused on conservation and management, including the protection of marine mammals and endangered species (especially turtles and mammals). Shark and shrimp management and bycatch reduction have also been discussed.[382]

Chapter 2 describes the long history of attempts to protect the vaquita. The most promising efforts are those of the International Committee (International Committee) for the Recovery of the Vaquita, which recommended that: the southern boundary of the Biosphere Reserve be expanded to incorporate the known range of the vaquita; gillnets and trawlers be phased out in the entire Biosphere Reserve; effective enforcement of fishing regulations begin immediately; acoustic surveys for vaquitas be initiated; research on alternative gear types be started; public outreach and education be developed; consideration be given to the compensation of fishermen for lost income; research be initiated on vaquita habitat; and international and non-governmental cooperation be fostered.[383] Many scientists believe that banning gillnets in the entire range of the species is the single measure most likely to prevent extinction. Implementation of these recommendations, especially the ban, will require significant financial resources and must be accompanied by socio-economic alternatives for the people whose incomes are affected by any restrictions. Perhaps as a result, the Mexican government seems to lack the political will to decisively implement these recommendations. Nevertheless there has been some progress through a newly decreed special protection zone, financial support from the Ministry of the Environment to assist fishermen, the voluntary agreement of fishermen to phase out nets with meshes of more than 6 inches (144mm), and investigations into alternative gears and fishing methods for the shrimp fishery. Socio-economic assistance is critical to bring about the necessary changes in fishing habits and to support the ongoing buy-out of the larger meshed nets.

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[382] http://www.nmfs.noaa.gov/ia/bilateral/docs/U.S.-Mexico%2005.doc

[383] Rojas-Bracho, L. and Jaramillo-Legorreta, A.M. 2002. Vaquita *Phocoena sinus*. Pp.1277–1280 *in:Encyclopedia of Marine Mammals* (eds. W.F. Perrin, B. Würsig, and J.G.M. Thewissen). Academic Press, San Diego, California.

In the course of bilateral discussions the U.S. could offer economic assistance and even consider a debt for conservation swap to provide the funds necessary to implement these recommendations and to create socio-economic opportunities that will enable Mexico to, in particular, implement the ban on gillnets and to enforce the restriction. The International Committee should be the body that puts together an action plan to implement their recommendations, including an estimate of the costs. The government to government bilateral could become the vehicle to officially adopt such provisions through a specific bilateral agreement.

Canada for right whales

The U.S. holds bilateral meetings with Canada under the authority of the Magnuson Fishery Conservation and Management Act, 16 U.S.C. 1822(a), which authorizes the Secretary of State to negotiate international fisheries agreements, and 16 U.S.C. 1855(d), which authorizes the Secretary of Commerce to promulgate regulations necessary to carry out the Magnuson Act. The focus of the discussions is bilateral, multilateral and global fisheries conservation and management issues of benefit to both parties. The U.S. and Canada discuss coordination with regard to conservation and management of shared stocks (such as Pacific albacore, Pacific hake, and species of mutual concern in the Gulf of Maine) and coordination and strategies for improving conservation and management within the Northwest Atlantic Fisheries Organization (NAFO). Global fisheries issues of interest to the U.S. and Canada include various international fisheries management agreements and initiatives (such as the FAO International Plans of Action for Seabirds, Sharks, Capacity and IUU Fishing and the UN Fish Stocks Agreement).[384]

As stated previously, the North Atlantic right whale is a transboundary species and thus it faces similar conservation challenges in both U.S. and Canadian waters. NOAA has stated that it, "intends, with the appropriate federal agency or agencies, to initiate the negotiation of a bilateral Conservation Agreement with Canada to ensure that, to the extent possible, protection measures are consistent across the border and as rigorous as possible in their protection of right whales."[385] To date no specific language of such an agreement has been published and it is uncertain whether NOAA has begun these discussions.

It has been recommended both in the North Atlantic Right Whale Recovery Plan and by noted marine mammal scientists that NOAA should engage in such bilateral discussions. Bilaterally agreed-upon management policy, regular joint meetings, and cooperative action are essential for the protection of this critically endangered migratory species.[386] It is recommended that NMFS expedite these discussions and develop a joint plan.[387]

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[384] http://www.nmfs.noaa.gov/ia/bilateral/docs/US-Canada%20-%2005.doc

[385] Silber, GK and Bettridge S. 2006. United States' Actions to Reduce the Threat of Ship Collisions With North Atlantic Right Whales Prepared for the International Whaling Commission's Working Group on Ship Strikes and Presented at the International Whaling Commission's Conservation Committee, St. Kitts, 9 June 2006. National Marine Fisheries Service. Silver Spring, Maryland.

[386] Sayles JS and Green DM 2005 Bilateral Action for Right Whales **Science** 9 December 2005: Vol. 310. no. 5754, pp. 1616 – 1618.

[387] Currently, two National Marine Fisheries Service staff are members on the Canadian Right Whale recovery team—one from Northeast Regional Office and one from Northeast Fishery Science Center.

Bilaterals related to free trade negotiations

The U.S. is currently engaged in bilateral discussions on living marine resource issues with many countries and fishing entities, including Chile, China, Japan, Russia, Vietnam, Taiwan, and the European Union. The Office of International Affairs should elevate cetacean bycatch issues highlighted in this report in each of these bilateral discussions and request that these nations provide estimates of bycatch in their commercial fisheries and cetacean abundance estimates for cetaceans that interact with these fisheries. The Office of International Affairs should use these bilateral discussions as a vehicle to make progress to gather information and urge development of conservation and management measures to reduce cetacean bycatch.

Actions to amend existing agreements

Section 108 (a)(4) mandates that the Secretary of Commerce through the Secretary of State initiate the amendment of any existing international treaty for the protection and conservation of any species of marine mammal to which the U.S. is a party in order to make such treaty consistent with the purposes and policies of the Act.

The Convention for the Regulation of Whaling is perhaps the only international treaty that meets this standard. For years, non-whaling nations have attempted to expand the purview of the International Whaling Commission by introducing such issues and subcommittees as the Subcommittee on Small Cetaceans, Subcommittee on Whalewatching, and Working Group on Estimation of Bycatch and Other Human-Induced Mortality. While these bodies are valuable sources of information and provide opportunities for scientific exchange and recommendations, they have no real power to bring about compliance with any of their recommendations. Until the Convention for the Regulation of Whaling is modified to explicitly provide the IWC with authority to regulate both the direct and incidental harvest of small cetaceans, progress to address these issues through the IWC will be limited. The major obstacles to such an undertaking are that the U.S. and other non-whaling, conservation-minded nations no longer have the three-quarters majority needed to amend the convention and a growing majority that support the viewpoint that the IWC does not have competence over small cetaceans. Nevertheless, the Office of International Affairs should consider how it might modify the Convention to broaden the IWC's authority to regulate bycatch and to make the Convention more consistent with the purposes and policies of the MMPA, as it relates to bycatch in commercial fisheries.

Actions Under MMPA Section 101

Mediterranean Driftnets

The nations that still continue to fish illegally with driftnets are Morocco, Turkey and Italy. It appears that Morocco and the U.S. have devised a plan to convert the Morroccan driftnet fleet to more sustainable fishing practices.[388]

Turkey on the other hand is still fishing in violation of the ICCAT and GFCM driftnet ban, administering a fleet of fewer than 100 driftnet vessels, each less than 15 meters long, with fishing nets that are 800-1,000 meters long, targeting swordfish off the southwest corner of Turkey. On its face, it appears that Turkey may not be violating the UN Driftnet Moratorium.

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[388] 2005 Report Of The Secretary Of Commerce To The Congress Of The United States Concerning U.S. Actions Taken On Foreign Large-Scale High Seas Driftnet Fishing Pursuant To Section 206(E) Of The Magnuson-Stevens Fishery Conservation And Management Act, As Amended By Public Law 104-297, The Sustainable Fisheries Act Of 1996. Available at http://www.americanalbacore.com/documents/HSDN_Report_02_21_06.doc

Nevertheless, the U.S. must take action to better document and ascertain the scope and magnitude of this fishery. The U.S. should also require that Turkey provide documentary evidence under both Section 101(a)(2)(A) and (F).

Italy is still driftnet fishing, with reports of between 15 to 37 Italian vessels operating from six Italian ports illegally driftnet fishing. To date, the U.S. certified Italy under the Pelly Amendment but lifted that certification in 1997. The U.S. continues to apply the provision of the High Seas Driftnet Fisheries Enforcement Act that denies entry of Italian large-scale driftnet vessels to U.S. ports and navigable waters. Since 29 May 1996, it has also required Italy to provide documentary evidence pursuant to the Dolphin Protection Consumer Information Act (16 U.S.C. 1371(a)(2)(E)) that certain fish and fish products it wishes to export to the U.S. are not harvested with large-scale driftnets on the high seas.

The U.S. has expressed its concern that some Italian vessels and nationals may still be engaged in large-scale high seas driftnet fishing. However, "The United States believes that the efforts now in progress [diplomatic discussions and Italian enforcement action] need some time to come to fruition and that the ultimate result of these efforts will be the complete elimination of any residual large-scale high seas driftnet fishing by Italian vessels and nationals that may still be occurring in the Mediterranean Sea."[389]

Italy's violation of the various driftnet bans has been ongoing for more than a decade and diplomatic actions and threat of Pelly sanctions have not been effective at either deterring illegal driftnet fishing or bringing about Italy's full compliance with the various international regulations banning driftnet fishing. The U.S. must take action under Section 101(a)(2) (16 U.S.C 1371(a)(2)) to ban the imports of fish and fish products from Italy, and it must certify and impose Pelly sanctions on Italy for violating the driftnet moratorium and the provisions of ICCAT which ban driftnets.

There are several fishery management agreements that apply in the region, such as ICCAT, to which the U.S. is a party. These provide linkage either through the relevant management commission or the bycatch prevention directives of the Straddling Stocks Agreement. The U.S. also could use the provisions of the M-SA to evaluate these driftnet fisheries and possibly certify Italy, Turkey and Morocco as nations that "fail to end or reduce bycatch of protected living marine resources by using regulatory measures that are comparable to those of the U.S., taking into account different conditions."

Takes in Peruvian Fisheries

Between 10,000 and 20,000 cetaceans die each year in Peruvian fisheries. This fishing mortality is causing the decline of Dusky dolphins and may also threaten the long-term survival of Burmeister's porpoise. Authorities in Peru remain unconvinced that any action beyond those already taken to prohibit commerce is needed to reduce the mortality of cetaceans in fisheries. Peru's enforcement of its national laws is poor and action is necessary to prohibit the capture of small cetaceans for bait and food. Additionally, efforts are needed to reduce the bycatch. The U.S. should take action, similar to that taken with Chile in regard to the Chilean crab fishery, to engage in bilateral discussions with Peru to devise a cooperative agreement to reduce cetacean bycatch and direct harvest. The trigger for such discussions could be the threat of an embargo of Peruvian fish products under Section 101(a)(2)(A).

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[389] 2005 Report Of The Secretary Of Commerce To The Congress Of The United States Concerning U.S. Actions Taken On Foreign Large-Scale High Seas Driftnet Fishing Pursuant To Section 206(E) Of The Magnuson-Stevens Fishery Conservation And Management Act, As Amended By Public Law 104-297, The Sustainable Fisheries Act Of 1996. Available on line at http://www.americanalbacore.com/documents/HSDN_Report_02_21_06.doc

Actions Under M-SFCMA

Section 202(h)(1) of the Magnuson-Stevens Fishery Conservation and Management Act calls on the Secretary of State, in cooperation with the Secretary of Commerce, to seek to secure international agreements to establish standards and measures for bycatch reduction that are comparable to the standards and measures applicable to U.S. fishermen if they conclude that it is necessary and appropriate.

New provisions in the Magnuson-Stevens Act call for the U.S. to promote improved monitoring and compliance for high seas fisheries or fisheries governed by international or regional fishery management agreements.[390] Among other provisions, the revised Act calls for improved communication and information exchange among law enforcement organizations, an international monitoring network, an international vessel registry, expansion of remote sensing technology, technical assistance to developing countries and support of a global vessel monitoring system for large vessels

There are several regional fisheries management agreements that may be vehicles to request that parties to such agreements assess cetacean populations and stocks, estimate bycatch, take measures to reduce bycatch and report their findings and actions back to the regional fisheries management secretariat.

The purposes of RFMOs and UNEP regional seas agreements are different. However, using both approaches would enable managers to come at the bycatch problem from both the side of improving fishery performance by using best practices to reduce bycatch, and work in concert with planners in the regional seas program to engage conservation, protection, and mitigation measures in the action plans.

Global Plan of Action for Marine Mammals

In the early 1980s UNEP and the Food and Agriculture Organization of the UN finalized and adopted a Global Plan of Action for Marine Mammals (MMAP), the central goal of which is to generate a consensus among governments on which to base their policies for marine mammal conservation under the auspices of UNEP. Several Regional Seas Programmes have incorporated marine mammal conservation into their Action Plans and protocols—the Mediterranean, South-East Pacific, Wider Caribbean and Eastern Africa regions. These plans include development of regional and national management plans for threatened species, research and monitoring programs and establishment of marine parks and protected areas. More to the point, a few regional seas conventions have established regional action plans dealing specifically with marine mammals.[391] Wherever regional seas conventions exist, the Office of International Affairs should seek to participate in those conventions and work to advance marine mammal/cetacean action plans that will result in creating the necessary infrastructure and process to reduce cetacean bycatch.

The MMAP should be revised and retooled to increase its relevance and usefulness. UNEP is in the process of revising and reevaluating the present relevance of this action plan given that nearly three decades have passed since it was first developed in 1978. UNEP is retooling the Marine Mammal Action Plan in consultation with CMS, CITES, the Convention on Biological Diversity, the regional seas conventions and action plans and relevant partner

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[390] Section 207(a)

[391] Notably, the Mediterranean has adopted action plans for the Mediterranean monk seal and cetaceans. The South-East Pacific has an Action Plan for the Conservation of Marine Mammals in the region, and the Caribbean Environment Programme has a Regional Management Plan for the West Indian Manatee.

organizations, including IUCN, in order to present a revised MMAP to the Fourth Global Meeting of Regional Seas Conventions and Action Plans. The Office of International Affairs should monitor and participate in this process wherever possible to ensure that the revised MMAP embodies the purposes and policies of the MMPA.

South Pacific Regional Environment Program

A recently formed Memorandum of Understanding (MoU) for the Conservation of Cetaceans and their Habitats in the Pacific Islands Region provides an institutional umbrella for Pacific Island Countries (PICs) to conserve Pacific Island whales and dolphins (cetaceans) and their habitats. It was negotiated under the auspices of the Convention on Migratory Species (CMS), in close collaboration with the Secretariat of the Pacific Regional Environment Programme (SPREP) based in Apia, Samoa and signed by Australia, Cook Islands, Federated States of Micronesia, Fiji, France, New Zealand, Niue, Samoa and Vanuatu. Contracting parties to CMS are Australia, Cook Islands, France, New Zealand and Samoa. The MoU's entry into effect is very timely and coincides with SPREP's review of its Whale and Dolphin Action Plan. The Action Plan will form an integral part of the MoU. The accompanying Action Plan calls upon signatories to reduce threats, respond to strandings and entanglements, and to protect habitat, including migratory corridors. Cooperation, information exchange, education and public awareness activities are also significant components of the Action Plan. In addition, signatories need to undertake more training, research and monitoring. Working towards sustainable and responsible cetacean-based tourism is another objective. The fisheries interaction objective is mostly focused on cetacean depredation of fish caught on longlines. An Action Plan from a SPREP Longline/Cetacean Interactions Workshop calls for further research into the species involved in depredation, extent of impact and possible methods for mitigation. To date, the signatories do not believe that bycatch and entanglement in fishing gear are a significant issue. The Office of International Affairs should work to expand this Action Plan to undertake the necessary cetacean abundance research and to more thoroughly document the frequency of cetacean bycatch.

Caribbean SPAW Protocol

The promulgation of a regional marine mammal action plan under UNEP's Caribbean regional seas program and the establishment in Guadeloupe of a Regional Activity Centre (RAC) for implementation of the protocol on Specially Protected Areas and Wildlife (SPAW Protocol), provide the International Affairs Office a means to develop regional networks, collaborative studies and training activities to promote scientific understanding of the cetaceans and cetacean bycatch and to further develop the scientific and technical capacity of the region.

The body that might fill the role of a RFMO in the Caribbean is the West Central Atlantic Fisheries Commission (WCAFC). Because it is advisory only, the U.S. might encourage efforts to revamp it in accordance with more recent trends for regional fishery management organizations, incorporating more of the principles of the Straddling Stocks Agreement. This region might be a place to use the resources provided in the M-SA amendments to foster creation of a new regional management body, to bring fishing into compliance with the most recent international standards. This region is adjacent to the U.S., includes U.S. territory, and would be a logical place to extend diplomatic, technical and conservation efforts.

Northwestern Atlantic Fisheries Organization

Even though NAFO's focus is on the conservation and management of stocks of commercially valuable groundfish and other species, the members—Bulgaria, Canada, Cuba, Denmark, European Union, France, Iceland, Japan, Korea, Norway, and Russia—can provide information critical to understanding the bycatch of cetaceans in these fisheries. Given NAFO's

on-going efforts to minimize bycatch and the fledging NAFO initiative on application of ecosystem considerations to the Organization's fisheries management decision-making, the organization would be a likely partner in helping to reduce cetacean bycatch. In 2006, NAFO passed a resolution calling upon contracting parties to generally support adoption and implementation of the FAO Guidelines to Reduce the Mortality of Sea Turtles in Fishing Operations, to provide information on existing domestic data collection (e.g., species identification, fate and condition at release, relevant biological information, and gear configuration) and/or observer training efforts relating to sea turtle interactions in NAFO-managed fisheries in the NAFO Convention Area. The resolution also calls upon NAFO Parties to consider, where appropriate, increasing cooperation both among NAFO Contracting Parties and with other regional, subregional and global organizations, to facilitate sharing of data and development of compatible and appropriate bycatch reduction measures. Such efforts may be enhanced by integration of sea turtle interaction data collection by NAFO observers.

The U.S. should propose a similar resolution for cetaceans within NAFO with particular emphasis on the bycatch of harbor porpoise.

Southeast Atlantic Fisheries Organization

The Commission has a broad range of fishery conservation and management functions (See Chapter 4), however, the types of conservation and management measures anticipated under the Convention include measures relating to the quantity of any species that may be caught; the areas and periods in which fishing may occur; the size and sex of any species that may be taken; the fishing gear and technology which may be used; the level of fishing effort; and the designation of regions and sub-regions.

SEAFO includes in its convention provisions that take into account the impact of fishing operations on ecologically related species such as seabirds, cetaceans, seals and marine turtles. It calls for conservation and management measures for species belonging to the same ecosystem as, or associated with or dependent upon, the harvested fishery resources. Parties are to ensure that fishery practices and management measures take into account the need to minimize harmful impacts on living marine resources as a whole and to protect biodiversity in the marine environment. In addition, the Scientific Committee is provided with the authority to assess the status and trends of relevant populations of living marine resources. Finally, the convention also has provisions for an observer program.

Recognizing the threats to cetaceans from fisheries that occur off the west coast of Africa, SEAFO appears to offer the vehicle to make progress towards assessing the cetacean populations of this region, the bycatch of the fisheries that operate here, and adopt effective monitoring and mitigation measures. The Office of International Affairs should participate in this fisheries organization and offer a resolution similar to that discussed for NAFO (See Appendix D).

Western Central Pacific

The new regional convention in this area calls for the adoption of measures to minimize waste, discards, catch by lost or abandoned gear, pollution originating from fishing vessels, catch of non-target species, both fish and non-fish species, and impacts on associated or dependent species, in particular endangered species. The agreement promotes the development and use of selective, environmentally safe and cost-effective fishing gear and techniques and protection of marine biodiversity. Of particular interest is the fact that this convention specifically provides for adoption of, "where necessary, conservation and management measures and recommendations for non-target species and species dependent on or associated with the target stocks, with a view to maintaining or restoring populations of

such species above levels at which their reproduction may become seriously threatened." The scientific experts used by the Commission may also conduct assessments of highly migratory fish stocks, non-target species, and species belonging to the same ecosystem or associated with or dependent upon such stocks, within the Convention Area.

In short, the Western Central Pacific Fisheries Commission includes the provisions necessary to call upon Parties to assess cetacean populations, fisheries bycatch, and to develop and implement measures to reduce cetacean bycatch. In December 2005, the Commission adopted a resolution addressing sea turtle bycatch. The Office of International Affairs should put forward a resolution that calls upon nations to assess cetacean populations within their waters, estimate bycatch in their coastal fisheries, and provide this information to the Commission. An example of such a resolution is provided in Appendix C.

South West Indian Ocean

One of the newest commissions is the South West Indian Ocean Fisheries Commission (SWIOFC). Although it is only advisory at present, it will focus on coastal fisheries of East Africa and island states in the region, and has a mandate for responsible management and regional cooperation on fisheries policy. Its first priority will be data collection. There is not much leverage for the U.S. in this region.

Southeast Pacific Ocean

The Southeast Pacific region spans the entire length of the Pacific coast of South America from Panama to Cape Horn, encompassing tropical, sub-tropical, temperate and sub-antarctic systems and crossing the boundaries of five countries—Chile, Peru, Ecuador, Colombia and Panama. One of the initial activities in the region was the drafting of a regional diagnosis on the state of marine mammals based on the national consultation reports. The governments, with the purpose of enhancing the application in the South East Pacific of the Global Programme of Action for the Conservation, Management and Use of Marine Mammals, approved the Plan of Action for the Conservation of Marine Mammals in the South East Pacific. A meeting of experts held in Costa Rica in January 1995 resolved that there had been progress in terms of research, management and legislation to protect these species.

A Regional Course on Catch, Monitoring, Data Collection Techniques and Assessment of Marine Mammals Stocks took place in 1997, in Guayaquil, Ecuador. National studies have also been conducted on the development of techniques for monitoring marine mammal mortality rates. Several projects are currently being carried out to launch different campaigns with the purpose of increasing awareness among communities of artisanal fishermen and authorities.[392] Despite these many efforts, it is still difficult to determine what effect these assessments are having on the water to assess cetacean populations or monitor or reduce cetacean bycatch. This is an area where concrete information on the progress that has been made by each nation in implementing these action plans and assessments should be shared with the U.S. through bilaterals and through other regional fisheries management organizations such as the Inter-American Tropical Tuna Commission.

One approach that might be effective in this region is to create a forum for information exchange. At present, there is no nexus between the MMAP and the IATTC, nor is there feedback or data exchange between the regional seas program and the regional fishery management entity. The management structure in this area is well developed and has a long history of conservation and bycatch reduction through gear and best practices. The IATTC

[392] CPPS (2004) (Accessed 06/07/04) http://www.cpps-int.org. Last updated 21/05/04

would be an effective partner to engage in this region.

Actions Under MMPA Title III

Title III of the MMPA—International Dolphin Conservation Program—addresses the capture of dolphins in purse seine fisheries predominantly in the eastern tropical Pacific Ocean. However, Congress was concerned that the association, encirclement, and capture of dolphins in purse seine nets to capture tuna may occur in other oceans. References to this issue occur several times within this title. First, Congress states that it is the policy of the U.S. to "encourage observer coverage on purse seine vessels fishing for tuna outside of the eastern tropical Pacific Ocean in a fishery in which the Secretary has determined that a regular and significant association occurs between marine mammals and tuna, and in which tuna is harvested through the use of purse seine nets deployed on or to encircle marine mammals." Likewise the Dolphin Protection Consumer Information Act's labeling provisions state that it is unlawful to label a product 'Dolphin Safe' if it comes from a fishery where "the Secretary has determined that a regular and significant association occurs between dolphins and tuna (similar to the association between dolphin and tuna in the eastern tropical Pacific Ocean)…"[393]

Although neither Title III nor the Dolphin Protection Consumer Information Act explicitly require a determination and a list of fisheries for which the Secretary has determined that a regular and significant association occurs between dolphins and tuna, it is inferred that such determination should be made. Moreover, new language in the M-S reauthorization amendments also requires a determination to be made identifying and listing of nations that "fail to end or reduce bycatch of protected living marine resources by using regulatory measures that are comparable to those of the United States." Insofar as was able to be determined, the NMFS has never taken action under Title III of MMPA. In the absence of such a determination, tracking and verification of tuna coming from other oceans than the ETP may be incomplete or flawed. The new international title of the M-SFCMA may provide needed impetus to investigate further. The paragraphs below summarize instances where the literature indicates some level of interactions with purse seine fisheries and cetaceans. The level and significance is poorly documented, but in most cases there are regional fishery management organizations that should be used to allocate the observer coverage necessary to define the scope and frequency of the interaction.

Western Central Pacific Ocean

In the Philippines, scientists estimated that about 2000 dolphins, primarily spinner, pan-tropical spotted, and Fraser's, were being killed each year by a fleet of five tuna purse seiners using fish-aggregating devices. The annual bycatch of small cetaceans in a single tuna driftnet fishery in Negros Oriental was estimated at about 400.[394] Similarly, there have been indications of dolphin bycatch immediately west of the 150°W Longitude, the line differentiating the eastern tropical Pacific and western central Pacific tuna treaties. The latter treaty should be the tool to investigate and mitigate the occurrence of bycatch in coastal purse seine fisheries like the Philippine purse seine fishery.

West Coast of Africa

For more than four decades scientists have speculated that dolphins are encircled and

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[393] 16 U.S.C 1385(d)(1)(B)(i)

[394] Dolar, M.L.L. 1994. Incidental takes of small cetaceans in fisheries in Palawan, central Visayas and northern Mindanao in the Philippines. Rep. Int. Whal. Commn (Special Issue) 15:355-363.

captured in tuna purse seine fisheries in the eastern tropical Atlantic Ocean, especially off the west coast of Africa. The levels of mortality, stock sizes, and even exact species involved are not known with certainty although the interactions most likely include several species of the genus Stenella, as well as common dolphins (*Delphinus spp*.).[395] It has been suggested that dolphin mortality in this fishery could be up to 30,000 or more animals per year.[396] Tuna/whale interactions are also known to occur, and baleen whales are considered to be good indicators of tuna schools.[397] Independent observer data are needed to define the composition and extent of the bycatch. The Office of International Affairs should work through ICCAT to either request that ecosystem working group of the Standing Committee on Research and Statistics SCRS to investigate, undertake a pilot study to conduct the research, or request greater levels of observer coverage necessary to define the extent of this problem.

Actions Under MMPA Title II

The Marine Mammal Commission was established under Title II of the MMPA. The Act calls upon the Commission to undertake a review and study of the activities of the U.S. pursuant to international conventions relating to marine mammals.[398] The Commission is also required to recommend to the Secretary of State appropriate policies regarding existing international arrangements for the protection and conservation of marine mammals, and suggest appropriate international arrangements for the protection and conservation of marine mammals.[399] Given these mandates, the Office of International Affairs might look to the Commission as a partner with whom to execute the recommendations in this report and to develop and further refine an annual strategy to reduce the international bycatch of cetaceans.

The Office of International Affairs might look to the Commission for its scientific expertise in developing international scientific programs or partnerships to begin to make progress on the research needs. The Office of International Affairs should also work with the Commission to develop resolutions and amendments to regional fishery management organizations that it might want the State Department to advance in these forums. Finally, the Commission might assist the Office of International Affairs in developing information for the reports mandated under the MMPA and Magnuson-Stevens Act. The Office of International Affairs could also work with the Commission to develop a strategy for each body to complete its mandates under both the MMPA and the Magnuson-Stevens Act.

Potential for New Legislation on Cetacean Bycatch

In the 109th Congress, Senator Barbara Boxer (D-CA) introduced S. 1224, the National Oceans Protection Act of 2005. The bill contains subtitle C—Cetacean and Sea Turtle Conservation Act of 2005 (Appendix E), which directs the Secretary of Commerce to enter into negotiations with countries that engage in commercial fishing operations that adversely impact

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[395] Maigret, J. 1981. Introduction à l'étude des rapports entre les cétacés et la pêche thonière dans l'Atlantique tropical. *Bull. du Centre Natl. Rech. Oceanogr.* PêchesMouadhibou **10**, 89–101.

[396] Alverson, F.G. 1991. Tuna purse seine and gill/drift net fisheries in the oceans of the world and their relationship to tuna-dolphin, tuna-whale and tuna-whale shark associated schools. Unpublished Report Submitted to the CANAINPES Seccion Especializada en Pesca de Atun Programa Atun-delfin, Camara Nacional de la Industria Pesquera. 110pp.

[397] *Id.*

[398] 16 U.S.C. 1402 (a)(1).

[399] 16 U.S.C. 1402 (a)(5).

cetaceans or sea turtles that result in agreements requiring such countries to reduce bycatch of such animals to at least sustainable levels. The bill, supported by the environmental community, further demonstrates Congress' interest in international cetacean bycatch and their desire to make progress in addressing the issue. The bill was never acted upon, but since introduction, subtitles of the National Oceans Protection Act have either been included in other introduced bills or enacted elsewhere.

In Appendix F[400], a proposed draft bill, patterned after the legislation in Appendix E, is provided. Section 5 of the draft bill calls for the negotiation of bilateral and multilateral agreements with foreign governments to reduce cetacean bycatch to sustainable levels. The bill also contains two critical provisions—establishment of a grant program and a bycatch database—the need for which will be discussed elsewhere in this chapter. The grant program provides foreign entities with funding to develop fishing gear and methods to reduce bycatch. But the more critical need is for assessments of abundance and bycatch monitoring. The bycatch database would create a sorely needed resource to collect information on cetacean bycatch, the development and use of appropriate fishing gear and methods, and efforts to reduce cetacean bycatch. This database could be linked to other databases that are being developed as part of the Integrated Ocean Observing System (IOOS) and the Global Earth Observing System of Systems (GEOSS). Finally, the bill authorizes sorely needed funds dedicated to this program at the level of ten million dollars annually for the implementation of this program.

The Office of International Affairs should consider developing similar legislation as an Administration bill. It is highly likely the conservation community could be enlisted to help advocate introduction and passage of such legislation.

Actions through the United Nations

In May 2007, President George W. Bush urged the U.S. Congress to ratify the United Nations Convention on the Law of the Sea (UNCLOS), a departure from more than 20 years of U.S. policy in opposition to the treaty. UNCLOS is described in detail in Chapter 4, but in general, it provides a legal framework within which countries may agree to carry out activities in the oceans and seas. The General Assembly of the United Nations convened the Third United Nations Conference on the Law of the Sea, which adopted UNCLOS in 1982, after several preceding negotiating sessions. The General Assembly annually considers and reviews ocean affairs and the law of the sea based on annual comprehensive reports prepared by the Secretary-General.

In November 1999, the General Assembly established an open-ended informal consultative process in order to facilitate the annual review by the General Assembly, which includes consideration of the Secretary-General's annual report on oceans, UNCLOS, the UN Straddling Stocks Agreement, and issues of particular interest as well as consideration of any particular resolution or decision of the General Assembly, any relevant special reports of the Secretary-General and any relevant recommendations of the Commission on Sustainable Development.

Since 2001 the General Assembly has passed two UNCLOS resolutions each year. One, typically referred to as the Oceans and Law of the Sea Resolution, recalls and reaffirms provisions related to the UNCLOS and highlights specific actions that the General Assembly

[400] While the previous legislation contained provisions for both sea turtles and cetaceans, for purposes of this report the authors focused these provisions only on cetaceans. Nevertheless, the same issues are also of concern to sea turtles and any legislation that moves forward should include provisions to reduce sea turtle bycatch.

either encourages, urges, or requests parties to undertake.[401] Similarly, the sustainable fisheries resolution relates to implementation of the provisions of the United Nations Convention for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks and it recalls and reaffirms the provisions of this agreement and calls upon parties to take specific action.

For example, in 2006, the sustainable fisheries resolution:

> *Urges* States, including those working through subregional or regional fisheries management organizations and arrangements, to implement fully the International Plan of Action for the Conservation and Management of Sharks, notably through the collection of scientific data regarding shark catches and the adoption of conservation and management measures, particularly where shark catches from directed and non-directed fisheries have a significant impact on vulnerable or threatened shark stocks, in order to ensure the conservation and management of sharks and their long-term sustainable use, including by banning directed shark fisheries conducted solely for the purpose of harvesting shark fins and by taking measures for other fisheries to minimize waste and discards from shark catches, and to encourage the full use of dead sharks;
>
> *Requests* States and regional fisheries management organizations and arrangements to urgently implement, as appropriate, the measures recommended in the Guidelines to Reduce Sea Turtle Mortality in Fishing Operations 12 and the International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries of the Food and Agriculture Organization of the United Nations in order to prevent the decline of sea turtles and seabird populations by reducing by-catch and increasing post-release survival in their fisheries, including through research and development of gear and bait alternatives, promoting the use of available by-catch mitigation technology, and promotion and strengthening of data-collection programmes to obtain standardized information to develop reliable estimates of the by-catch of these species.[402]

The Office of International Affairs could work to include similar language in the sustainable fisheries resolution that calls upon states to implement the MMAP (preferably the revised version) and to take urgent action to assess cetacean population within their waters, document cetacean bycatch and reduce bycatch. This approach provides top-down support through the General Assembly for the recommended actions that have been made at the bottom-up regional fisheries management agreement/organization level.

Incentives

Incentives can be combined with mandates to provide impetus for compliance with international agreements. In the past, countries have used access agreements, favorable trade status, development grants and other economic assistance (such as aid for construction of freezer or dock facilities) to encourage coastal states or flag states to change fishing behavior. In the current world fishery situation, incentives that fall in the realm of fishery development are

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[401] *See, e.g.* UNGA Resolution on Oceans and Law of the Sea A/RES/61/222 (16 March 2007).

[402] 2006 UNGA Resolution on Sustainable Fisheries. A/RES/61/105.

not a tool of choice, but incentives that relate to capacity reduction or effort limitation might be considered. Technology transfers or research grants might be useful incentives. The FAO has ongoing programs examining buyouts and other mechanisms for capacity reduction in which the U.S. has been participating.

Favorable price or favorable trading partner status is another type of incentive, but must be considered carefully in light of rules on tariffs and trade. This is the flip side of import restrictions, trade sanctions or requirements that importers provide proof of origin for some fish (see, for example, the ICCAT requirements outlined in Chapter 4). One mechanism the private sector has employed in an effort to provide a price benefit for seafood products is certification that fish was caught in a sustainable manner. This approach varies from consumer-oriented programs such as seafood cards that urge shoppers and restaurant diners to choose items labeled "green," to more rigorous industry-oriented programs such as certification by the Marine Stewardship Council. In this latter approach, an applicant fishery sector must prove through responses to a set of criteria, that it can achieve a score that translates as "sustainable." The certification is done by a third-party examiner, and follows a rigorous review process.[403] The criteria already include an assessment of bycatch and interaction with protected species, but scoring guidelines are created for each fishery under examination. In cases where cetacean bycatch is an issue, it might be useful to work with the MSC to place emphasis on at-risk cetaceans during creation of scoring guidelines. Although to date most of the fisheries that have undergone MSC assessment have been large, industrial fisheries, the organization has devoted study to methods for assessing smaller, coastal and artisanal fisheries, and is currently developing guidelines for such approaches. These cases may have application for cetacean protection in areas with coastal fisheries such as Asia and Africa.

Labeling programs, whether "dolphin safe," country of origin, MSC, or other certification that the product was caught according to a set of rules and standards, are only as good as the infrastructure necessary to conduct and enforce the tracking and compliance. To the degree that standards for avoidance of cetacean bycatch can be integrated into existing, required programs for seafood tracking, this incentive could be an effective tool.

An opportunity to further consideration of cetacean bycatch as an element of sustainable seafood certification and labeling could be to conduct a session on incentives at an international seafood show or conference. In recent months major seafood retailers such as Wal*Mart have made a show of pushing sustainable seafood. They join the ranks of Whole Foods and others who have been on the "green" bandwagon longer, but have less of an impact on the market. In some cases, these major players have foundations and sources of funding that might be applied to research or gear investigation or technology transfer. The tremendous influence that buyers such as Wal*Mart have on the supply chain is not to be underestimated.

New Technology

Ocean observing via satellites is an emerging technology whose applications are only beginning to be employed in resource conservation. Data on temperature, salinity, and other geophysical and oceanographic information can be related to fronts where predators and prey are most likely to be found. The data that fishing fleets use to figure out where fishing is most productive can be used to predict where marine mammals are most likely to be fishing, too. It might be possible to delineate avoidance areas by overlaying time/place/temperature information gathered through the International Ocean Observing System. The Global Earth

[403] A description of the MSC certification process is available online at . See also, Eco-labelling in Fisheries: what is it all about? B. Phillips, T. Ward & C. Chaffee, eds. Blackwell Science, Oxford, UK. 2003.

Observation System of Systems[404] provides a framework to integrate numerous data sets that may provide insight into the interaction of fishing fleets and cetaceans. These new technologies offer precision and potential to integrate data that have not be available heretofore. It is important to bring this potential to the attention of scientific committees in regional and international management bodies.

Building Capacity for Assessments and Mitigation

Capacity building is a term that refers to the enhancement of human capabilities through a combination of education and infrastructure improvement. Capacity building is crucial to providing local scientists with the skills necessary to undertake research to make progress on conservation efforts to reduce cetacean bycatch. The Office of International Affairs should seek opportunities to expand programs of scholarships to study abroad, transfer technology, engage in collaborative research, and continue programs of professional development. Any training effort should involve practical field experience that results in products such as formal population assessments, management plans, or bycatch estimates. In the end, training programs will only be successful if they are accompanied by the opportunities for local researchers to use the skills that they develop to conduct cetacean research and conservation and bycatch reduction in that region. In addition, the infrastructure necessary to aid researchers in applying these skills must be available or be able to be easily developed. The Office of International Affairs should look for opportunities to facilitate workshops that bring together researchers from a particular region to address a particular cetacean bycatch issue so they may identify and agree on priorities, coordinate research activities, standardize methodology, and enhance the analytical skills of participants.

Below are examples of ongoing programs with which the Office of International Affairs could partner to achieve some of the research needs identified throughout this report.

Programs to develop aid to undertake or establish population assessment, bycatch estimation, and bycatch reduction programs

International cetacean bycatch reduction efforts are affected by the adequacy of the science and management capacity of every coastal nation. Well-trained scientists and high-quality laboratories and equipment contribute to our understanding of cetacean bycatch. There are a variety of U.S. programs designed to assist in ocean and coastal science capacity building. The U.S. Agency for International Development, as part of its mission to expand democracy and improve the lives of citizens in the developing world, sponsors programs that promote natural resource management.

Sea Grant International—the Need for International Internships

In its 2004 report the U.S. Commission on Ocean Policy recommended that: “Congress should significantly expand the National Sea Grant College Program as part of doubling ocean and coastal research funding.” President Bush’s U.S. Ocean Action Plan states, “In response to direct requests from interested foreign governments and universities, the Administration will conduct a donors conference in Latin America, hold a workshop in Southeast Asia, and develop a technical assistance plan in North Africa in order to help introduce and adapt the successful U.S. Sea Grant system of applied research, extension, and education to countries in these regions. Sea Grant will help create a global network of institutions dedicated to applying the knowledge and technologies that lead to sustainable forms of coastal and marine resource

[404] A description of GEOSS is available online at http://www.epa.gov/geoss/

development and conservation."

This statement demonstrates the reach of The National Sea Grant College Program, but the international reach of this program has been limited. The Office of International Affairs should work with Congress and the National Sea Grant College Program to strengthen the international component of Sea Grant. Through international internships Sea Grant could evolve to become a marine environmental stewardship version of the Peace Corps—a Sea Corps. From the viewpoint of international bycatch reduction, students could undertake international internships to foster global capacity to reduce cetacean bycatch worldwide by adapting the Sea Grant model of applied research, extension and education to international contexts. These internships could become the mechanism to train international scientists and provide nations with the tools and personnel needed to assess cetacean population abundance, estimate bycatch, and test promising mitigation measures.

Partnerships with Academia and Environmental NGOs

World Wildlife Fund (WWF) bycatch reduction efforts

World Wildlife Fund undertakes several programs to address bycatch. WWF's first International Smart Gear Competition was held in 2005. The competition brings together the fishing industry, research institutes, universities, and government, to "inspire and reward practical, innovative fishing gear designs that reduce sea turtles, birds, marine mammals, cetaceans and non-target fish."[405] In 2006, the competition drew more than 80 entries from 26 countries. An international panel of gear technologists, fisheries experts, and representatives of the seafood industry, fishermen, scientists, researchers and conservationists judged the entries. The annual award has been between $25,000 and $50,000 and has gone to research to modify longline, gillnet, and shrimp trawl fisheries or gear.

In January 2002, WWF organized an international workshop that brought together the world's leading scientists on cetacean bycatch to formulate a plan for making progress toward solving the global bycatch problem. This workshop resulted in a plan for reducing cetacean bycatch, an international strategy, the formation of a network, and the creation of a virtual Resource Center, which aims to assist fishermen, scientists, environmentalists and the public in working together to address cetacean bycatch. Working closely with WWF, the International Cetacean Bycatch Task Force conducts research and training in areas with the most severe bycatch problems, works with fishermen to develop cetacean-safe fishing techniques and actively advocates for more resources and attention in international policy arenas.

Duke University

Duke Center for Marine Conservation, through the Nicolas School of Environment and Earth Sciences, is involved in a global assessment of the impact of fisheries bycatch on marine mammals, seabirds, and sea turtles. The overall goal of the program is to reduce fisheries bycatch of these vulnerable species and promote sustainable fisheries. Through synthesis of existing data, collaboration and coordination of ongoing research efforts, Duke hopes to develop new approaches to bycatch assessment looking across gear types and taxa and to place bycatch into an oceanographic context.

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[405] Information available on line at bycatch.

Society for Marine Mammalogy

In 1999 the International Society for Marine Mammalogy established a program to help support marine mammal research in economically disadvantaged countries. Individual awards of up to $1000 may be made annually and each award may be renewed for up to three years. The grants are intended to support field research, the purchase of essential equipment, travel to field sites, or other fundamental research components.

Small grant programs

U.S. law has numerous provisions for grants and gear research. The Cetacean Conservation Act (Appendix E) contains provisions for a small grant program. The MMPA has provisions for research into gear development. In past years, the Saltonstall Kennedy Grant Program administered by NMFS has made bycatch avoidance research projects a themed priority. Although the program was cancelled in FY 2007 for lack of funding, it may be revived in the future. The annual budget and appropriations cycle usually spawns numerous line item projects that provide money for research into fishery bycatch of protected species. The Office of International Affairs should look for opportunities to either develop or use existing grant programs to fund the research needs identified in this report.

Additionally, the Office of International Affairs might look to develop a public/private partnership with external institutions and the fishing industry to either expand these existing programs or to initiate a new small grant program that would enable it to meet its obligations under the MMPA and the Magnuson-Stevens Act.

Additional Steps to Document Bycatch Worldwide

Workshop on bycatch similar to 1990 La Jolla event

In October 1990, the Workshop on Mortality of Cetaceans in Passive Fishing Nets and Traps was held in La Jolla, California. The idea for this workshop began six years earlier, but budget constraints delayed the workshop. The workshop included a symposium of contributed papers and consideration of incidental mortality in traps and other passive fishing gear. The International Whaling Commission Special Issue—Gillnets and Cetaceans that was published in 1994, remains a important, though dated, source of information on cetacean bycatch

The WWF workshop held in Annapolis in January 2002 produced a recommendation that was forwarded to the IWC Subcommittee on Small Cetaceans; that recommendation was that countries should develop formal national plans of assessment to estimate bycatch rates. “Such Plans would include collection and analysis of data to describe fishing fleets, including the size of the fleet (number of vessels), fishing methods, fishing areas and measures of fishing effort. They should also include where appropriate bycatch monitoring schemes based on independent observations when possible.”

The IWC Subcommittee on Small Cetaceans has proposed a series of regional workshops, sponsored by the IWC, to advance assessment and mitigation of cetacean by-catches. “The main thrust of the workshops would be to conduct the necessary assessment, monitoring and mitigation functions that will lead, where necessary, to the reduction of bycatch and alleviation of the conservation threat to the population or species under consideration.”[406]

[406] Annex L, Report of the Subcommittee on Small Cetaceans, IWC 2004.

The Subcommittee recognized that many advances have been made in the assessment and mitigation of cetacean bycatch since the 1990 IWC workshop and they questioned whether another workshop of the scope and scale of the 1990 workshop was appropriate. Given the case-specific nature of the problem, the comments of the Subcommittee seemed to support the recommendation of either a national plan (such as the plans of assessment) or a series of broad-based regional workshops focusing on regions where bycatch problems have been identified as a priority.

The Office of International Affairs should take the lead in this effort. The workshops should not be held in the US but in regions where the bycatch problem occurs. The workshops should include an assessment of the problem and consideration of appropriate mitigation and monitoring measures. Workshop participants should include international scientists/experts on cetacean bycatch, invited experts on the biology of the most affected species, local scientists, fishery managers, representatives of the fishing industry and non-governmental organizations and government decision makers. The Office of International Affairs should collaborate with the Convention on Migratory Species, the Committee on Fisheries of the UN Food and Agriculture Organization, IUCN, relevant international and regional fishery organizations in the development and execution of these workshops. Finally, these workshops should not be a one-time occurrence but should be repeated every several years.

CHAPTER 7. PRIORITY RECOMMENDATIONS

Throughout this report the authors identify a combination of both research needs (Chapters 2 and 5) and recommendations for agency action (Chapter 6). With more than twenty recommendations, and limited agency resources (staff and budget), it is necessary to set some priorities among the recommendations. While recognizing that there will be agency considerations, budget and policy guidance and diplomatic opportunities that will arise and that cannot be predicted here, the authors attempted to rank the recommended actions by using a set of scoring criteria. The information in Table 7.1 illustrates how to score the recommendations against two types of measures.

The first overarching criterion analyses the level of risk to the population and the conservation benefit of implementing a particular recommendation. The subcriteria ask whether the recommendation:

- Assists a critically endangered species;
- Assists a species at risk (listed under the IUCN Red List);
- Addresses unsustainable bycatch;
- Aids a trans-boundary species;
- Will help meet a critical research need (e.g., provide information on cetacean abundance or bycatch estimates).

The second overarching criterion evaluates the ease and effectiveness of implementation. The subcriteria query whether legal frameworks and capacity to implement mitigation measures exist:

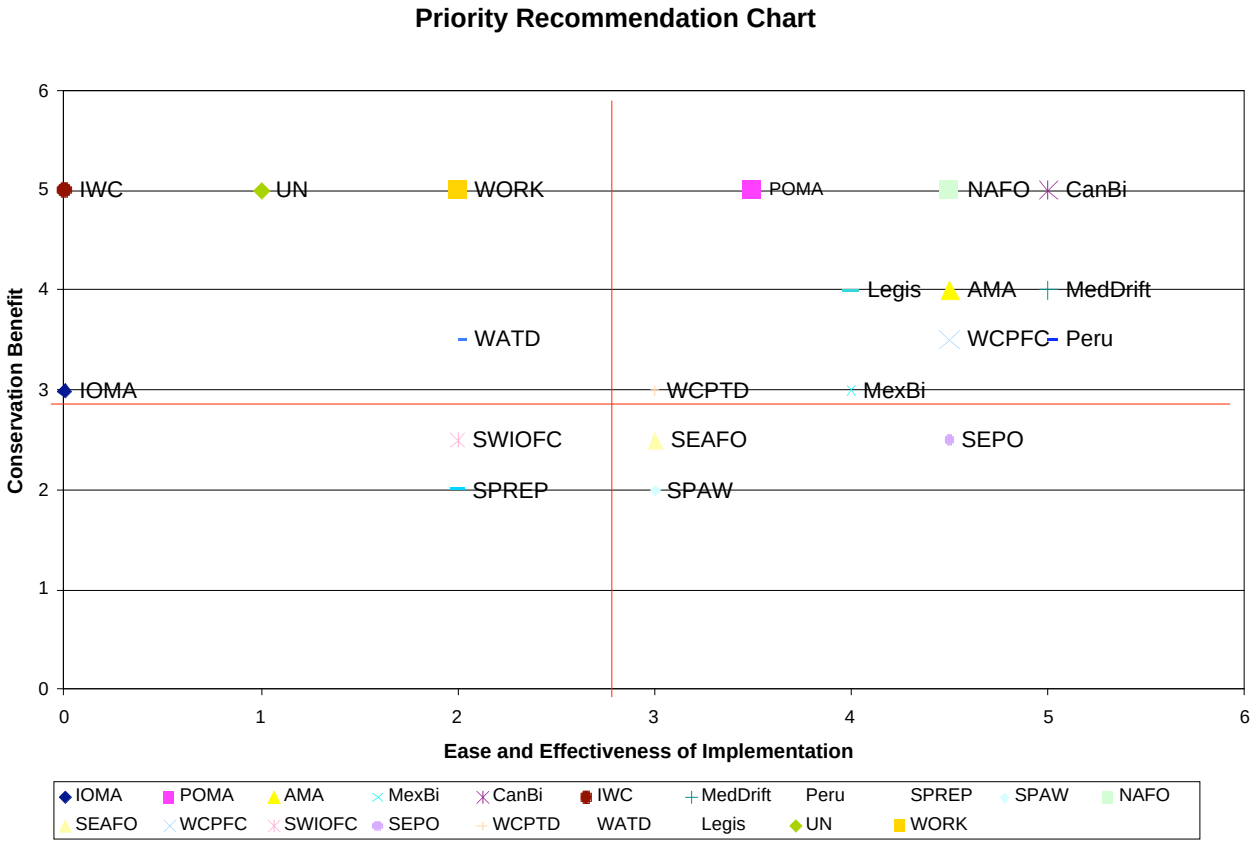
- Regional agreement is in place that can be used to implement the recommendation;
- Bilateral agreement is in place that can bring about prompt action;
- National legislation is in place that either requires enforcement or modification to strengthen conservation requirements;
- Mitigation strategies or possible solutions are available to be used or tested;
- Institutional capacity is such that intervention is feasible.

Each recommendation was analyzed, and a point value assigned based on the number of subcriteria that it satisfied. Those subcriteria denoted with a question mark indicate that, based on the literature, there is some level of uncertainty. In these situations, a half of a point was scored. The results of that evaluation are summarized in Table 7.1

Table 7.1 Analysis to Develop Priority Recommendations					
Recommendation Title	Acronym	Conservation Benefit Criteria	Total # of Pts	Ease/Effectiveness of Implementation Criteria	Total # of Pts
Indian Ocean Multilateral Agreement	IOMA	2,3,5	3		0
Pacific Ocean Multilateral Agreement	POMA	1,2,3,4,5	5	1,2,4,5(?)	3.5
Americas Multilateral Agreement	AMA	1,3,4,5	4	1,2,3,4,5(?)	4.5
US/Mexico Bilateral	MexBi	1,3,5	3	2,3,4,5	4
US/Canada Bilateral	CanBi	1,2,3,4,5	5	1,2,3,4,5	5
Amend IWC	IWC	1,2,3,4,5	5		0
Mediterranean Driftnets	MedDrift	2,3,4,5	4	1,2,3,4.5	5
Peruvian Fisheries Bycatch	Peru	2,3(?),4,5	3.5	1,2,3,4,5	5
South Pacific Regional Environment Program	SPREP	3,5	2	1,5	2
Caribbean SPAW Protocol	SPAW	3,5	2	1,4,5	3
Northwestern Atlantic Fisheries Organization	NAFO	1,2,3,4,5	5	1,2(?)3,4,5	4.5
Southeast Atlantic Fisheries Organization	SEAFO	3,4(?),5	2.5	1,2,4	3
Western Central Pacific Fisheries Commission	WCPFC	1,3,4,5(?)	3.5	1,2,3,4(?),5	4.5
Southwest Indian Ocean Fisheries Commission	SWIOFC	1,(?),3,5	2.5	1,3	2
Plan of Action for Marine Mammals in the Southeast Pacific Ocean	SEPO	3,4,(?),5	2.5	1,2,3,4,5(?)	4.5
Western Central Pacific--tuna/dolphin interactions	WCPTD	3,4,5	3	1,4,5	3
West Coast of Africa--tuna/dolphin interactions	WATD	2,3,4(?),5	3.5	1,4	2
Bycatch Legislation	Legis	1,2,3,4,5	4	1,2,4,5	4
United Nations General Assembly Resolution	UN	1,2,3,4,5	5	1	1
Workshops for Science and Technology Transfer	WORK	1,2,3,4,5,	5	4,5	2

The ranking is then graphed with Conservation Criterion on the y-axis and the Legal Framework Criterion on the x-axis. The following example demonstrates how the priorities may group into sectors that will serve as the basis for prioritization. Figure 7 shows the distribution of the various recommendations.

Figure 7. Priority Ranking Scheme



Discussion and Further Analysis of the Priorities

Top Priority

Ten recommendations fall within the Top Priority. Four of these can be categorized as bilateral negotiations that are either ongoing or should be initiated. They are the US/Mexico (MexBi) bilateral, the US/Canada bilateral (CanBi), negotiations related to Pelly Certification of Italy and other Mediterranean nations for the use of driftnets (MedDrift), and the initiation of bilateral negotiations (possibly in response to an MMPA Section 101 Pelly petition) with Peru to reduce cetacean bycatch and bring about greater enforcement of its national laws. The Canada, Mexico, and Mediterranean driftnet negotiations all have a lengthy history but joint efforts to take the necessary action to begin to resolve the bycatch problems have been slow. With additional effort substantial progress could be made to reduce cetacean bycatch through these negotiations over the next one to two years. The same is true if the Office of International Affairs initiated discussions with Peru similar to those that it has undertaken with Chile. Peru has both the legal framework and the scientific infrastructure in place to better assess cetacean abundance and bycatch and to control it.

Three recommendations that occur in the Top Priority fall under actions that can be taken to reduce cetacean bycatch under existing multi-lateral agreements and will likely require two to three years of effort to achieve progress. These are: the Northwestern Atlantic Fisheries Organization (NAFO); Western Central Pacific Fisheries Commission (WCPFC); and a subset of the Western Central Pacific tuna/dolphin interactions (WCPTD). NAFO and the WCPFC have

recently adopted resolutions to assess and mitigate sea turtle bycatch in longline and purse seine fisheries. Appendix C provides an example of a resolution that calls upon member nations to estimate cetacean stock abundance and bycatch within their waters and to report the results of their findings back to the Secretariat of that particular agreement. It also calls upon member nations to take action where possible to reduce cetacean bycatch. The purpose of such a resolution is to use existing multilateral fisheries commissions or agreements as a mechanism to gather and share scientific information and to work collaboratively on techniques to reduce cetacean bycatch. In the situation where interactions are either suspected or scantily documented between purse seine fishing vessels fishing for tuna and dolphins, the WCPFC provides the framework to allow the U.S. to investigate the frequency and magnitude of this interaction and to mitigate any potential bycatch.

The final three recommendations will take three to five years to achieve and require either the adoption of new legislation (Legis) or the negotiation of new multilateral agreements specifically focused on cetaceans within a particular geographic region such as the Pacific Ocean Multilateral Agreement (POMA) or the Americas Multilateral Agreement (AMA). The cetacean bycatch legislation referred to here and included in Appendix E has been introduced at least once in the 108th Congress. While many of its mandates calling for international negotiations to reduce cetacean bycatch overlap with existing mandates in both the MMPA and the M-SFCMA, the provisions calling for the development of an international bycatch database are sorely needed and well worth the effort to secure passage of such legislation. This database could ultimately provide the baseline information needed by both the Office of International Affairs and the Office of Protected Resources to improve cetacean conservation and management and to meet the mandates of both the MMPA and the M-SFCMA. Section 108 provides the authority for the Secretary of Commerce to work through the Secretary of State to negotiate multilateral agreements to protect and conserve cetaceans. The areas most in need of such an agreement are the Pacific Ocean and the east and west coasts of Mexico, Central and South America. For these multilaterals, an agreement similar to the Inter-American Convention for the Protection and Conservation of Sea Turtles would provide an appropriate model.[407] One of the many measures called for in the Inter-American Convention is the "reduction, to the greatest extent practicable, of the incidental capture, retention, harm or mortality of sea turtles in the course of fishing activities, through the appropriate regulation of such activities, as well as the development, improvement and use of appropriate gear, devices or techniques, including the use of turtle excluder devices (TEDs)…"[408] An international effort to negotiate this type of agreement would likely take five years to complete and ratify, yet it would provide the framework to assess cetacean abundance and bycatch and would likely have benefits beyond cetacean bycatch reduction including reducing direct harvests and consumption, preventing habitat degradation, and providing a mechanism to address issues

[407] The Inter-American Convention is founded on the concepts of other critical international accords, such as the United Nations Convention on the Law of the Sea, the United Nations Conference on the Environment and Development and the Code of Conduct for Responsible Fisheries, adopted by the Conference of the Food and Agriculture Organization (FAO) of the United Nations in its 28th Session (1995). It complies with the measures established in other international instruments, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora and the World Trade Organization. The Inter-American Convention compliments the Bonn Convention or CMS. All species of sea turtles found in the western hemisphere are listed in both Appendix I and Appendix II of the Bonn Convention, and the text of CMS includes many concepts fundamental to regional conservation of migratory marine animals, such as sea turtles. In the same vein, the Protocol concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (known also as the Cartagena Convention) is totally complementary to the Inter-American Convention.

[408] Article IV(h) of the Inter-American Convention to Protect and Conserve Sea Turtles.

such as climate change and the adverse impacts of anthropogenic sound and contaminants.

Second Tier Priority

The second tier priority—at the top left corner of the graph—includes adoption of a United Nations General Assembly Resolution on cetacean bycatch (UN); workshop for science and technology transfer (WORK); an Indian Ocean Multilateral Agreement (IOMA); modifications to the International Whaling Commission to recognize its competence to manage small cetaceans (IWC); and investigations into West Coast of Africa tuna/dolphin interactions (WATD). While there is potentially great conservation benefit in either modifying the mandate of the IWC or negotiating a new cetacean specific IOMA, the likelihood of success is remote. The current membership composition of the IWC makes such changes unlikely and progress on the issues already identified through the Small Cetacean Subcommittee has been slow. In the Indian Ocean, the U.S. has little capacity or leverage to either spark negotiations for such an agreement (given the geography, it is unlikely that the U.S. would be a party to such an agreement) or to take action against nations like Sri Lanka or India for cetacean bycatch or harvests.

Within the next two to three years the U.S. could make progress in two areas. First, it could take a leadership role to hold a series of regional bycatch workshops, similar to the one held in La Jolla in the early 1990s. These workshops could review the status of cetacean populations and what is known about cetacean bycatch in each participating country. They could also become a forum to discuss the use of existing mitigation measures and testing and development of new technologies to reduce bycatch. This information provides the foundation for actions recommended in association with other bilateral and multilateral negotiations or agreements and mandates under the MMPA and the MS-FCMA. Second, the U.S. could use the framework of both ICCAT and SEAFO to investigate the interaction between tuna purse seine vessels fishing for tuna off the coast of West Africa and whales and dolphins. Allegations and sparse documentation of these interactions have existed for more than twenty years. By placing observers on tuna vessels fishing in these areas through the auspices of the RFMOs, the organizations could help document the occurrence of association of tuna schools with whales and dolphins and the frequency of encirclement and magnitude of any bycatch.

Finally, the Office of International Affairs could work to introduce a measure that calls upon parties to reduce cetacean bycatch as part of the sustainable fisheries resolution. This resolution relates to implementation of the provisions of the United Nations Convention for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks and it recalls and reaffirms the provisions of this agreement and calls upon parties to take specific actions. Although U.N. resolutions are not binding, passage of a measure that includes precise language on cetacean bycatch and requests that parties take a specified course of action (e.g. assess cetacean abundance, estimate bycatch, establish bycatch limits, and mandate bycatch mitigation) might provide impetus to regional fishery management bodies and parties to other regional agreements to carry out efforts described earlier for venues such as NAFO, ICCAT, WCPFC, and SEAFO.

Third Tier Low Priority

These recommendations fall in the bottom two quadrants of the graph and encompass five recommendations. Four of these call for continued work within existing multilateral agreements to elevate the issue of cetacean bycatch. They are: Southeast Atlantic Fisheries Organization (SEAFO); the Caribbean SPAW Protocol (SPAW); the Marine Mammal Action Plan in the Southeast Pacific Ocean (SEPO); and the South Pacific Regional Environment

Program (SPREP). SPAW, SEPO, and SPREP all have some form of marine mammal/cetacean action plan that provides a framework from which to assess cetacean stock abundance and to estimate bycatch. Because these plans encourage technology transfer and scientific exchange they would be fertile ground for the regional workshops previously discussed. And although they ranked lower than the recommendations pertaining to action within the IWC, IOMA, or the UN, they should likely be elevated in priority to the second tier, given the framework that already exists and the natural alignment with the WORK recommendation.

Finally, for the reasons outlined in Chapter 6 and earlier in this chapter related to agreements in the Indian Ocean, efforts to achieve bycatch reduction through the Southwest Indian Ocean Fisheries Organization should be a low priority. The U.S. will have little leverage and a great deal of difficulty in affecting change within this agreement.

Conclusion

Based on the analysis conducted in this chapter, Table 7.2 proposes four categories for priorities and lists the recommendations under each. As part of an overall action plan to reduce cetacean bycatch and comply with the mandates under the MMPA and the M-SFCMA over the next one to three years, it is recommended that the Office of International Affairs focus its efforts on the short term top- and second tier priorities.

Table 7.2 Priority Recommendations
Short Term (1-3 yrs)—Top Priorities--Bilateral Agreements
US/Mexico Bilateral (MexBi)
US/Canada Bilateral (CanBi)
Mediterranean Driftnets (MedDrift)
Peruvian Fisheries Bycatch (Peru)
Workshops for Science and Technology Transfer (WORK)
Short Term (1-3 yrs)—Second Tier Priorities—Multilateral Agreements
Northwestern Atlantic Fisheries Organization (NAFO)
Western Central Pacific Fisheries Commission (WCPFC)
Western Central Pacific--tuna/dolphin interactions (WCPTD)
Southeast Atlantic Fisheries Organization (SEAFO)
West Coast of Africa--tuna/dolphin interactions (WATD)
Plan of Action for Marine Mammals in the Southeast Pacific Ocean (SEPO)
Caribbean SPAW Protocol (SPAW)
South Pacific Regional Environment Program (SPREP)
Long Term (3-5 yrs)—Top Priorities—Multilateral Agreements
Pacific Ocean Multilateral Agreement (POMA)
Americas Multilateral Agreement (AMA)
Bycatch Legislation (Legis)
United Nations General Assembly Resolution (UN)
Low Priority Recommendations
Amend IWC (IWC)
Southwest Indian Ocean Fisheries Commission (SWIOFC)
Indian Ocean Multilateral Agreement (IOMA)

Appendix A. Review of Cetacean Incidental Mortality in International Fisheries

Increasing attention has been paid in the last decade or two to the ways in which fisheries may impact cetacean populations. Most research done recently has addressed the accidental killing of cetaceans in fishing operations, a source of mortality that has given rise to serious concerns about the status of several cetacean populations.[1] More than half of the fifty-seven initiatives recommended in the IUCN—The World Conservation Union's Species Survival Commission Conservation Action Plan for the World's Cetaceans deal with bycatch.[2] Conflicts between cetaceans and commercial fisheries are increasing in frequency and intensity because of increasing human populations and the demand for seafood as a protein source. However our knowledge about the global extent of cetacean bycatch is poor and fragmented and the significance of this bycatch to cetacean populations is lacking in most nations. Species including the baiji and the vaquita, and local populations of humpback dolphins, striped and bottlenose dolphins and the harbor porpoise were singled out as being unlikely to be able to sustain current catch levels. [3]

Conflicts between marine mammals and fisheries were reviewed on a worldwide basis in 1984 and 1991.[4] Subsequently, numerous studies and investigations of marine mammal fishery interactions have been implemented around the world.[5] The purpose of this Appendix is to summarize subsequent publications on this subject, and to demonstrate the overall scale of such conflicts. The International Whaling Commission estimates that kill rates of as low as 2 percent of a cetacean population may not be sustainable, depending on the life history of the species and the age and sex composition of the kill. Likewise the US Congress established as part of the MMPA the potential biological removal level (PBR), which establishes a sustainable bycatch limit for cetaceans at less than 2 percent of a cetacean population.[6] These numbers were used as our benchmarks. Species at risk are those species where the bycatch represents between one and two percent of the population estimate. Species where the bycatch is unsustainable are those where the bycatch exceeds two percent of the population estimate.

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[1] In January 2002 a group of experts on marine mammal bycatch concluded that "incidental capture in fishing operations is the major threat to whales, dolphins, and porpoises worldwide. Several species and many populations will be lost in the next few decades if nothing is done. Urgent national and international action is needed." Read, A.J., and A.A. Rosenberg (convenors). 2002. Draft International Strategy for Reducing Incidental Mortality of Cetacean in Fisheries. http://cetaceanbycatch.org/intlstrategy.cfm.

[2] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A. and Notarbartolo di Sciara, Giuseppe (compilers). (2003).

Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans. IUCN/SSC

Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp

[3] Id. See also. Andrew J. Read, Phebe Drinker, Simon Northridge (2006) Bycatch of Marine Mammals in U.S. and Global Fisheries Conservation Biology 20 (1), 163–169.

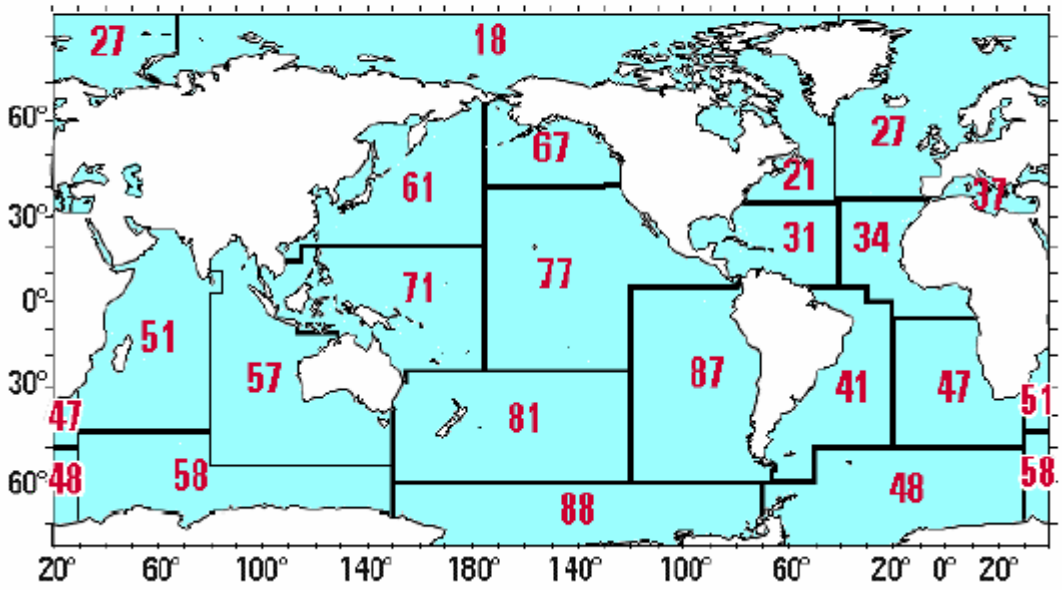
[4] Northridge, S.P., [1991] An updated world review of interactions between marine mammals and fisheries. FAO Fish. Tech. Paper 251 (Suppl 1). 58pp.

[5] Northridge, S.P. and Hofman, R.J. 1999. Marine mammal interactions with fisheries. Pp.99–119 *in: Conservation and Management of Marine Mammals* (eds. J.R. Twiss, Jr. and R.R. Reeves). Smithsonian Institution Press, Washington, DC. See also Read, A.J., and A.A. Rosenberg (convenors). 2002. Draft International Strategy for Reducing Incidental Mortality of Cetacean in Fisheries. http://cetaceanbycatch.org/intlstrategy.cfm.

[6] Wade, P.R. 1998. Calculating limits to the allowable human-caused mortality of cetaceans and pinnipeds. Marine Mammal Science 14:1-37

The interactions are considered on the basis of FAO statistical areas, which are shown on the map below. The use of FAO statistical areas to discuss regional bycatch issues is carried throughout the report. Appendix A presents, in tabular format, for each cetaceans species for which there are documented bycatch records, estimates of species abundance and bycatch, as well as information on the type of fisheries that interact with or accidentally catch that cetacean species. The information in this Appendix provides the foundation for further analysis that are undertaken in Chapters 2 and 5 of this report.

Food and Agriculture Organization (FAO) Statistical Areas



AREA 21 NORTHWEST ATLANTIC

The Northwest Atlantic includes cetaceans within the US EEZ, since the focus of this report is international bycatch, and the assessment and mitigation of bycatch in the United States is governed under the MMPA, the description for this area will focus only on international bycatch of shared cetacean stocks.

Species	***Eubalaena glacialis* Northern right whale**	
Abundance Estimate	300	
Fisheries	Right whales are entangled in cod trap, lobster trap lines, groundfish gillnets, herring weirs. A mother and calf were released from a herring weir in 1976.	
Estimated Annual Mortality	1.2/yr 2000-2004	
Species	***Balaenoptera physalus* Fin whale.**	
Abundance Estimate	2,814 (Georges Bank to mouth of Gulf of St. Lawrence	
Fisheries	Fin whale entangled in lobster trap lines (3), groundfish gillnets (6), a herring weir and a squid trawl (1) since 1976.[7]	
Estimated Annual Mortality	No recent estimates of mortality for fin whales outside the US EEZ are available.	
	Up to 3 fin whales per year have been reported entangled in inshore fishing gear in Newfoundland, of those 5 out of 12 fin whales caught in inshore fishing gear in Newfoundland were dead.[8]	
Species	***Balaenoptera acutorostrata* Minke whale.**	
Abundance Estimate	Canadian East Coast (Georges Bank to the mouth of the Gulf of St. Lawrence)[9]	2,998
	west Greenland	
	central North Atlantic[10]	60,000
	northeastern North Atlantic	120,000
Fisheries	Read reported interactions between minke whales and gillnets in Newfoundland and Labrador, cod traps in Newfoundland, and herring weirs in the Bay of Fundy.[11]	

[7] Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

[8] NOAA (2006) Draft Atlantic Marine Mammal Stock Assessment Report at 28

[9] NOAA (2006) Draft Atlantic Marine Mammal Stock Assessment Report at 28

[10] IUCN Red List

[11] Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int

Estimated Annual Mortality[12]	From 1991 through 1996 scientists observed no minke whales taken in fishing vessels operating in Canadian waters.[13] During 1997 to 2001, there were no confirmed mortalities or serious injuries in Canadian waters as reported by the various, small-scale stranding and observer data collection programs in Atlantic Canada. No additional information is available on Canadian mortalities from 2002 to present. During 1980 to 1990, 15 of 17 minke whales were released alive from herring weirs in the Bay of Fundy. During January 1991 to September 2002, 26 minke whales were trapped in herring weirs in the Bay of Fundy. Of these 26, 1 died and several (number unknown) were released alive and unharmed.[14]
Species	***Megaptera novaeangliae* Humpback whale.**
Abundance Estimate	Barents and Norwegian Sea 889
Fisheries	Reports of collisions with fixed fishing gear set for groundfish around Newfoundland averaged 365 annually from 1979 to 1987 (range 174-813). An average of 50 humpback whale entanglements (range 26-66) was reported annually between 1979 and 1988, and 12 of 66 humpback whales that were entangled in 1988 died.[15] Between 1979 and 1992, Newfoundland and Labrador, cod traps caused the most entanglements and entanglement mortalities--21% of humpbacks. Between 1975 and 1990, gillnets are primarily responsible for 20% of humpback

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Whal. Commn Special Issue 15: 133-147.

[12] Additional, but somewhat dated information indicates that Lien et al (1987) estimated average entanglement rates of around 11 minke whales per year in Newfoundland's inshore fisheries. Between 1979 and 1985 58% of such entanglements were in cod traps and 21% in gillnets (O'Hara et al 1986). Lien et al report that around 75% of such entanglements are mortalities. Read suggests some possible mortality in Gulf of St. Lawrence set gillnet fisheries, and also reports two minke whale deaths in Bay of Fundy herring weirs between 1980 and 1990.

Other Fisheries--Six minke whales were reported entangled during 1989 in the now non-operational groundfish gillnet fishery in Newfoundland and Labrador. One of these animals escaped and was still towing gear, the remaining 5 animals died. Salmon gillnets in Canada, now no longer being used, had taken a few minke whales. In Newfoundland in 1979, one minke whale died in a salmon net. In Newfoundland and Labrador, between 1979 and 1990, it was estimated that 15% of the Canadian minke whale takes were in salmon gillnets. A total of 124 minke whale interactions were documented in cod traps, groundfish gillnets, salmon gillnets, other gillnets and other traps. The salmon gillnet fishery ended in 1993 as a result of an agreement between the fishermen and North Atlantic Salmon Fund (Read 1994). Five minke whales were entrapped and died in Newfoundland cod traps during 1989. The cod trap fishery in Newfoundland closed in 1993 due to the depleted groundfish resources (Read 1994).

[13] Hooker, S.K., R.W. Baird and M.A. Showell. 1997. Cetacean strandings and bycatches in Nova Scotia, Eastern Canada, 1991-1996. Meeting document SC/49/O5 submitted to the 1997 International Whaling Commission meeting in Bournemouth, UK. Hooker *et al.* (1997) summarized bycatch data from a Canadian fisheries observer program that placed observers on all foreign fishing vessels operating in Canadian waters, on between 25% and 40% of large Canadian fishing vessels (greater than 100 feet long), and on approximately 5% of smaller Canadian fishing vessels. During 1991 through 1996, no minke whales were observed taken.

[14] NOAA (2006) at 31

[15] Lein, J. , W. Ledwell, and J. Naven. 1988. Incidental entrapment in inshore fishing gear during 1988: A preliminary report to the Newfoundland and Labrador Department of Fisheries and Ocean, 15 pp.

	entanglements and entanglement mortalities in the Gulf of Maine.[16]	
Estimated Annual Mortality	0.6/yr 2000-2004	
Species	***Stenella coeruleoalba* Striped dolphin**	
Abundance Estimate	Maryland to the Bay of Fundy	52,055 (CV = 0.57)
Fisheries	Gillnet, trap, and trawl fisheries	
Estimated Annual Mortality	In review of Canadian gillnet and trap fisheries, no mortalities were documented.[17] However, Baird reported two records of incidental mortality; in the late 1960's and early 1970's, two mortalities each, were reported in trawl and salmon net fisheries.[18] Between January 1993 and December 1994, 36 Spanish deep-water trawlers, covering 74 fishing trips (4,726 fishing days and 14,211sets), were observed off the Grand Bank. A total of 47 incidental catches were recorded, which included two striped dolphins. The incidental mortality rate for striped dolphins was 0.014/set.[19]	
Species	***Delphinapterus leucas* White whale.**	
Abundance Estimate[20]	North Water (Baffin Bay)	28,000
	West Greenland	2,000
	Cumberland Sound	485
	Frobisher Bay	No info
	Ungava Bay (endangered)	<50
	West Hudson Bay (not at risk)	25,100
	Foxe Basin	1,000
	South Hudson Bay	1,299
	James Bay	3,300
	East Hudson Bay	1,014
	St. Lawrence River (endangered)	1,238

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[16] Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

[17] Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

[18] Baird, R.W., S. K. Hooker, H. Whitehead, and R. Etcheberry. 1997. A Review of records of striped dolphins (*Stenella coeruleoalba*) from Canadian waters. IWC Doc. SC/49/SM4, 10 pp.

[19] Lens, S. 1997. Interactions between marine mammals and deep water trawlers in the NAFO regulatory area. ICES CM 1997/Q:8. 10 pp.

[20] IWC (2000) Report of the Scientific Committee from its Annual Meeting 3-15 May 1999 in Grenada J. Cetacean Res. Manage 2(Suppl).

Fisheries	Entanglement in inshore fisheries in Newfoundland, including entrapments in Gulf of St Lawrence groundfish gillnets, and in Canadian cod traps.[21]
Estimated Annual Mortality	No Mortality Estimates

Species	***Globicephala melaena* Longfinned pilot whale**
Abundance Estimate	Maryland to the Bay of Fundy 15,728[22]
Fisheries	An unknown number of pilot whales have been entangled in Newfoundland, Labrador, and Bay of Fundy groundfish gillnets; Atlantic Canada and Greenland salmon gillnets; and Atlantic Canada cod traps.[23]
Estimated Annual Mortality	Between January 1993 and December 1994, 36 Spanish deep-water trawlers, were observed off the Grand Banks, they incidentally caught 1 long-finned pilot whale for an incidental mortality rate of 0.007 pilot whales /set. From 1991-1996, Canadian fisheries observer data indicated that long-finned pilot whales were bycaught (number of animals in parentheses) in bottom trawl (65); midwater trawl (6); and longline (1) gear. Recorded bycatches by year were: 16 in 1991, 21 in 1992, 14 in 1993, 3 in 1994, 9 in 1995 and 6 in 1996. Pilot whale bycatches occurred in all months except January-March and September. [24]

Species	***Lagenorhynchus acutus* Atlantic white-sided dolphin.**	
Abundance Estimate	Gulf of Maine Stock	51,640 (CV 0.38)[25]
	Gulf of St. Lawrence Stock	11,740 (CV=0.47)
	Labrador Sea Stock	No Abundance Estimate
Fisheries	White-sided dolphins were entangled in gillnet fisheries, longlines, herring weirs and trawls	
Estimated Annual Mortality	There is little information available that quantifies fishery interactions involving white-sided dolphins in Canadian waters. Two white-sided dolphins were reported caught in groundfish gillnet sets in the Bay of Fundy during 1985 to 1989, and 9 were reported caught in West Greenland between 1964 and 1966 in the now non-operational salmon drift nets. Several (number not specified) were also caught during the 1960's in the now non-operational Newfoundland and Labrador groundfish gillnets. From 1965 to 1982, a few (number not specified) were caught in	

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[21] Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

[22] Current estimate includes short-finned pilot whales as the two species cannot be differentiated during surveys.

[23] Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

[24] Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

[25] NOAA (2006) at 85

an experimental drift gillnet fishery for salmon off West Greenland.[26]

From 1991 through 1996, an estimated 6 white-sided dolphins were observed entangled. One animal was from a longline trip south of the Grand Banks in November 1996 and the other 5 were captured in the bottom trawl fishery off Nova Scotia in the Atlantic Ocean; 1 in July 1991, 1 in April 1992, 1 in May 1992, 1 in April 1993, 1 in June 1993 and 0 in 1994 to 1996.[27]

Canada is working on an estimation of small cetacean bycatch for Newfoundland fisheries using data collected during 2001 to 2003. White-sided dolphins were reported to have been caught in the Newfoundland nearshore gillnet fishery and offshore monkfish/skate gillnet fisheries.

One animal was caught but released alive in a herring weir.

Species	***Phocoena phocoena* Harbour porpoise.**	
Abundance Estimate	Gulf of Maine/Bay of Fundy Stock	89,700 (CV = 0.22)[28]
	Gulf of St. Lawrence Stock	21,700 (CV=0.38)[29]
	Newfoundland and Greenland	No Abundance Estimate
Fisheries	Gulf of Maine/Bay of Fundy harbor porpoise entanglements have been in the Canadian Bay of Fundy groundfish sink gillnet and herring weir fisheries	
Estimated Annual Mortality	In Canada, the total average annual mortality between 2000 -2004 is 55 animals. The average annual mortality in the Canadian groundfish sink gillnet fishery (2000 – 2004) is 51 harbor porpoise The average annual mortality in the Canadian Herring Weir fishery (2000 – 2004) is 4.4 harbor porpoise.[30]	

Bay of Fundy Sink Gillnet

During the 1980's, Canadian harbor porpoise bycatch in the Bay of Fundy sink gillnet fishery, was estimated at 94-116 in 1986 and 130 in 1989.[31] In 1993, an observer program provided a total bycatch estimate of 424 harbor porpoises (± 1 SE: 200-648) from 62 observed trips, (approximately 11.3% coverage of the Bay of Fundy trips); and in 1994, the bycatch estimate was 101 harbor porpoises (95% confidence limit: 80-122), from 171 observed trips (covering 49% of the gillnet trips).[32]

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[26] Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

[27] NOAA (2006) at 89

[28] NOAA (2006) at 111

[29] NOAA (2006) at 111

[30] NOAA (2006) at 111

[31] Trippel, E. A., J. Y. Wang, M. B. Strong, L. S. Carter, and J. D. Conway. 1996. Incidental mortality of harbour porpoise (*Phocoena phocoena*) by the gillnet fishery in the lower Bay of Fundy. Can. J. Fish. Aquat. Sci. 53:1294-1300.

32 Trippel, E. A., J. Y. Wang, M. B. Strong, L. S. Carter, and J. D. Conway. 1996. Incidental mortality of harbour porpoise (Phocoena phocoena) by the gillnet fishery in the lower Bay of Fundy. Can. J. Fish. Aquat. Sci.53:1294-1300.

During 1995, due to groundfish quotas being exceeded, the gillnet fishery was closed from July 21 to August 31. During the open fishing period of 1995, 89% of the trips were observed, approximately 30% of observed trips used pingered nets, and the estimated bycatch was 87 harbor porpoises.[33] During 1996, the Canadian gillnet fishery was closed during July 20-31 and August 16-31 due to groundfish quotas and the estimated bycatch was 20 harbor porpoises.[34] Trippel estimated that during 1996, gillnets equipped with acoustic alarms reduced harbor porpoise bycatch rates by 68% over nets without alarms.[35] During 1997, groundfish quotas again closed the fishery during portions of July and August, and a harbor porpoise time-area closure was implemented in September in the Swallowtail area- the estimated bycatch was 43 animals.[36] Again, in 1997, Trippel estimated that gillnets equipped with acoustic alarms reduced harbor porpoise bycatch rates by 85% over nets without alarms in the Swallowtail area of the lower Bay of Fundy.[37] For the years 1998-2001, the estimated annual mortality was 38 for 1998, 32 for 1999, 28 for 2000, and 73 for 2001.[38] Estimates of variance are not available. From 2002 to 2004 there is no bycatch estimate due to a lack of an observer program.

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33 Trippel, E. A., J. Y. Wang, M. B. Strong, L. S. Carter, and J. D. Conway. 1996. Incidental mortality of harbour porpoise (Phocoena phocoena) by the gillnet fishery in the lower Bay of Fundy. Can. J. Fish. Aquat. Sci 53:1294 1300.

34 Trippel, E. A., M. B. Strong, J. M. Terhune, and J. D. Conway. 1999. Mitigation of harbour porpoise (Phocoena phocoena) bycatch in the gillnet fishery in the lower Bay of Fundy. Can. J. Fish. Aquat. Sci. 56:113-123.

35 Trippel, E. A., M. B. Strong, J. M. Terhune, and J. D. Conway. 1999. Mitigation of harbour porpoise (Phocoena phocoena) bycatch in the gillnet fishery in the lower Bay of Fundy. Can. J. Fish. Aquat. Sci. 56:113-123.

36 DFO [Department of Fisheries and Oceans]. 1998. Harbour porpoise bycatch in the lower Bay of Fundy gillnet fishery. DFO Maritimes Regional Fisheries Status Report 98/7E. [Available from Department of Fisheries and Oceans, Resource management Branch, P.O. Box 550, Halifax, NS B3J 2S7, Canada.]

37 Trippel, E. A., M. B. Strong, J. M. Terhune, and J. D. Conway. 1999. Mitigation of harbour porpoise (Phocoena phocoena) bycatch in the gillnet fishery in the lower Bay of Fundy. Can. J. Fish. Aquat. Sci. 56:113-123.

38 Trippel, E.A., and Shepherd, T.D. 2004. By-Catch of Harbour Porpoise (Phocoena phocoena) in the Lower Bay of Fundy Gillnet Fishery from 1998-2001. DFO Res. Doc. 2004/2521.

39 Smith, G.J.D., A.J. Read, and D.E. Gaskin. 1983. Incidental catch of harbor porpoises, (*Phocoena phocoena*) in herring weirs in Charlotte County, New Brunswick, Canada. Fish Bull., U.S. 81(3):660-2

40 Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

41 Neimanis, A.S., H.N. Koopman, A.J. Westgate, L.D. Murison and A.J. Read. 2004. Entrapment of harbour porpoises (Phocoena phocoena) in herring weirs in the Bay of Fundy, Canada. J.Cet. Res. Manag. 6(1):7-17.

42 Neimanis, A.S., H.N. Koopman, A.J. Westgate, L.D. Murison and A.J. Read. 2004. Entrapment of harbour porpoises (Phocoena phocoena) in herring weirs in the Bay of Fundy, Canada. J.Cet. Res. Manag. 6(1):7-17.

43 Neimanis, A.S., H.N. Koopman, A.J. Westgate, L.D. Murison and A.J. Read. 2004. Entrapment of harbour porpoises (Phocoena phocoena) in herring weirs in the Bay of Fundy, Canada. J.Cet. Res. Manag. 6(1):7-17.

44 Lesage, V., J. Keays, S. Turgeon, and S. Hurtubise. 2003. Incidental mortality of harbour porpoises in the gillnet fishery of the Estuary and Gulf of St. Lawrence in 2000-2002. Canadian Science Advisory Secretariat. Research Document 2003/069. Available at http://www.dfo-mpo.gc.ca/csas/

45 Lesage, V., J. Keays, S. Turgeon, and S. Hurtubise. 2003. Incidental mortality of harbour porpoises in the gillnet fishery of the Estuary and Gulf of St. Lawrence in 2000-2002. Canadian Science Advisory Secretariat. Research Document 2003/069. Available at http://www.dfo-mpo.gc.ca/csas/

Herring Weirs

Harbor porpoises are caught in Canadian herring weirs, but there have been no recent efforts to observe bycatch. In the 1980's, approximately 70 harbor porpoises became trapped annually and, on average, 27 died each year.[39] In 1990, at least 43 harbor porpoises were trapped in Bay of Fundy weirs.[40] In 1993, a cooperative program between fishermen and Canadian biologists was initiated; as a result, between 1992 and 1994, 206 of 263 harbor porpoises caught in herring weirs were released alive.[41] Mortalities (and releases) were 11 (and 50) in 1992, 33 (and 113) in 1993, and 13 (and 43) in 1994.[42] Since that time, an additional 682 harbor porpoises have been documented in Canadian herring weirs, of which 637 were released or escaped, 36 died, and 9 had an unknown status. Mortalities (and releases and unknowns) were 5 (and 60) in 1995; 2 (and 4) in 1996; 2 (and 24) in 1997; 2 (and 26) in 1998; 3 (and 89) in 1999; 0 (and 13) in 2000, 14 (and 296) in 2001, 3 (and 46 and 4) in 2002, and 1 (and 26 and 3) in 2003, and 4 (and 53 and 2).[43]

Gulf of St. Lawrence gillnet

This fishery interacts with the Gulf of St. Lawrence harbor porpoise stock, not the Gulf of Maine/Bay of Fundy harbor porpoise stock. Using questionnaires to fishermen, scientists determined a total of 2,180 (95% CI 1012-3802) and 2,478 (95% CI 1591-3464) harbor porpoises were entangled in 2000 and 2001, respectively.[44] The largest takes were in July and August around Miscou and the North Shore of the Gulf of St. Lawrence. An at-sea observer program, conducted during 2001 and 2002, concluded that resulting bycatch estimates were unreliable, due to low observer coverage that was not representative of the fishing effort.[45]

Newfoundland gillnet

This fishery interacts with the Newfoundland harbor porpoise stock, not the Gulf of Maine/Bay of Fundy harbor porpoise stock. Estimates of incidental catch of harbor porpoises are currently being calculated for 2001- 2003 for the Newfoundland nearshore cod and Greenland halibut fisheries, and the Newfoundland offshore fisheries in lumpfish, herring, white hake, monkfish and skate.

AREA 27 NORTHEAST ATLANTIC

There are very few recent comprehensive studies on cetacean abundance or population sizes in this area. The most recent abundance estimates are provided in the tables below. Note that the estimate of cetacean abundance in a specified survey region is not equivalent to an estimate of population size, as biological populations may extend over wider areas, or conversely may be contained within a sub-area of the survey region. Very little is actually known about stock structure in this region. Since abundance estimates are usually snapshots of animal density and abundance over a short period of time, the actual density or abundance of these highly migratory cetaceans within a survey region may vary considerably either seasonally or inter-annually if those animals range outside the survey area. For animals with seasonal migrations, an estimate of abundance in one part of the range should not be used as an indication of abundance throughout the year.

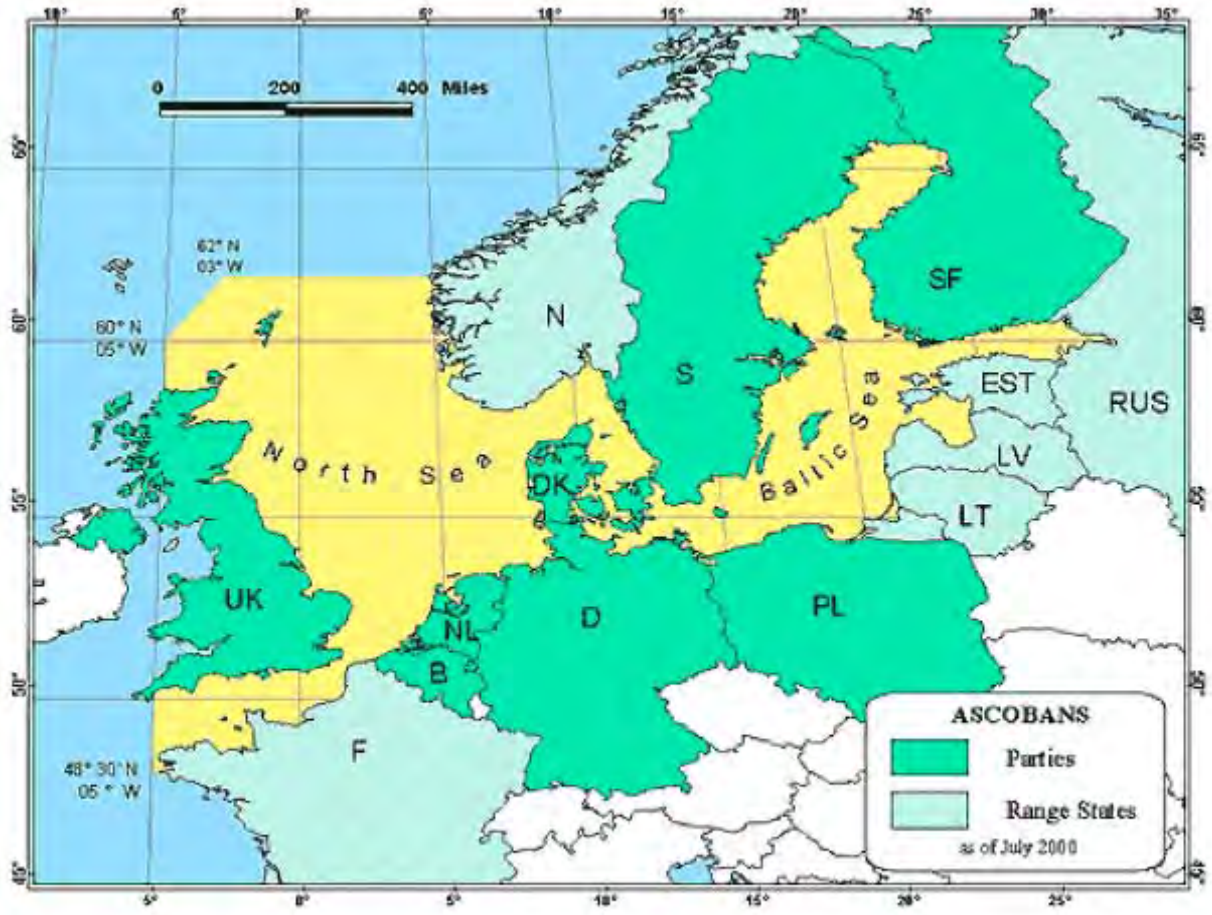

Fig. 1 – Area currently covered by the ASCOBANS agreement and ASCOBANS Parties and Range States

Species	***Phocoena phocoena*** **Harbor porpoise.**		Fisheries	Mortality Est./% Take
Abundance Estimate[46]	Northern and Central North Sea	61,335	Danish, UK gillnet fisheries for various species	2,700[47]/4.1%
	Kattegat and Oeresund	36,046 (20,276-64,083)	German, Danish, Swedish gillnet fisheries	83[48]/ .2%

46 Hammond PS, Berggren P, Benke H, Borchers DL, Collet A, Heide-Jorgensen MP, Heimlich S, Hiby AR, Leopold MF, Oien N, 2002. Abundance of harbour porpoise and other cetaceans in the North Sea and adjacent waters. Journal of Applied Ecology 39:361-376.

47 Harwood J, Andersen LW, Berggren P, Carlström J, Kinze CC, McGlade J, Metuzals K, Larsen F, Lockyer CH, Northridge SP, Rogan E, Vinther M, Walton M, 1999. Assessment and reduction of the bycatch of small cetaceans in European waters (BY-CARE) - Executive summary. Report to the European Commission on contract CT05-0523, St. Andrews, Scotland, NERC Sea Mammal Research Unit.

48 Not all included bycatch estimates are based on independent observer schemes. Kaschner K, 2001. Harbour porpoises in the North Sea and Baltic - bycatch and current status. Report for the Umweltstiftung WWF - Deutschland; 82.

Skagerrak	4,738	Swedish gillnet fisheries for cod & Pollock	114[49]/2.4%
Kattegat	4,009	Swedish gillnet fisheries for cod & pollock	50[50]/1.2%
Kiel & Mecklenburg Bight	588 (240-1,430)	Included in Kattegat & Oeresund estimate above	
Southwestern Baltic proper	599 (200-3,300)	Danish, Finish, Polish & Swedish drift & bottom-set gillnet fisheries	13[51]/2.1%
Northern North Sea	98,564 (66,679-145,697)	(north of 56°N) Danish, UK gillnet fisheries for various species	5,000[52]/5%
Southern & Central North Sea	169,888 (124,121-232,530)	Danish, Swedish, UK, Belgian, Dutch, German gillnet fisheries for various species	7,493[53]/4.3%
Celtic Sea	36,280 (12, 828-102,604)	Irish gillnet fishery for hake (14- 22m vessels), UK gillnet fishery for hake (> 15 m vessels)	2,200[54]/6.2%

49 Abundance estimate derived using SCANS density estimates, scale-downed to Swedish EEZ Harwood J, Andersen LW, Berggren P, Carlström J, Kinze CC, McGlade J, Metuzals K, Larsen F, Lockyer CH, Northridge SP, Rogan E, Vinther M, Walton M, 1999. Assessment and reduction of the bycatch of small cetaceans in European waters (BY-CARE) - Executive summary.

Report to the European Commission on contract CT05-0523, St. Andrews, Scotland, NERC Sea Mammal Research Unit. See also: CEC, 2002a. Incidental catches of small cetaceans. Report of the meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC(2002) 376, Brussels, BL, Commission of the European Communities; 83.

50 Abundance estimate derived using SCANS density estimates, scale-downed to Swedish EEZ Harwood J, Andersen LW, Berggren P, Carlström J, Kinze CC, McGlade J, Metuzals K, Larsen F, Lockyer CH, Northridge SP, Rogan E, Vinther M, Walton M, 1999. Assessment and reduction of the bycatch of small cetaceans in European waters (BY-CARE) - Executive summary. Report to the European Commission on contract CT05-0523, St. Andrews, Scotland, NERC Sea Mammal Research Unit. See also: CEC, 2002a. Incidental catches of small cetaceans. Report of the meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC(2002) 376, Brussels, BL, Commission of the European Communities; 83

51 Not all included bycatch estimates are based on independent observer schemes. Kaschner K, 2001. Harbour porpoises in the North Sea and Baltic - bycatch and current status. Report for the Umweltstiftung WWF - Deutschland; 82.

52 Mean Annual Estimated Take between 1987-2001. Harwood J, Andersen LW, Berggren P, Carlström J, Kinze CC, McGlade J, Metuzals K, Larsen F, Lockyer CH, Northridge SP, Rogan E, Vinther M, Walton M, 1999. Assessment and reduction of the bycatch of small cetaceans in European waters (BY-CARE) - Executive summary. Report to the European Commission on contract CT05-0523, St. Andrews, Scotland, NERC Sea Mammal Research Unit.

53 Not all included bycatch estimates are based on independent observer schemes. Kaschner K, 2001. Harbour porpoises in the North Sea and Baltic - bycatch and current status. Report for the Umweltstiftung WWF - Deutschland; 82.

54 Bycatch mortalities do not include other set net fisheries or other fisheries in the same area. UK & Irish fishing effort decreased in recent years, CEC, 2002a. Incidental catches of small cetaceans. Report of the meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC(2002) 376, Brussels, BL, Commission of the European Communities; 83.

North Sea	268,800	Danish gillnets for cod, turbot, hake	2,971[55]	1.3%
		UK gillnets for cod, skate, turbot, sole	436	

Species	***Lagenorhynchus acutus* Atlantic white-sided dolphin**	
Abundance Estimate[56]	Celtic Shelf[57]	833 (159- 4,360)
	Central North Sea[58]	9,242 5,344-15,981)
	Northern North Sea[59]	1,685 (690 – 4,113)
	Northern North Sea	74,626 (35,000–160,000)
	West of Ireland	490 (1,134–10,015)
Fisheries	White-side dolphins are susceptible to capture in mid-water trawl fisheries.	
Estimated Annual Mortality	In 1996 and 1998 respectively, the Irish driftnet fishery for albacore caught 2 and 15 white-sided dolphins.[60]	
	Approximately 196 (5 – 493) white-sided dolphins have been caught in pelagic trawl fisheries for horse mackerel and mackerel southwest of Ireland.[61] Small numbers have been taken by Spain in the deep water trawl fishery for Greenland halibut.	
	In 1999, bycatch in the Irish experimental pelagic pair trawl fishery for albacore off western Ireland and the southern Bay of Biscay resulted in the capture of two Atlantic white-sided dolphins.[62]	

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55 CEC, 2002a. Incidental catches of small cetaceans. Report of the meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC(2002) 376, Brussels, BL, Commission of the European Communities; 83. Impact based on combined current bycatch estimates of all Danish and most UK gillnet fisheries, does not include Norwegian, Dutch, Belgian, German and other UK fleets and is therefore likely an underestimate.

56 Hammond PS, Berggren P, Benke H, Borchers DL, Collet A, Heide-Jorgensen MP, Heimlich S, Hiby AR, Leopold MF, Oien N, 2002. Abundance of harbor porpoise and other cetaceans in the North Sea and adjacent waters. Journal of Applied Ecology 39:361-376. See also: MacLeod K, 2001. The spatial and temporal distribution of cetaceans off the west coast of Scotland in relation to environmental factors: implication for marine management (Ph.D.). London: University of Greenwich.

57 Estimate is for white-sided and white-beaked dolphins

58 Estimate is for white-sided and white-beaked dolphins

59 Estimate is for white-sided and white-beaked dolphins

60 Lesage, V., J. Keays, S. Turgeon, and S. Hurtubise. 2003. Incidental mortality of harbour porpoises in the gillnet fishery of the Estuary and Gulf of St. Lawrence in 2000-2002. Canadian Science Advisory Secretariat. Research Document 2003/069. Available at http://www.dfo-mpo.gc.ca/csas/

61 Lesage, V., J. Keays, S. Turgeon, and S. Hurtubise. 2003. Incidental mortality of harbour porpoises in the gillnet fishery of the Estuary and Gulf of St. Lawrence in 2000-2002. Canadian Science Advisory Secretariat. Research Document 2003/069. Available at http://www.dfo-mpo.gc.ca/csas/

62 BIM. 2000. Diversification trials with alternative tuna fishing techniques including the use of remote sensing technology. Final report of EU Contract 98/010, Bord Iascaigh Mhara (BIM), Dun Laoghaire, Ireland.

Species	***Tursiops truncatus* Bottlenose dolphin.**	
Abundance Estimate	Moray Firth[63]	129 (110- 174)
	Brittany[64]	30
	Mont St. Michel [65]	6
	Arachon[66]	60
	French Coast[67]	250-300
	Cornwall[68]	15
	Dorset[69]	5
	Cardigan Bay[70]	135 (85-214)
	Shannon Estuary[71]	113 (94-161)
	Dingle Bay[72]	12
Fisheries	Bottlenose dolphins have been reported caught in gillnets in the south of England in very small numbers, some mortality in Irish driftnet fisheries, and occasional captures in French fisheries.	
Estimated Annual Mortality	In 1996 and 1998 respectively, the Irish driftnet fishery for albacore caught 6 and 45 bottlenose dolphins.[73]	
	From 2000 to 2003, French reported between 9 – 10 bottlenose dolphins	

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63 Wilson B, Hammond PS, Thompson PM, 1999. Estimating size and assessing trends in a coastal bottlenose dolphin population. Ecological Applications 9:288-300.

64 ICES, 1996. Report of the Study Group on Seals and Cetaceans in European Seas (CM 1996/N:01). ICES; 27.

65 ICES, 1996. Report of the Study Group on Seals and Cetaceans in European Seas (CM 1996/N:01). ICES; 27.

66 ICES, 1996. Report of the Study Group on Seals and Cetaceans in European Seas (CM 1996/N:01). ICES; 27.

67 ICES, 2002. Report of the Working Group on Marine Mammal Population Dynamics and Habitat (CM 2002/ACE:02). ICES; 27.

68 ICES, 1996. Report of the Study Group on Seals and Cetaceans in European Seas (CM 1996/N:01). ICES; 27.

69 White R, Webb A, 1995. Coastal birds and marine mammals of mid Dorest. Peterborough, UK, Joint Nature Conservation Committee; 48.

70 Baines ME, Reichelt M, Evans PGH, Shepherd B, 2002. Comparison of the abundance and distribution of harbor porpoise (*Phocoena phocoena*) and bottlenose dophins (*Tursiops truncatus*) in Cardigan Bay, UK (Abstract). Liege, Belgium, ECS.

71 Ingram SN, 2000. The ecology and conservation of bottlenose dolphins in the Shannon estuary (Ph.D.). Cork, Ireland: University College.

72 ICES, 1996. Report of the Study Group on Seals and Cetaceans in European Seas (CM 1996/N:01). ICES; 27.

73 Harwood, J., Andersen, L.W., Berggren, P., Carlström, J., Kinze, C.C., McGlade, J., Metuzals, K., Larsen, F., Lockyer, C.H., Northridge, S., Rogan, E., Walton, M., Vinther, M., 1999. Assessment and reduction of the by-catch of small cetaceans (BY-CARE). Final report to the European Commission on FAIR-CT05-0523.

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	incidentally caught in French fisheries in the Atlantic[74]	
	From 2000 to 2003, Spain reported between 2 – 8 bottlenose dolphins incidentally caught in Spanish fisheries in the Atlantic[75]	
Species	***Delphinus delphis* Common dolphin.**	
Abundance Estimate	Celtic Sea[76]	75,449 (22,900 - 284,900)
	Bay of Biscay[77]	61,888 (35,461 - 108,010)
	Celtic Sea & Western Waters[78]	101,205 (55125 – 185802)
Fisheries	Common dolphins are caught in Irish salmon driftnets, mackerel purse seines in the southwest of Britain, English midwater trawl research cruises in the Channel, and unidentified type of trawl in the Channel. There is a considerable accidental catch of small cetaceans in the English bottom set net fishery off the southwest coast of England. Catches of common dolphins in various French fisheries continue, and large numbers of animals with evidence of entanglement have washed up on French Atlantic coasts in the past few years. There is also a large French gillnet fishery in this area operating along similar lines to the English one, as well as several trawl fisheries.	
Estimated Annual Mortality[79]	Dutch horse mackerel	101 (4-214)
	French hake	203 (4-529)
	French tuna	95 (3-287)
	French bass	25 (1-83)
	French tuna driftnet	415 (265 – 564)
	UK tuna driftnet	61 (16 – 106)
	Celtic Sea hake gillnet	200 (4 – 500)

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[76] Hammond PS, Berggren P, Benke H, Borchers DL, Collet A, Heide-Jorgensen MP, Heimlich S, Hiby AR, Leopold MF, Oien N, 2002. Abundance of harbour porpoise and other cetaceans in the North Sea and adjacent waters. Journal of Applied Ecology 39:361-376. See also: MacLeod K, 2001. The spatial and temporal distribution of cetaceans off the west coast of Scotland in relation to environmental fators: implication for marine management (Ph.D.). London: University of Greenwich.

[77] Goujon M, 1996. Captures accidentelles du filet maillant dérivant et dynamique des populations dedauphins au large du Golfe de Gascogne. Rennes Cedex, France: Ecole Nationales Superieure Agronomique de Rennes. See also: Goujon M, Antoine L, Collet A, Fifas S, 1993. Approche de l'impact écologique de la pecherie thonière au filet maillant dérivant en Atlantique nord-est. RI.DRV-93034, IFREMER; 47.

[78] Rogan E, 1999. Relationship between bycatch in the Irish drift-net fishery for albacore, dolphin population size and operational features - Chapter 5. In: Assessment and reduction of the bycatch of small cetaceans in European waters (BY-CARE) (Harwood J, Andersen LW, Berggren P, Carlström J, Kinze CC, McGlade J, Metuzals K, Larsen F, Lockyer CH, Northridge SP, Rogan E, Vinther M, Walton M, eds). St. Andrews, Scotland: NERC Sea Mammal Research Unit.

[79] Tregenza, NJC and Collet, A. 1998. Common dolphin *Delphinus delphis* bycatch in pelagic trawl and other fisheries in the North East Atlantic. *Report of the International Whaling Commission* 48: 453-459

The French driftnet fishery for albacore in the northeast Atlantic in the early 1990s caught between 420– 460 dolphins, apparently both white-sided and striped dolphins (1992, 410 (325-495); 1993, 419 (266-572)).

On the North coast of Spain, 7 common dolphins were caught in fishing gear between 1977 and 1987 and 11 common dolphins were caught in fishing nets in Portugal in 1980. Common dolphins are frequently caught in coastal Portuguese fisheries: 47% of those reported were from gillnet fisheries.

In 1996 and 1998 respectively, the Irish driftnet fishery for albacore caught 356 and 2,522 common dolphins.[80]

In 1999, bycatch in the Irish experimental pelagic pair trawl fishery for albacore off western Ireland and the southern Bay of Biscay resulted in the capture of 127 common dolphins.[81]

From 1999-2001, bycatch in the pelagic trawl fisheries for mackerel, herring, bass, sprats, pilchards, blue whiting, and anchovy was 53 common dolphins—all of which were in the bass fishery in the Channel.

From 2000 to 2003, French reported from 41 – 218 common dolphins incidentally caught in French fisheries in the Atlantic.[82]

From 2000 to 2003, Ireland reported from 1 – 16 common dolphins incidentally caught in Irish trawl fisheries in the Atlantic.[83]

From 2000 to 2003, Spain reported from 3 – 77 common dolphins incidentally caught in Spanish fisheries in the Atlantic.[84]

From 2000 to 2003, the United Kingdom reported between 12 – 72 common dolphins incidentally caught in UK trawl fisheries in the Atlantic.[85]

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[80] Harwood, J., Andersen, L.W., Berggren, P., Carlström, J., Kinze, C.C., McGlade, J., Metuzals, K., Larsen, F., Lockyer, C.H., Northridge, S., Rogan, E., Walton, M., Vinther, M., 1999. Assessment and reduction of the by-catch of small cetaceans (BY-CARE). Final report to the European Commission on FAIR-CT05-0523.

[81] BIM. 2000. Diversification trials with alternative tuna fishing techniques including the use of remote sensing technology. Final report of EU Contract 98/010, Bord Iascaigh Mhara (BIM), Dun Laoghaire, Ireland.

[82] Annex L. Report of the Sub-Committee on Small Cetaceans. 2004

[83] Annex L. Report of the Sub-Committee on Small Cetaceans. 2004

[84] Annex L. Report of the Sub-Committee on Small Cetaceans. 2004

[85] Annex L. Report of the Sub-Committee on Small Cetaceans. 2004

Species	***Stenella coeruleoalba* Striped dolphin**	
Abundance Estimate	Bay of Biscay[86]	73,843 (36,113–150,990)
	Celtic Sea & Western Waters[87]	66,824 (37,583 - 118,813)
Fisheries	Striped dolphins are recorded “sporadically” in fishing gear in northern Spain, and in French and Portuguese Atlantic fisheries.	
Estimated Annual Mortality	Estimates of catches in the French albacore driftnet fishery for 1992/3 were 1,172 striped dolphins.[88] In 1992, the fishery caught 1,193 (946-1440) striped dolphins and in 1993, it killed 1,152 (732-1572) dolphins.[89]	
	In 1995, the UK driftnet fishery for albacore caught 104 striped dolphins (38 – 169).[90]	
	In 1996 and 1998 respectively, the Irish driftnet fishery for albacore caught 136 and 964 striped dolphins.[91]	
	In 1999, bycatch in the Irish experimental pelagic pair trawl fishery for albacore off western Ireland and the southern Bay of Biscay resulted in the capture of eight Striped dolphins.[92]	
	From 2000 to 2003, French incidentally caught between 9 – 16 striped dolphins in French fisheries in the Atlantic[93]	

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86 Goujon M, Antoine L, Collet A, Fifas S, 1993. Approche de l'impact écologique de la pecherie thonière au filet maillant dérivant en Atlantique nord-est. RI.DRV-93034, IFREMER; 47.

87 Rogan E, 1999. Relationship between bycatch in the Irish drift-net fishery for albacore, dolphin population size and operational features - Chapter 5. In: Assessment and reduction of the bycatch of small cetaceans in European waters (BY-CARE) (Harwood J, Andersen LW, Berggren P, Carlström J, Kinze CC, McGlade J, Metuzals K, Larsen F, Lockyer CH, Northridge SP, Rogan E, Vinther M, Walton M, eds). St. Andrews, Scotland: NERC Sea Mammal Research Unit.

88 Tregenza, NJC and Collet, A. 1998. Common dolphin *Delphinus delphis* bycatch in pelagic trawl and other fisheries in the North East Atlantic. *Report of the International Whaling Commission* **48**: 453-459 See also: Goujon M, Antoine L, Collet A, Fifas S, 1993. Approche de l'impact écologique de la pecherie thonière au filet maillant dérivant en Atlantique nord-est. RI.DRV-93034, IFREMER; 47.

89 Goujon estimates that the French driftnet fishery for tuna caught 1,722 (1365-2079) common, striped and bottlenose dolphins, and long-finned pilot whales in 1992; and 1,654 (1115-2393) common, striped and bottlenose dolphins, and long-finned pilot whales in 1993. Goujon M, Antoine L, Collet A, Fifas S, 1993. Approche de l'impact écologique de la pecherie thonière au filet maillant dérivant en Atlantique nord-est. RI.DRV-93034, IFREMER; 47.

90 Tregenza, NJC and Collet, A. 1998. Common dolphin *Delphinus delphis* bycatch in pelagic trawl and other fisheries in the North East Atlantic. *Report of the International Whaling Commission* **48**: 453-459

91 Harwood, J., Andersen, L.W., Berggren, P., Carlström, J., Kinze, C.C., McGlade, J., Metuzals, K., Larsen,

F., Lockyer, C.H., Northridge, S., Rogan, E., Walton, M., Vinther, M., 1999. Assessment and reduction of the by-catch of small cetaceans (BY-CARE). Final report to the European Commission on FAIR-CT05-0523.

92 BIM. 2000. Diversification trials with alternative tuna fishing techniques including the use of remote sensing technology. Final report of EU Contract 98/010, Bord Iascaigh Mhara (BIM), Dun Laoghaire, Ireland.

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Species	***Globicephala melaena* Long-finned pilot whale.**	
Abundance Estimate[94]	East Greenland, Iceland, Jan Mayen, Faroe Islands, & Western Coast of the British Islands	778,000
	Bay of Biscay	80,867
	East of 15°W	12,235 (3,924–38,148)
	West of 15°W	128,080 (45,241–362,640)
Fisheries	Pilot whales are commonly killed in gillnet, purse seines, trawl, and longline fisheries	
Estimated Annual Mortality	An estimated 50-100 pilot whales are killed in gillnets off the coast of France[95] One was reported drowned in a lobster creel line in Orkney in 1984, 1 in a purse seine off Scotland in 1986, three were reported in set gillnets off Cornwall (2 released alive), and there have been further unconfirmed reports of captures in purse seines off Cornwall and even a possible record of one in a demersal trawl in the same area.[96]	
	In 1996 and 1998 respectively, the Irish driftnet fishery for albacore caught 8 and 59 pilot whales.[97]	
	In 1999, bycatch in the Irish experimental pelagic pair trawl fishery for albacore off western Ireland and the southern Bay of Biscay resulted in the capture of eight long-finned pilot whales.[98]	
	From 2000 to 2003, French report between 1 – 2 pilot whales incidentally caught each year in French fisheries in the Atlantic.[99]	

Species	***Lagenorhynchus albirostris* White-beaked dolphin**	
Abundance Estimate[100]	North Sea	7,856

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94 Buckland ST, Cattanach KL, Hobbs RC, 1993b. Abundance estimates of Pacific white-sided dolphin, Northern right whale dolphin, Dall's porpoise and Northern fur seal in the North Pacific, 1987-1990. International North Pacific Fisheries Commission Bulletin:387-407.

95 International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15

96 Northridge, S.P., and P.S. Hammond, 1999. Estimation of porpoise mortality in UK gill and tangle net fisheries in the North Sea and west of Scotland. Paper presented to the Scientific Committee of the International Whaling Commission, Grenada, May 1999. SC/51/SM42.

97 Harwood, J., Andersen, L.W., Berggren, P., Carlström, J., Kinze, C.C., McGlade, J., Metuzals, K., Larsen,

F., Lockyer, C.H., Northridge, S., Rogan, E., Walton, M., Vinther, M., 1999. Assessment and reduction of the by-catch of small cetaceans (BY-CARE). Final report to the European Commission on FAIR-CT05-0523.

98 BIM. 2000. Diversification trials with alternative tuna fishing techniques including the use of remote sensing technology. Final report of EU Contract 98/010, Bord Iascaigh Mhara (BIM), Dun Laoghaire, Ireland.

99 Annex L. Report of the Sub-Committee on Small Cetaceans. 2004

100 Øien N, 1993. Abundance of killer whales (Orcinus orca) in waters off Norway. Reykjavik, Iceland, (unpublished).

Fisheries	White-beaked dolphins are caught in mid-water herring trawls and salmon driftnet fisheries
Estimated Annual Mortality	There is an unknown mortality of white-beaked dolphins off the Yorkshire coast (northeast England) every summer when Dutch midwater herring trawlers operate in that region.[101] There are also unconfirmed reports that this species is caught in Irish salmon driftnet fisheries.

AREA 31 WESTERN CENTRAL ATLANTIC

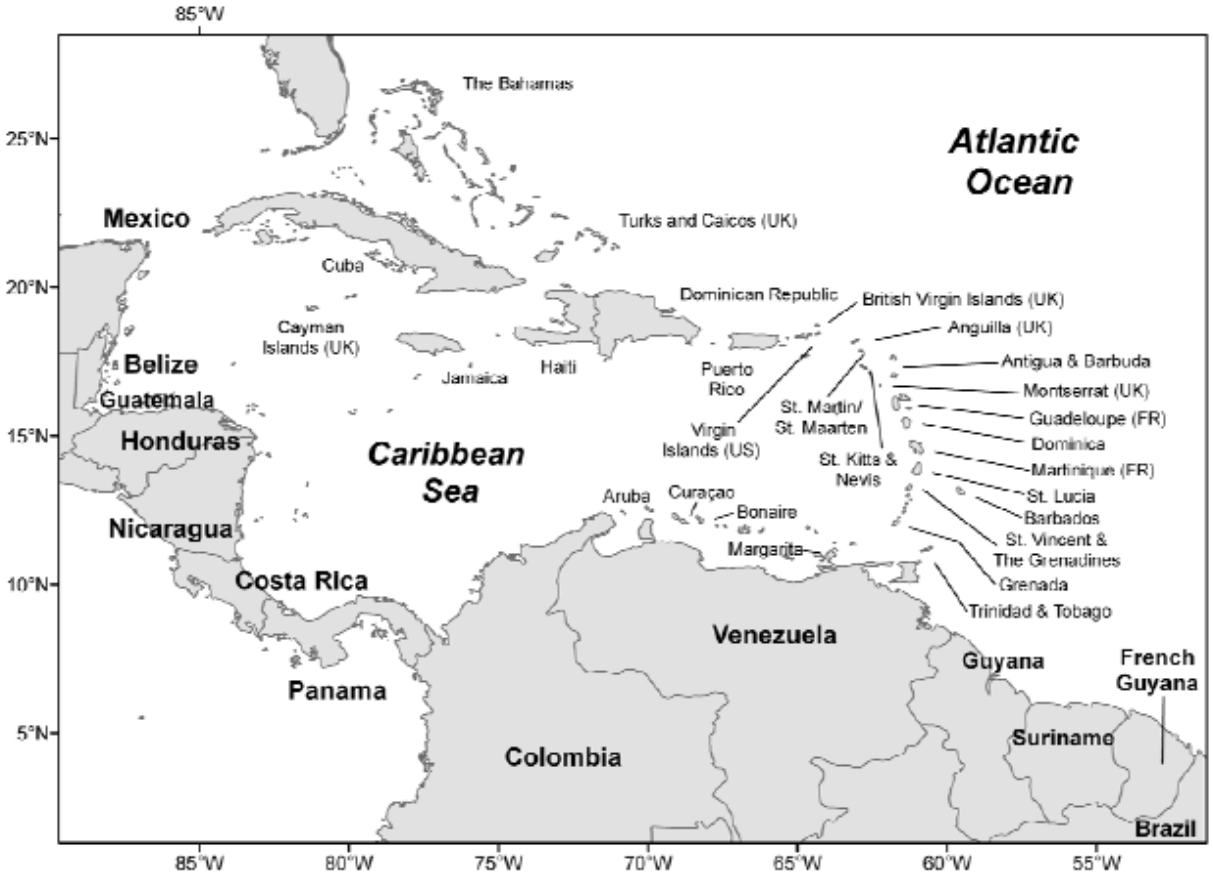

Fig. 2 Detailed map of the Caribbean Sea

Species	***Kogia breviceps* Pygmy sperm whale**
Abundance Estimate	No Abundance Estimate
Fisheries	Entanglement mortality has been reported in Colombia and Puerto Rico. There was the capture of one individual taken in a coastal gillnet fishery in the Gulf of Morrosquillo, Colombia, in 1988

[101] Northridge, S.P., and P.S. Hammond, 1999. Estimation of porpoise mortality in UK gill and tangle net fisheries in the North Sea and west of Scotland. Paper presented to the Scientific Committee of the International Whaling Commission, Grenada, May 1999. SC/51/SM42.

Estimated Annual Mortality	No Estimate of Mortality

Species	***Sotalia fluviatilis* Tucuxi**	
Abundance Estimate	Cananéia estuary of Brazil	156-380
	No Abundance Estimate for Any Other Region	
Fisheries	Dolphins are frequently entangled in fishing gear, especially coastal gillnets, in Brazil, and their flesh is used as bait in shark fisheries. Bycatch of tucuxis has been reported in gillnets in the Gulf of Venezuela. Tucuxi are also captured in shrimp and fish traps and seine nets. Tucuxi are also incidentally captured in gillnets in French Guiana, and in a gillnet fishery in the mouth of the Sinu river, Colombia.	
Estimated Annual Mortality	Dozens of tucuxis may be killed per year in Rio de Janeiro state based on strandings records collected at Atafona	
	An estimated 938 animals were taken in drift nets from the port of Arapiranga during the summer of 1996 and a further 125 taken during the winter.[102]	

Species	***Pseudorca crassidens* False killer whale.**
Abundance Estimate	No Abundance Estimate
Fisheries	These whales are caught in coastal gillnets off southern and southeastern Brazil. They also interact with longline fisheries in southern Brazil.
Estimated Annual Mortality	No Estimate of Mortality

Species	***Orcinus orca* Killer whale**
Abundance Estimate	No Abundance Estimate
Fisheries	A killer whale drowned in a driftnet in Trinidad waters of the Gulf of Paria. Killer whales interact with longline fisheries for swordfish, tuna and sharks off Brazil and some hooking and entanglement are known to occur.
Estimated Annual Mortality	No Estimate of Mortality

Species	***Globicephala macrorhynchus* Short-finned pilot whale.**
Abundance Estimate	No Abundance Estimate
Fisheries	Pilot whales interact with longline fisheries off Brazil
Estimated Annual Mortality	No Estimate of Mortality

[102] IWC (2000)Annex K: Report of the Sub-Committee on small cetaceans, IWC, Cambridge, 2000

Species	***Peponocephala electra* Melon-headed whale**	
Abundance Estimate	No Abundance Estimate	
Fisheries	A melon-headed whale that stranded at Los Roques, Venezuela had net marks on its body.	
Estimated Annual Mortality	No Estimate of Mortality	

Species	***Tursiops truncatus* Bottlenose dolphin**	
Abundance Estimate	Margarita Islands off northern Venezuela	50
	Gandoca-Manzanillo Wildlife Refuge, Costa Rica	82
	Bocas del Toro, Panama	50
Fisheries	Bottlenose dolphins have been entangled in both gillnet and trawl fisheries in Honduras, Colombia, French Guiana, Trinidad, and Venezuela. There is evidence of bycatch of bottlenose dolphins in gillnets along much of the Brazilian coastline, where it is common for people to use dolphin meat as shark bait. Scientists have reported a possibly large incidental capture of small cetaceans, in the Brazilian gillnet fishery off of French Guiana that included bottlenose dolphins.[103] A bottlenose dolphin was captured in a gillnet in a Colombian coastal fishery. Other gillnet fisheries in Mexico, for example may also be expected to impact bottlenose dolphins in this area.	
Estimated Annual Mortality	No Estimate of Mortality	

Species	***Grampus griseus* Risso's dolphin.**	
Abundance Estimate	No Abundance Estimate	
Fisheries	Risso's dolphins are entangled and interact with longline fisheries in deep offshore waters of southern Brazil and with trawl and gillnet fisheries in Colombia	
Estimated Annual Mortality	No Estimate of Mortality	

Species	***Stenella coeruleoalba* Stripped dolphin.**	
Abundance Estimate	No Abundance Estimate	
Fisheries	Bycatch has been reported in coastal gillnet fisheries in Brazil	
Estimated Annual	No Estimate of Mortality	

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[103] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A. and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans.* IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp

Mortality

Species	***Stenella longirostris* Spinner dolphin.**	
Abundance Estimate	Fernando de Noronha Archipelago	700 (photo id)
Fisheries	Spinner dolphins interact with driftnet fisheries off southern Brazil	
Estimated Annual Mortality	No Estimate of Mortality	

Species	***Stenella frontalis* Atlantic spotted dolphin.**	
Abundance Estimate	No Abundance Estimate--considered abundant	
Fisheries	Spotted dolphins are incidentally captured in gillnets throughout much of its range off Brazil, Venezuela and Colombia-- particularly high bycatch occurs in coastal gillnets in southern Brazil.	
Estimated Annual Mortality	No Estimate of Mortality	

Species	***Delphinus delphis* Common dolphin.**	
Abundance Estimate	No Abundance Estimate	
Fisheries	Common dolphins may be regularly caught in northeastern Venezuela and in coastal gillnets and driftnets in southern and southeastern Brazil	
Estimated Annual Mortality	No Estimate of Mortality	

Species	***Sousa teuszii* Atlantic humpback dolphin**	
Abundance Estimate[104]	Dakhla Bay	Considered small in size
	Parc National du Banc d' Arguin in Mauritania.[105]	Considered small in size
	Saloum delta, Senegal[106]	100

[104] Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Jallow, A.O., Ndiaye, E., Samba Ould Bilal, A.O. and Bamy, I. L. 2004. Distribution, status and biology of the Atlantic humpback dolphin Sousa teuszii (Kükenthal, 1892). Aquatic Mammals 30: 56-83.

[105] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A. and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans.* IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp

[106] Van Waerebeek, K., Ndiaye, E., Djiba, A., Diallo, M., Murphy, P., Jallow, A., Camara, A., Ndiaye, P., and Tous, P. 2000. A survey of the conservation status of cetaceans in Senegal, The Gambia and Guinea-Bissau. Report to UNEP/CMS Secretariat, Bonn, Germany. 80pp.

	Canal do Geba-Bijagos[107]	Considered the largest stock, perhaps < a thousand animals
	South Guinea[108]	Unknown
	Cameroon	Unknown
	Gaboon Estuaries	Unknown
	Angola	Considered small
Fisheries	Atlantic humpback dolphins are caught in beach seines and shark nets in Senegal. Artisanal fisheries are diversifying and expanding rapidly in Dakhla Bay, southern Morocco/Western Sahara. Interactions with fisheries, possible depletion of food resources (through fisheries), competitive interactions with bottlenose dolphins, and population fragmentation may all be contributing to wipe out S. teuszii from Dakhla Bay and perhaps throughout southern Morocco.[109]	
Estimated Annual Mortality	No Estimate of Mortality In 1996, Senegal's Saloum Delta three carcasses, found together on a remote island, had rope tied around their tail stocks.	

AREA 37 MEDITERRANEAN AND BLACK SEA

Abundance estimates for the western Mediterranean basin are were obtained in 1991-1992. Although dated, it is an improvement over the southern and eastern parts of the Mediterranean where abundance estimates are completely lacking. Other species known to occur in this area, but for which information on abundance estimates and fishery interactions are sparse include:

- *Pseudorca crassidens* False killer whale.
  Di Natale refers to 2 false killer whales taken by longlines, in the Tyrrhenian Sea off the Calabrian coast.[110]
- *Megaptera novaeangliae* Humpback whale
  There are four instances of humpback whale bycatch: (1) 1992, Gulf of Gabes, Tunisia; (2) 1993, Cavalaire, France; (3) 2004 Corfu Island, Greece; and (4) Siracusa, Sicily, Italy, (released alive).[111]

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[107] Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Drammeh, F., Jallow, A., Ndiaye, E. and Samba Ould Bilal, A.O. 2001a. Conservation efforts and field research on cetaceans in Senegal and The Gambia. Report to UNEP/CMS Secretariat, Bonn, Germany.

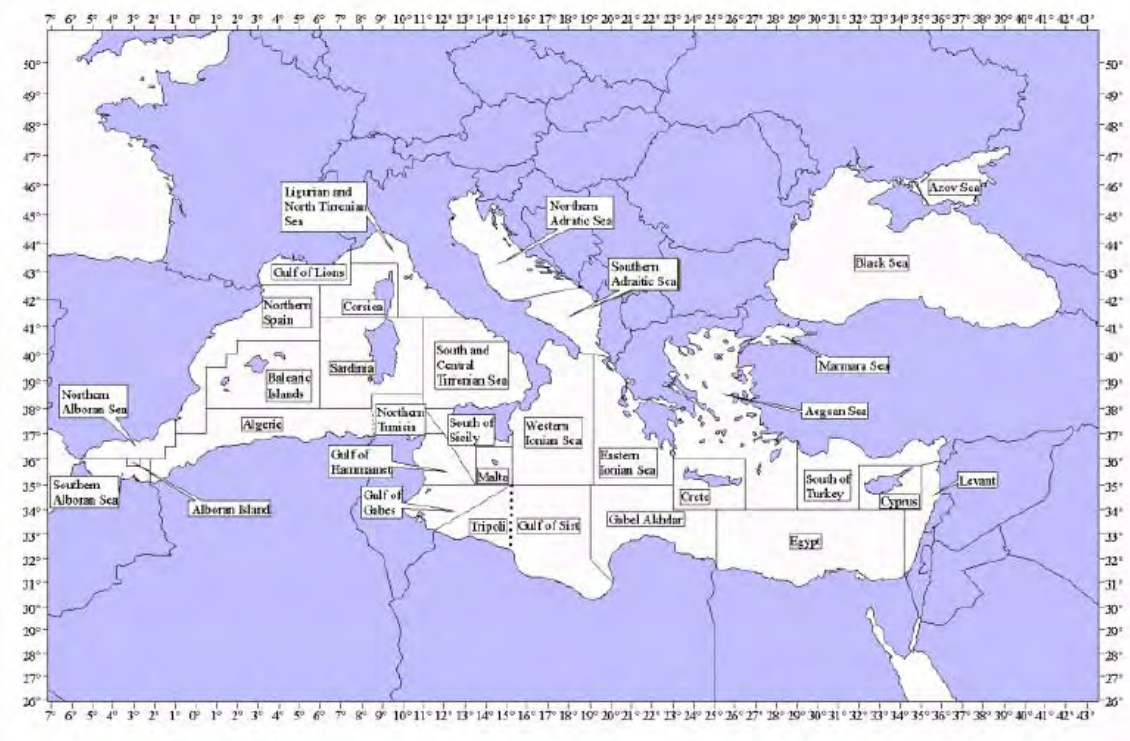
[108] Although the species' range may have been continuous historically, gaps in distribution are increasingly apparent. Ironically, although the species was discovered in the Cameroon Estuary in 1892, its presence in the northern Gulf of Guinea, a coastline of more than 2,000 km, has not been confirmed since then. Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Drammeh, F., Jallow, A., Ndiaye, E. and Samba Ould Bilal, A.O. 2001. Conservation efforts and field research on cetaceans in Senegal and The Gambia. Report to UNEP/CMS Secretariat, Bonn, Germany.

[109] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A. and Notarbartolo di Sciara, Giuseppe (compilers). (2003). Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans. IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp

[110] Di Natale A., Mangano A. 1983. Killer whale, *Orcinus orca* (Linnaeus) and false killer whale, *Pseudorca crassidens* Owen, in the Italian seas. Rapports de la Commission Internationale de la Mer Méditerranée 28(5):181-182.

[111] Reeves R., Notarbartolo di Sciara G. 2006. The status and distribution of cetaceans in the Black Sea and Mediterranean Sea. IUCN Centre for Mediterranean Cooperation, Malaga, Spain 137pp.

- *Steno bredanensis* Rough-toothed dolphin
  There are two instances of bycatch involving rough-toothed dolphins: (1) 2002, Atlit shore, Israel, juvenile stranded after being bycaught; (2) 2003, Carmel Beach, Haifa, Israel, calf entangled in gillnet.



Species	***Globicephala melaena* Longfinned pilot whale**		
Abundance Estimate	Strait of Gibraltar	260 – 270	
Fisheries	Uncertain		
Estimated Annual Mortality	Between 1978 and 1982, 26 pilot whales were caught in fishing and other gear in the western Mediterranean, at least 3 of them in tuna nets.[112] Pilot whales are caught in the swordfish driftnet fishery--7% of animals recorded by Notobartolo di Sciara were pilot whales.		

Species	***Balaenoptera acutorostrata* Minke whale.**		
Abundance Estimate	No Abundance Estimate		
Fisheries	Minke whales are caught in driftnets.		
Estimated Annual Mortality	1978-1981	Italian seas	2 different records of incidental capture in driftnets, involving 4 whales[113]

[112] Northridge S. P. 1984. World review of interactions between marine mammals and fisheries. Fisheries Technical paper 251. Food and Agriculture Organization of the United Nations, Rome. 191 pp.

[113] Di Natale A., Mangano A. 1981. Report of the progress of Project Cetacea. VI. July 1978 – October 1981. Memorie di biologia marina e di oceanografia. N. 5. Vol. 11. 49 pp.

1998	Near Giens Peninsula, France	Standed after being caught in a net[114]
1998	Toulon Region, France	Bycaught whale[115]
2000	Akko, Israel	Calf found entangled in net[116]
2002-2003	Al Hoceima, Morocco	Adult bycaught in pelagic driftnet[117]
2004	Haifa, Israel	Calf found entangled in net[118]

Species	***Ziphius cavirostris* Cuvier's beaked whale.**
Abundance Estimate	No Abundance Estimate
Fisheries	Cuvier's beaked whales are occasionally incidentally caught in driftnets and longlines in the Mediterranean Sea.
Estimated Annual Mortality	The Spanish Mediterranean longlining fleet entangled (and released alive) only one unidentified beaked whale out of 798 sets.[119] In Italy, 13 whales were bycaught between 1986 and 1997.[120]

Species	***Physeter macrocephalus* Sperm whale.**
Abundance Estimate	No Abundance Estimate, but likely in the hundreds of thousands and declining
Fisheries	Sperm whales are caught in the high-seas swordfish driftnet fishery.
Estimated Annual Mortality	Since the mid-1980s, entanglement in high seas swordfish driftnets has caused and continues to cause considerable mortality.[121] The number of sperm whales found dead or entangled from 1971 to 2004 in Spain,

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[114]Robineau D. 2005. Cétacés de France. Féderation Française des Sociétés de Sciences Naturelles, Paris. 646 pp.

[115]Macé M., Bompar J.-M., Fabre J.-L., Bourcaud-Baralon C., Petit C. 1999. The minke whale, *Balaenoptera acutorostrata*, a new candidate for Mediterranean endemic species? European Research on Cetaceans 13:369.

[116] Scheinin A., Kerem D., Goffman O., Spanier E. 2004. Rare occurrences of cetaceans along the Israeli Mediterranean coast. FINS 1(1):19.

[117] Tudela S., Kai Kai A., Maynou F., El Andalosi M., Guglielmi P. 2004. Driftnet fishing and biodiversity conservation: the case study of the large-scale Moroccan driftnet fleet operating in the Alborán Sea (SW Mediterranean). Biological Conservation 121:65-78.

[118] Scheinin A., Kerem D., Goffman O., Spanier E. 2004. Rare occurrences of cetaceans along the Israeli Mediterranean coast. FINS 1(1):19.

[119] Valeiras J., Camiñas J. A. 2001. Captura accidental de mamíferos marinos en las pesquerías españolas de palangre de pez espada y túnidos en el Mediterráneo. II Simposium de la Sociedad Española de Cetáceos. SEC. Noviembre, Valsain, Segovia.

[120] Centro Studi Cetacei. 1998. Cetacei spiaggiati lungo le coste italiane. XII. Rendiconto 1997. Atti. Soc. Ital. Sci. Nat. Museo civ. Stor. Nat. Milano, 139(II): 213-226.

[121] International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15:1-72. See also: Pace D.S., Miragliuolo A., Mussi B. 2005. Behaviour of a nursery group of entangled sperm whales (*Physeter macrocephalus*) off Capo Palinuro (Southern Tyrrhenian Sea, Italy). Abstracts, 19Th Annual Conference of the European Cetacean Society, La Rochelle, France, 2-7 April 2005:69.

France and Italy (combined) was 229.[122]

The large majority of the strandings in Italy and Mediterranean Spain were caused by entanglement in driftnets, as evident from the presence of net fragments or characteristic marks on the whales' bodies[123] From 1986 to 1990, 56 sperm whales stranded due to entanglement.[124]

Despite international and national regulations banning driftnets from the Mediterranean, illegal or quasi-legal driftnetting continues in the western Mediterranean (e.g., in France, Italy, and Morocco) and in the eastern basin (e.g., Greece and Turkey), continuing to threaten the species' survival in the region.

Species	***Tursiops truncatus* Bottlenose dolphin.**	
Abundance Estimate[125]	No Abundance Estimate—may be in the low 10,000s	
	Probably declining, reduced by 30% over the last 60 yrs.	
	Strait of Gibraltar	258 (CV 0.08) (226 – 316)
	Alboran Sea (Spain)	584 (CV 0.28) (278-744)
	Almeria (Spain)	279 (CV 0.28) (146–461)
	Asinara Island National Park (Italy)	22 (CV 0.26) (22–27)
	Balearic Islands & Catalonia (Spain)	7,654 (CV 0.47) (1,608-15,766)
	Balearic Islands (Spain)	1,030 (CV 0.35) (415-1,849)
	Alboran sea and Murcia	1288
	Gulf of Vera (Spain)	256 (CV 0.31) (188–592)
	Valencia (Spain)	1,333 (CV 0.31) (739-2,407)
	Ionian Sea	48
	Amvrakikos Gulf	152 (136-186)
	Central Adriatic Sea (Kornati & Murtar Sea, Croatia)	14
	North-eastern Adriatic Sea (Kvarneric, Croatia)	120

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[122] International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15:1-72. See also: Pace D.S., Miragliuolo A., Mussi B. 2005. Behaviour of a nursery group of entangled sperm whales (*Physeter macrocephalus*) off Capo Palinuro (Southern Tyrrhenian Sea, Italy). Abstracts, 19Th Annual Conference of the European Cetacean Society, La Rochelle, France, 2-7 April 2005:69.

[123] Lazaro F., Martin V. 1999. Sperm whales and drifting nets in the Mediterranean Sea: the example of the Balearic Islands. In: European Research on Cetaceans - 13. Proc. 13th Ann. Conf. ECS, Valencia, 20-24 April, 1999, pp. 118.

[124] Cagnolaro L., Notarbartolo di Sciara G. 1992. Research activities and conservation status of cetaceans in Italy. Boll. Mus. Ist. Biol. Genova, 56-57:53-85.

[125] Reeves R., Notarbartolo di Sciara G. 2006. The status and distribution of cetaceans in the Black Sea and Mediterranean Sea. IUCN Centre for Mediterranean Cooperation, Malaga, Spain 137pp.

	North Adriatic Sea (Gulf of Trieste, Slovenia)	47
Fisheries	Bottlenose dolphins are incidentally caught in trammel, set gillnets, and drift gillnets	
Estimated Annual Mortality	In some Mediterranean areas the incidental mortality rates are probably unsustainable.[126]	
	Bycatch in trawl nets is relatively uncommon in most Mediterranean areas; but high mortality in bottom trawls has been reported from the coast of Israel.[127]	
	Dolphins die incidentally in purse seines and longlines, but the relative importance of mortality from these gear types on Tursiops at the basin level is probably low.	
	In 1991, 30 bottlenose dolphins were caught by artisanal gear and trawlers in the Balearic area.[128]	
Species	***Tursiops truncatus ponticus*** **Black Sea Bottlenose dolphin.**	
Abundance Estimate[129]	No Abundance Estimate—may be in the low 10,000s	
	Probably declining, reduced by 30% over the last 60 yrs.	
	Turkish Straits System	495 (203–1,197)
	(Bosphorus, Marmara Sea and Dardanelles)	468 (184–1,186)
	Kerch Strait	76 (30–192)
		88 (31–243)
		127 (67–238)
	NW, N and NE Black Sea within Ukrainian and Russian territorial waters	4,193 (2,527–6,956)
	NE shelf area of the Black Sea	823 (329–2,057)
Fisheries	*T. t. ponticus* are captured in bottom-set gillnets for turbot (*Psetta maeotica*), spiny dogfish (*Squalus acanthias*), sturgeon (*Acipenser* spp.) and sole (*Solea* spp.), purse seines for mullet (Mugil spp. and Lisa spp.) and anchovy (*Engraulis encrasicolus ponticus*), trammel nets and trap nets. Bottom-set gillnets take significant numbers, especially during the turbot fishing season between April and June.	
Estimated Annual	Although *T. t. ponticus* constituted no more than 3% of the totals in the reports from Black Sea countries during the 1990s, at present, incidental	

126 Silvani L., Raich J., Aguilar A. 1992. Bottlenose dolphins, Tursiops truncatus, interacting with fisheries in the Balearic Islands, Spain. European Research on Cetaceans 6:32–34.

127 Goffman O., Kerem D., Spanier E. 1995. Dolphin interactions with fishing-trawlers off the Mediterranean coast of Israel. Abstract. 11th Biennial Conference on the Biology of Marine Mammals, Orlando, FL. 14-18 December 1995.

128 Silvani, L., Raich, J. and Aguilar, A. 1992. Bottle-nosed dolphins, Tursiops truncatus, interacting with local fisheries in the Balearic Islands, Spain. European Research on Cetaceans: 32-33.

129 Reeves R., Notarbartolo di Sciara G. 2006. The status and distribution of cetaceans in the Black Sea and Mediterranean Sea. IUCN Centre for Mediterranean Cooperation, Malaga, Spain 137pp.

Mortality	mortality in fishing gear is probably one of the main threats to *T. t. ponticus*.[130] At least 200-300 bottlenose dolphins were incidentally killed in Turkish fisheries each year.[131] The estimated annual mortality of *T. t. ponticus* in gillnet fisheries in the Mediterranean is 110 to 455.[132]
Species	***Grampus griseus* Risso's dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	Risso's dolphins are caught in longlines and gillnets in Spain and Italy.
Estimated Annual Mortality	In the Mediterranean Sea, Risso's dolphins are among the cetacean species frequently entangled in fishing gear--catches in longlines (two individuals), set nets (in France) and driftnets in Italy.[133]
Species	***Stenella coeruleoalba* Striped dolphin**
Abundance Estimate[134]	Alboran Sea 14,736 (6,923 – 31,366)[135]
	Western Mediterranean 117, 880 (68,379-214,800)
	Corso-Ligurian basin 25,614 (15,377 – 42, 685)
	No Abundance Estimate for the Eastern Mediterranean
	Population trend is uncertain
Fisheries	Striped dolphins are caught in the pelagic driftnet fishery
Estimated Annual Mortality	Italian, Greek and Moroccan pelagic drift fishing vessels have high levels of incidental mortality.
	In 1993 and 1994, the Swordfish driftnet fishery in the Eastern Gibraltar Straits captured 366 (268 – 464) and 286 (283 – 340) striped and common dolphins[136]
	The Spanish driftnet fishery in the Alborán Sea reportedly killed 145-183 striped dolphins per season in the early 1990s, this fishery was halted in

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130 Birkun A. Jr. 2002b. Interaction between cetaceans and fisheries: Black Sea. Pp. 98-107 in: G. Notarbartolo di Sciara (Ed.), Cetaceans of the Mediterranean and Black Seas: State of knowledge and conservation strategies. ACCOBAMS Secretariat, Monaco, 219pp.

131 Öztürk B. (Comp.) 1999. *Black Sea Biological Diversity: Turkey*. United Nations Publ., New York. 144 pp.

132 Perrin WF, Donovan GP, and Barlow J (1994). Gillnets and Cetaceans. Report of the International Whaling Commission Special Issue 15. 629pp.

133 Notarbartolo di Sciara G. 1990. A note on the cetacean incidental catch in the Italian driftnet swordfish fishery, 1986-1988. Rep. Int. Whal. Commn 40:459.

134 Forcada J., Aguilar A., Hammond P.S., Pastor X., Aguilar R. 1994. Distribution and numbers of striped dolphins in the western Mediterranean Sea after the 1990 epizootic outbreak. Mar. Mammal Sci. 10(2):137-50.

135 Forcada, J. and Hammond, P.S. 1998. Geographical variation in abundance of striped and common dolphins of the western Mediterranean. Journal of Sea Research 39: 313-325.

136 Silvani, L., Gazo, M. and Aguilar, A. 1999. Spanish driftnet fishing and incidental catches in the western Mediterranean. Biological Conservation 90: 79 - 85

	1995.[137] Moroccan driftnet vessels kill more than 3,600 dolphins (striped and common, combined) in the Alborán Sea per year.[138] The Italian drift net (spadare) fishery is estimated to have killed thousands of striped dolphins per year through the early 1990s (1149 in 1990 and 1363 in 1991).[139] The Italian driftnet fishery in the Ligurian Sea has been banned since 1992, but illegal fishing may still contribute to striped dolphin fishery mortality in Italian waters. In 2000, the French thonaille drift net fishery killed 326 (180-472) striped dolphins.[140] In 1994, the Spanish pelagic purse seine fishery off the SE Spanish Mediterranean coast had a bycatch of 300 striped dolphins.[141] There are also reports of (but no estimates) widespread and significant striped dolphin mortality in at least pelagic purse seines, longlines, trawl, harpoon fishery and gillnets.[142]
Species	***Delphinus delphis* Common dolphin.**
Abundance Estimate	Alboran Sea 14,736 (6,923 – 31,366)[143]
Fisheries	Common dolphins appear to be regularly taken as bycatch in driftnets
Estimated Annual Mortality	Approximately 165 to 145 common dolphins were caught in 1993 and 1994 in the swordfish driftnet fishery representing 1.2% of the estimated population. Since then Spanish driftnetting has been banned but the Moroccan driftnetting effort increased from 200 to 400 vessels.[144]

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[137] Silvani L., Gazo M., Aguilar A. 1999. Spanish driftnet fishing and incidental catches in the western Mediterranean. Biol. Conserv. 90:79-85.

[138] Tudela S., Kai Kai A., Maynou F., El Andalossi M., Guglielmi P. 2005. Driftnet fishing and biodiversity conservation: the case study of the large-scale Moroccan driftnet fleet operating in the Alboran Sea (SW Mediterranean). Biol. Conserv. 121:65-78.

[139] Di Natale A. 1995. Driftnets impact on protected species: observers data from the Italian fleet and proposal for a model to assess the number of cetaceans in the by-catch. Col. Vol. Sci. Pap. ICCAT 44(1):255-263. See also: Di Natale A., Notarbartolo di Sciara G. 1994. A review of the passive fishing nets and trap fisheries in the Mediterranean Sea and of the cetacean bycatch. Rep. int. Whal. Commn (Special Issue) 15:189-202.

[140] Imbert, G., Gaertner, J.-C. and Laubier, L. 2001b. Prevention a l'aide de repulsifs acoustiques des captures de dauphins par les thonailles. 10e Conference International sur les cetaces Mediterranee de la RIMMO. Juan-les Pins 16-18 nov. 2001 (Abstract)

[141] Silvani, L., Gazo, M. and Aguilar, A. 1999. Spanish driftnet fishing and incidental catches in the western Mediterranean. Biological Conservation 90: 79 - 85

[142] Di Natale A. 1995. Driftnets impact on protected species: observers data from the Italian fleet and proposal for a model to assess the number of cetaceans in the by-catch. Col. Vol. Sci. Pap. ICCAT 44(1):255-263. See also: Di Natale A., Notarbartolo di Sciara G. 1994. A review of the passive fishing nets and trap fisheries in the Mediterranean Sea and of the cetacean bycatch. Rep. int. Whal. Commn (Special Issue) 15:189-202.

[143] Forcada, J. and Hammond, P.S. 1998. Geographical variation in abundance of striped and common dolphins of the western Mediterranean. Journal of Sea Research 39: 313-325.

[144] Di Natale A. 1995. Driftnets impact on protected species: observers data from the Italian fleet and proposal for a model to assess the number of cetaceans in the by-catch. Col. Vol. Sci. Pap. ICCAT 44(1):255-263. See also: Di Natale

	No other estimate of mortality exist for other parts of the Mediterranean	
Species	***Phocoena phocoena* Harbor porpoise**	
Abundance Estimate[145]	No Total Abundance Estimate—at least several thousands maybe 10,000-12,000 Probably declining	
	Azov Sea in total	2,922 (1,333–6,403)
	Kerch Strait	54 (12–245)
	NW, N and NE Black Sea within Ukrainian and Russian territorial waters	1,215 (492–3,002)
	SE Black Sea within Georgian territorial waters	3,565 (2,071–6,137)
	Central Black Sea beyond territorial waters of Ukraine and Turkey	8,240 (1,714–39,605)
Fisheries	Almost all (>99%) of the porpoises are caught in bottom-set gillnets for turbot (*Psetta maeotica*), spiny dogfish (*Squalus acanthias*) and sturgeon (*Acipenser* spp.). The peak occurs from April–June during the turbot season in the Azov Sea and Kerch Strait and throughout the shelf area of the Black Sea.	
Estimated Annual Mortality	At present, incidental mortality in fishing nets is the most serious threat to harbor porpoise, with the majority (95%) of recorded cetacean entanglements being porpoises. Mortality estimates are not available; however, available data indicate that the annual level of harbor porpoise bycatch may be in the thousands.[146]	

A., Notarbartolo di Sciara G. 1994. A review of the passive fishing nets and trap fisheries in the Mediterranean Sea and of the cetacean bycatch. Rep. int. Whal. Commn (Special Issue) 15:189-202.

[145]Birkun A. Jr., Glazov D., Krivokhizhin S., Mukhametov L. 2002. Distribution and abundance of cetaceans in the Sea of Azov and Kerch Strait: Results of aerial survey (July 2001). P.73 *in*: Abstr. 16th Annual Conf. of the European Cetacean Society (Liege, 7-11 April 2002). See also: Birkun A., Jr., Glazov D., Krivokhizhin S., Nazarenko E., Mukhametov L. 2003. Species composition and abundance estimates of cetaceans in the Kerch Strait and adjacent areas of the Black and Azov Seas: The second series of aerial surveys (August 2002). Pp.271-272 *in*: Abstr. 17th Annual Conf. of the European Cetacean Society (Las Palmas de Gran Canaria, 9-13 March 2003).

[146] Commercial hunting of Black Sea cetaceans, including harbour porpoises, was banned in 1966 in the former USSR (present Georgia, Russia and Ukraine), Bulgaria and Romania, and in 1983 in Turkey. The riparian states assumed international obligations to protect Black Sea cetaceans as contracting parties of the Convention on Biological Diversity (CBD), Convention on the Conservation of Migratory Species of Wild Animals (CMS), Convention on the Conservation of European Wildlife and Natural Habitats (Berne Convention), Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, Appendix II), and the Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS). The harbor porpoise, *P. phocoena*, is mentioned in Annex II of the EC Directive No.92/43/EEC on the conservation of natural habitats of wild fauna and flora. In 1996, the Ministers of Environment of Black Sea countries adopted cetacean conservation and research measures within the framework of the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea (paragraph 62). The harbor porpoise is included as Data Deficient in the regional Black Sea Red Data Book (1999). However, in 2002 it was listed as Endangered in the Provisional List of Species of the Black Sea Importance, an annex to the Black Sea Biodiversity and Landscape Conservation Protocol of the Bucharest Convention.

AREA 41 SOUTHWEST ATLANTIC

In the southwest Atlantic, the problem of marine mammal bycatch has not been addressed by fisheries management authorities. A complicating factor in some countries is that cetaceans taken incidentally are frequently used for human food, oil, and bait and in fact the distinction between incidental and direct catch has been blurred. In many of these nations (especially Brazil), information is still almost entirely lacking on the scale and species composition of the bycatches, fishery characteristics, and fleet dynamics.

Species	***Sotalia fluviatilis* Tucuxi**	
Abundance Estimate	Cananéia estuary of Brazil	156-380
	No Abundance Estimate For Any Other Region	
Fisheries	Tucuxi are reported to become entangled in beach seines and, more frequently, in set gillnets and driftnets throughout their range. These dolphins are frequently entangled in fishing gear, especially coastal gillnets, in Brazil, and their flesh is used as bait in shark fisheries. Bycatch of tucuxis has been reported in gillnets in the Gulf of Venezuela. Tucuxi are captured in shrimp and fish traps and seine nets. Tucuxi are also incidentally captured in gillnets in French Guiana, and in a gillnet fishery in the mouth of the Sinu river, Colombia.	
Estimated Annual Mortality	Dozens of tucuxis may be killed per year in Rio de Janeiro state based on strandings records collected at Atafona	
	An estimated 938 animals were caught in drift nets from the port of Arapiranga during the summer of 1996 and an additional 125 caught during the winter.[147] In 1999, the IWC estimated 141 tucuxis were incidentally caught in fisheries.[148]	

Species	***Globicephala melas* Long finned pilot whale**
Abundance Estimate	No Abundance Estimate
Fisheries	Pilot whales are entangled in longline, driftnet fisheries, and purse seines
Estimated Annual Mortality	The pelagic shark driftnet fishery off southern Brazil incidentally caught 15 long-finned pilot whales in 1995 and 1997.[149]
	Between 1980 and 1985, 6 pilot whales were entangled taken on longlines in Brazilian waters.[150]

Species ***Lagenorhynchus obscurus* Dusky dolphin.**

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[147] IWC (2000)Annex K: Report of the Sub-Committee on small cetaceans, IWC, Cambridge, 2000

[148] IWC (2003) Annex K: Report of the Sub-Committee on small cetaceans, IWC, Cambridge, 2003

[149] Zerbini, A.N. and Kotas, J.E. 1998. A note on cetacean bycatch in pelagic driftnetting off southern Brazil. *Report of the International Whaling Commission* 48, 519–524.

[150] Zerbini, A.N. and Kotas, J.E. 1998. A note on cetacean bycatch in pelagic driftnetting off southern Brazil. *Report of the International Whaling Commission* 48, 519–524.

Abundance Estimate	Patagonian coast[151]	7,252
	Punta Ninfas and Cabo Blanco, Argentina	6,628
Fisheries	Dusky dolphins are entangled in mid-water trawls for shrimp, squid, and hake, driftnet fisheries, longline fisheries, and purse seines	
Estimated Annual Mortality	Mid-water trawls for shrimp, squid, and hake off the Patagonian coast incidentally caught between 442-560 dusky dolphin in 1984. From 1992 to 1994, 70 to 200 dusky dolphins were incidentally killed in Patagonian trawl fisheries--the number decreased to 36 in 1994.[152] The catch was 70% mature or pregnant females and in the mid-1980s the bycatch represented 8% of the present population estimate.[153]	
	Dusky dolphins are caught in a purse seine fishery off the Argentine coast near Necochea; 50–100 dusky and common dolphins per year may be killed. An unknown number also becomes entangled in a similar purse seine fishery at Mar del Plata.[154]	

Species	**Lagenorhynchus australis Peale's dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	Peale's dolphins are caught in mid-water trawls and coastal gillnets
Estimated Annual Mortality	Peale's dolphins have been caught in set nets in Tierra del Fuego, but the overall numbers involved are unknown.[155]
	Peale's dolphins have been harpooned for crab bait in Argentina.

Species	***Delphinus delphis* Common dolphin.**
Abundance Estimate	No Abundance Estimate
Fisheries	Common dolphins are caught in mid-water trawls, coastal gillnets, and purse seines
Estimated Annual Mortality	Common dolphins are caught with dusky dolphins, at a combined rate of about 50–100 a year in a purse seine fishery off Necochea, Argentina and in mid-water trawls on the Patagonia shelf.[156]

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[151] Dans SL, Crespo EA, Garcia NA, Reyes LM, Pedraza SN, Alonso MK (1997) Incidental mortality of patagonian dusky dolphins in mid-water trawling: Retrospective effects from the early 1980s. *Report of the International Whaling Commission* 47, 699–703.

[152] Crespo EA., Pedraza SN, Dans SL, Alonso MK, Reyes LM., García NA, Coscarella M, and Schiavini ACM. (1997) Direct and Indirect Effects of the Highseas Fisheries on the Marine Mammal Populations in the Northern and Central Patagonian Coast. J. Northw. Atl. Fish. Sci., Vol. 22: 189–207

[153] Dans SL, Crespo EA, Garcia NA, Reyes LM, Pedraza SN, Alonso MK (1997) Incidental mortality of patagonian dusky dolphins in mid-water trawling: Retrospective effects from the early 1980s. *Report of the International Whaling Commission* 47, 699–703

[154] Crespo, E.A., Corcuera, J.F., and López Cazorla, A. 1994. Interactions between marine mammals and fisheries in some fishing areas of Argentina. *Report of the International Whaling Commission* (Special Issue) 15, 269–281.

[155] Crespo, E.A., Corcuera, J.F., and López Cazorla, A. 1994. Interactions between marine mammals and fisheries in some fishing areas of Argentina. *Report of the International Whaling Commission* (Special Issue) 15, 269–281.

[156] Id.

Species	***Cephalorhynchus commersonii* Commerson's dolphin**
Abundance Estimate	Recent aerial surveys suggest that there are approximately 21,000 Commerson's dolphins along the entire coast, with 7,000 between 42-48ºS and 14,000 in Tierra del Fuego.[157]
Fisheries	Commerson's dolphins are caught in mid-water trawls (in Chubut, Tierra del Fuego and Peninsula Valdez) and coastal gillnets.
Estimated Annual Mortality	Total bycatch estimates are not available, but 5-30 Commerson's dolphins die each year in nets set perpendicular to shore in eastern Tierra del Fuego; this fishery type also captures dolphins in the Argentinean provinces north of Tierra del Fuego and in the eastern strait of Megellan.[158] From 1992 to 1994, the average annual mortality of Commerson's dolphins in mid-water trawls was 25-170 animals.[159] In the 1999/2000, fishing season in the region of La Angelina and Ria Gallegos, Argentinean artisanal setnet fisheries killed 179 (141 – 212).[160] Commerson's dolphins are also used as crab bait.

Species	***Phocoena spinipinnis* Burmeister's porpoise**
Abundance Estimate	No Abundance Estimate
Fisheries	Burmeister's porpoise are caught in coastal or shark gill net fisheries
Estimated Annual Mortality	Total bycatch estimates are not available, but about 10–15 Burmeister's porpoises are reported killed annually in shark nets set at around 50m off Necochea. Some are also killed in set nets in Tierra del Fuego, and in coastal gillnets around Buenos Aires. In Uruguay, eight Burmeister's porpoises were drowned in shark gillnets since 1974.[161]

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[157] The South American form of Commerson's dolphin is endemic to Patagonia in waters between 42ºS and 55ºS; its actual distribution is restricted to particular areas within that range. Pedraza, S.N., A.C.M. Schiavini, E.A. Crespo, S.L. Dans, and M.A. Coscarella. In review. Abundance of Commerson´s dolphins (Cephalorhynchus commersonii) in the coasts of Patagonia (Argentina). Journal of Cetacean Research and Management.

[158] Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.Crespo EA., Pedraza SN, Dans SL, Alonso MK, Reyes LM., García NA, Coscarella M, and Schiavini ACM. (1997) Direct and Indirect Effects of the Highseas Fisheries on the Marine Mammal Populations in the Northern and Central Patagonian Coast. J. Northw. Atl. Fish. Sci., Vol. 22: 189–207

[159] Crespo EA., Pedraza SN, Dans SL, Alonso MK, Reyes LM., García NA, Coscarella M, and Schiavini ACM. (1997) Direct and Indirect Effects of the Highseas Fisheries on the Marine Mammal Populations in the Northern and Central Patagonian Coast. J. Northw. Atl. Fish. Sci., Vol. 22: 189–207 See also: Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.

[160] Iniguez MA, Hevia M, Gasparrou C, Tomsin AL and Secchi ER. (2003) Preliminary estimate of incidental mortality of Commerson's dolphin (*Cephalorhynchus commersonii*) in an artisanal setnet fishery in La Angelina beach and Ria Gallego, Santa Cruz, Argentina. LAJAM 2(2) 87-94. See also: Annex H, Small Cetacean Subcommittee (2004)

[161] Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.Crespo EA., Pedraza SN, Dans SL, Alonso MK, Reyes LM., García NA, Coscarella M, and Schiavini ACM. (1997) Direct and Indirect Effects of the Highseas Fisheries on the Marine Mammal Populations in the Northern and Central Patagonian Coast. J. Northw. Atl. Fish. Sci., Vol. 22: 189–207

Species	***Australophocoena dioptrica* Spectacled porpoise.**		
Abundance Estimate	No Abundance Estimate		
Fisheries	Spectacled porpoise are caught in coastal or shark gill net fisheries		
Estimated Annual Mortality	Total bycatch estimates are not available, but at least 34 animals were incidentally killed between 1975 and 1990 in coastal gill nets set in Tierra del Fuego.[162] There is also mortality in bottom and mid-water trawls off the coast of Chubut, Argentina.		

Species	***Inia geoffrensis* Boto**		
Abundance Estimate	No Abundance Estimate		
Fisheries	Lampara seine nets and gillnets are most frequently responsible for incidental captures of Boto.		
Estimated Annual Mortality	Total bycatch estimates are not available or known, but are thought to have increased with increased fishing effort.		

Species	***Pontoporia blainvillei* Franciscana.**		
Abundance Estimate[163]	FMA I	No Abundance Estimate	Total annual bycatch = 110
	FMA II	No Abundance Estimate	Total annual bycatch = 375
	FMA III	42,078 (33,047 – 53,542)[164]	Total annual bycatch = 1374 (694-2215)
	FMA IV	34,131 (16,360-74,397)	Total annual bycatch = 651 (398-1097)
Fisheries	The franciscana is caught in fairly large numbers in gillnets set for sharks along most of its coastal range.		
Estimated Annual Mortality	Between 2.1 – 10.8 % of the population is removed each year by the fishery. The total estimated mortality throughout the range could be in the order of 1,500-2,000 animals per year. Most bycaught animals are juveniles with an average age of one year and 64% of the individuals		

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[162] Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.Crespo EA., Pedraza SN, Dans SL, Alonso MK, Reyes LM., García NA, Coscarella M, and Schiavini ACM. (1997) Direct and Indirect Effects of the Highseas Fisheries on the Marine Mammal Populations in the Northern and Central Patagonian Coast. J. Northw. Atl. Fish. Sci., Vol. 22: 189–207

[163] The IWC has divided, for management purposes, franciscana population into four Franciscana Management Units (FMUs) according to ecological, morphological, and genetic information. At least three populations have been differentiated genetically (FMU 1, 2, and 3-4). Levels of bycatch mortality are generally high throughout the franciscana's range. Removal rates, estimated by dividing the mean bycatch by the mean abundance, have ranged from 1.6% for FMU 4 to 3.3% for FMU 3. Secchi, E. R., Danilewicz, D. and Ott P. H. 2004. Applying the phylogeographic concept to identify franciscanas dolphin stocks: implications to meet management objectives. Journal of Cetacean Research and Management 5:61-68.

[164] Secchi, E.R., Ott, P.H., Crespo, E.A., Kinas, P.G., Pedraza, S.N., and Bordino, P. 2001. A first estimate of franciscana (*Pontoporia blainvillei*) abundance off southern Brazil. *Journal of Cetacean Research and Management* **3**, 95–100.

were under three years.[165]

Uruguay gillnet fisheries incidentally killed 235 franciscana in 1992-93 and 28 in 1998.[166]

In Rio Grande do Sul and Buenos Aires fisheries, an estimated 700 and 500[167] franciscana are captured each year.[168] Incidental mortality of franciscana in coastal gillnet fisheries in northern Buenos Aires, Argentina from September to April, during a four-year period from 2000 – 2004 was 312 dolphins—seventy-one percent of these bycaught franciscanas were female and most (56%) were immature.[169]

In 2000, Brazilian fisheries killed 1496 franciscana.[170]

In a small-scale survey of fishers operating from the post of Rio Grande, logbook data obtained from 9 – 10% of the fleet, estimated the total number of dolphins taken as bycatch by the entire fleet to be 946 dolphins (CI 467 – 1525) in 1999 and 719 (CI 248 – 1413) in 2000. This data was further extrapolated to all of the fishing area, giving a total estimated bycatch of 1106 (578 – 1915) in 1999 and 992 (475 – 1832) in 2000.[171]

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165 Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

166 The reason for the decline is a decline in fish stocks and the fisheries that use nets with larger mesh (32-34 and 20-22 mm) have reduced their effort and nets with small mesh are being used instead. Also Uruguayan legislation protecting franciscana (Law 9481 and Decrees 26, 1/78, 586/79 and 565/81 are being enforced.

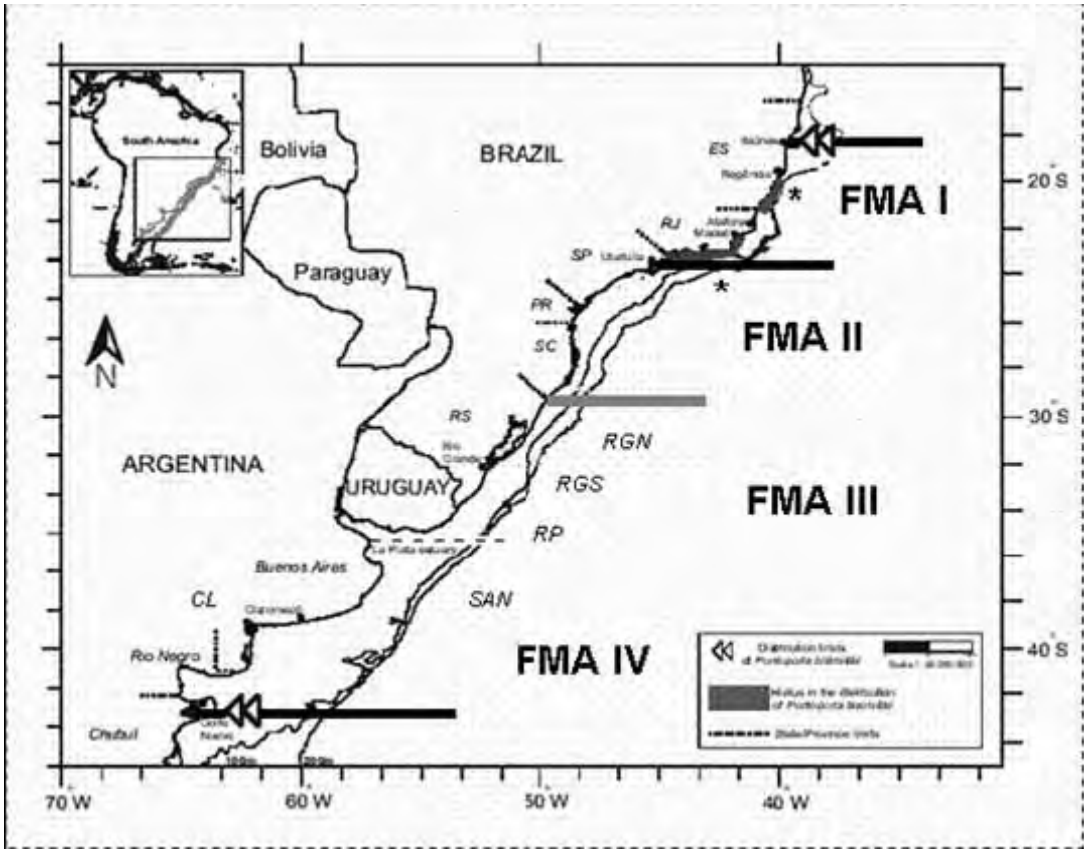
167 From 2000 to 2003 Argentinean fisheries killed between 160 to 893 animals annually.

168 Crespo EA (2002) Franciscana—*Potoporia blainvillei* In: Encyclopedia of marine mammals (Perrin WF, Wursig B, Thewissen JGM eds) Academic Press, San Diego, pp482-487

169 Annex H, Small Cetacean Subcommittee (2004)

170 Annex H, Small Cetacean Subcommittee (2004) Figures composed as follows: >850 (55) Caught in Southern Brazil – Gillnet. (It is only a rough estimate based on extrapolation. For the whole fleet. Data from only nine boats from a fleet of about 140-150) + 646 (48) from Rio Grande, southern Rio Grande do Sul.

171 Annex H, Small Cetacean Subcommittee (2004)

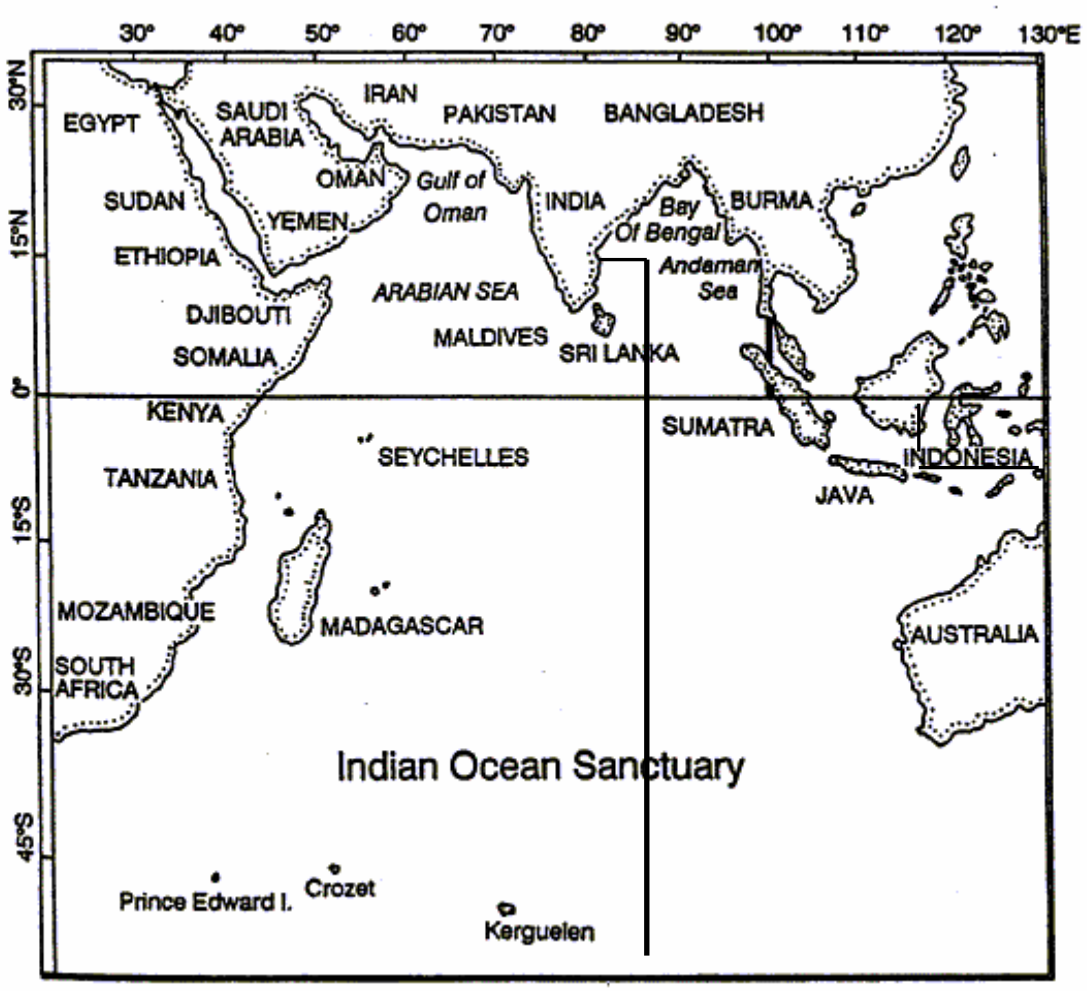


AREA 47 SOUTHEAST ATLANTIC

Species	***Cephalorhynchus heavisidii* Heaviside's dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	Heaviside's dolphins are entangled in inshore gillnets off South Africa and Namibia. There are unconfirmed reports of animals taken in bottom trawl fisheries and beach seine nets
Estimated Annual Mortality	The estimated total kills of dolphins in 7,013 sets of Namibia in 1983 were 67 (C. heavisidii and Lagenorhynchus obscurus combined); whereas 57 were killed in South Africa. Other sources of incidental mortality were set nets close to the shore of Namibia, and a bottom trawl fishery.[172]

[172] Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.

AREA 51 WESTERN INDIAN OCEAN



Species	***Kogia breviceps* Pygmy sperm whale.**
Abundance Estimate	No Abundance Estimate
Fisheries	Pygmy sperm whales are caught in Sri Lankan coastal gillnet and driftnet fisheries
Estimated Annual Mortality	Pygmy sperm whales are one of the major cetacean species caught in the Sri Lankan driftnet fisheries. Up to 6% of the landed catch consists of pygmy sperm whales, the total annual catch for all cetaceans has been estimated at 15,000 to 25,000, and therefore, total annual catches may reach 2,700 animals.[173] Population impact of this catch is unknown. The IWC, in 1994, estimated that more than 80 pygmy sperm whales are

[173] Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

[174] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

killed each year off the coast of Sri Lanka.[174]

Species	***Kogia simus* Dwarf sperm whale.**
Abundance Estimate	No Abundance Estimate
Fisheries	Dwarf sperm whales are caught in Sri Lankan coastal gillnet and driftnet fisheries
Estimated Annual Mortality	Dwarf sperm whales may represent up to 6% of the cetacean bycatch in the Sri Lankan driftnet fisheries. Therefore, total annual catches may reach 2,700 animals.[175] The IWC, in 1994, estimated that more than 230 dwarf sperm whales are killed each year off the coast of Sri Lanka.[176]

Species	***Steno bredanensis* Rough-toothed dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	Rough-toothed dolphins are caught in Sri Lankan coastal gillnet fisheries
Estimated Annual Mortality	This dolphin is taken in the Sri Lankan driftnet fishery in small numbers only, (5 recorded in total) with a maximum of only 2% in one sample, suggesting a catch of perhaps a few hundreds per year.[177] The IWC, in 1994, estimated that more than 50 rough-toothed dolphins are killed each year off the coast of Sri Lanka.[178]

Species	***Sousa plumbea/chinensis* Indian humpback dolphin.**	
Abundance Estimate	No Total Abundance Estimate	
	Plettenberg Bay, South Africa	25[179]
	Natal coast	200[180]
	Zanzibar (Tanzania), East Africa	71 (48-94)[181]

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175 Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

176 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

177 Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

178 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

179 Ross GJB, Heinsohn GE, Cockroft VG 1994. Humpback dolphins-*Souza chinensis* (Osbeck, 1765), Souza plumbea (G. Cuvier, 1829) and Souza teuszii (Kukenthal, 1892). In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 5: The first book of dolphins. Academic Press, London, pp 23-42.

180 Ross GJB, Heinsohn GE, Cockroft VG 1994. Humpback dolphins-*Souza chinensis* (Osbeck, 1765), Souza plumbea (G. Cuvier, 1829) and Souza teuszii (Kukenthal, 1892). In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 5: The first book of dolphins. Academic Press, London, pp 23-42.

181 Stensland, E. 2004. Behavioural ecology of Indo-Pacific bottlenose and humpback dolphins. Doctoral thesis, Stockholm University, Department of Zoology. ISBN: 91-7265-837-X.

	South Eastern Cape coast of South Africa	466[182]
	Bazaruto Archipelago, Mozambique	60[183]
	Indus Delta	500[184]
Fisheries	Indian humpback dolphins are caught in Sri Lankan coastal gillnet and driftnet fisheries, shark nets in Natal, Indian ocean coastal gillnets, and gillnets in offshore waters of Pakistan.	
Estimated Annual Mortality	Entanglements in gillnets have been reported from Djibouti, the Arabian Gulf, Indus delta and the south-west coast of India. This species also becomes entangled in Indian shark and catfish gillnet fisheries along the east coast of India. Between 1980 and 1988, 67 humpback dolphins died in shark nets to protect bathing beaches along the Natal coast, South Africa—or about 7-8 animals per year.[185] 2.2 animals per year are captured in the Calicut gillnet fishery. Hump-back dolphins are commonly entangled in coastal driftnet fisheries for seerfish and tunas on the Indian west coast, and in set nets and driftnets. The IWC, in 1994, estimated that more than 100 hump-back dolphins died each year in fisheries off the Sri Lankan coast[186] and more than 7.5 hump-back dolphins died annually in fisheries off the Indian Ocean coast of Africa.[187]	
Species	***Peponocephala electra* Melon-headed whale.**	
Abundance Estimate	No Abundance Estimate	
Fisheries	Melon-headed whales are caught in Sri Lankan coastal gillnet and driftnet fisheries	
Estimated Annual Mortality	Three melon-headed whales were caught in the Sri Lankan driftnet fishery[188] The IWC, in 1994, estimated that less than 10 melon-headed whales were caught annually in fisheries in the northern Indian Ocean.[189]	

182 Karczmarski, L., Winter, P.E.D., Cockcroft, V.G., and McLachlan, A. 1999. Population analyses of Indo-Pacific humpback dolphins Sousa chinensis in Algoa Bay, Eastern Cape, South Africa. Marine Mammal Science 15, 1115–1123.

183 Ross GJB, Heinsohn GE, Cockroft VG 1994. Humpback dolphins-Souza chinensis (Osbeck, 1765), Souza plumbea (G. Cuvier, 1829) and Souza teuszii (Kukenthal, 1892). In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 5: The first book of dolphins. Academic Press, London, pp 23-42.

184 Ross GJB, Heinsohn GE, Cockroft VG 1994. Humpback dolphins-Souza chinensis (Osbeck, 1765), Souza plumbea (G. Cuvier, 1829) and Souza teuszii (Kukenthal, 1892). In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 5: The first book of dolphins. Academic Press, London, pp 23-42.

185Jefferson, T.A. and Karczmarski, L. 2001. Sousa chinensis. Mammalian Species (American Society of Mammalogists) 655, 9pp. See also. Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. South African Journal of Wildlife Research 20(2), 44–51.

186 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

187 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

188 Leatherwood, S. and Reeves, R.R. (eds.). 1989. Marine mammal research and conservation in Sri Lanka 1985–1986. UNEP Marine Mammal Technical Report 1, Nairobi, Kenya.

189 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

Species	***Feresa attenuata* Pygmy killer whale.**
Abundance Estimate	No Abundance Estimate
Fisheries	Pygmy killer whales are caught in Sri Lankan coastal gillnet and driftnet fisheries
Estimated Annual Mortality	Although they comprise less than 2% of all cetaceans caught in gillnet fisheries in Trincomalee, Sri Lanka and in villages on the southwest coast of Sri Lanka, fishery mortality may be 300-900 animals annually.[190] The IWC, in 1994, estimated that less than 170 pygmy killer whales were killed annually in fisheries off the coast of Sri Lanka.[191]

Species	***Pseudorca crassidens* False killer whale.**
Abundance Estimate	No Abundance Estimate
Fisheries	False killer whales are caught in Sri Lankan coastal gillnet and driftnet fisheries, shark nets in Natal, and Indian ocean coastal gillnets
Estimated Annual Mortality	Between 1980 and 1988, 1 false killer whale died in shark nets to protect bathing beaches along the Natal coast, South Africa.[192] Catches in the Sri Lankan fishery included false killer whales representing up to 6% of one sample.[193] The IWC, in 1994, estimated that more than 125 false killer whales were killed annually in fisheries off the coast of Sri Lanka.[194]

Species	***Lagenodelphis hosei* Fraser's dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	Fraser's dolphins are caught in Sri Lankan coastal gillnet and driftnet fisheries, shark nets in Natal, and Indian ocean coastal gillnets
Estimated Annual Mortality	Between 1980 and 1988, 2 Fraser's dolphins died in shark nets to protect bathing beaches along the Natal coast, South Africa.[195]

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190 Ross GJB, Leatherwood S 1994. Pygmy killer whale—Feresa attenuata. In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds) Vol. 5: The first book of dolphins. Academic Press, London, pp 387-404.

191 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

192 Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. South African Journal of Wildlife Research 20(2), 44–51.

193 Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

194 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

195 Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. South African Journal of Wildlife *Research* 20(2), 44–51.

196 Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

197 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

	One Fraser's dolphin was caught in the Sri Lankan driftnet fishery[196]	
	The IWC, in 1994, estimated that more than 10 Fraser's dolphins were killed annually in fisheries off the coast of Sri Lanka.[197]	
Species	***Tursiops truncatus* Bottlenose dolphin**	
Abundance Estimate	No Total Abundance Estimate	
	Zanzibar (Tanzaniz), East Africa	161 (144-177)[198]
	Indian Ocean coast, South Africa, south of Natal	250
	Indian Ocean coast, South Africa, north of Natal	1,000
Fisheries	Bottlenose dolphins are caught in Sri Lankan coastal gillnet and driftnet fisheries, shark nets in Natal, Indian ocean coastal gillnets, gillnets in Madagascar, and there are unquantified entanglements in medium and large mesh gillnets in offshore waters of Pakistan.	
Estimated Annual Mortality	Between 1980 and 1988, 271 bottlenose dolphins died in shark nets to protect bathers.[199] Scientists suggested that current catch rates may approach 5% of the local population and therefore may threaten it.[200]	
	Catches in India are reported quite frequently, and formed 33% of the total catch of cetaceans recorded in the gillnet fishery at Calicut.[201] Bottlenose dolphins are one of the commonly caught dolphins in seerfish and tuna driftnet fisheries on the west coast of India, and in coastal gillnet fisheries for pomfrets and other species too. In Sri Lanka, this species was found to consist of between 5 and 25% of the total cetacean catch in four different surveys amounting to 1,250 to 10,000 animals.[202]	
	Although national legislation prohibits the capture of cetaceans, which were formerly taken with harpoons[203] an estimated 200-300 bottlenose	

198 Stensland, E. 2004. Behavioural ecology of Indo-Pacific bottlenose and humpback dolphins. Doctoral thesis, Stockholm University, Department of Zoology. ISBN: 91-7265-837-X.

199 Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. *South African Journal of Wildlife Research* 20(2), 44–51.

200 Peddemors, V.M., Cockcroft, V.G., and Wilson, R.B. 1991. Incidental dolphin mortality in the Natal shark nets: a preliminary report on prevention measures. Pp.129–137 *in: Cetaceans and Cetacean Research in the Indian Ocean Sanctuary* (eds. S. Leatherwood and G.P. Donovan). UNEP Marine Mammal Technical Report No. 3. Nairobi, Kenya.

201 Mohan, R.S.L. 1994. Review of gillnet fisheries and cetacean by-catches in the northeastern Indian Ocean. *Report of the International Whaling Commission* (Special Issue) 15, 329–346.

202 Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp. See also Mohan, R.S.L. 1994. Review of gillnet fisheries and cetacean by-catches in the northeastern Indian Ocean. *Report of the International Whaling Commission* (Special Issue) 15, 329–346.

203 Leatherwood, S. 1986. *Whales, Dolphins and Porpoises of the Indian Ocean Sanctuary. A Catalogue of Available Information.* Hubbs Marine Research Centre Technical Report No. 87-197. San Diego: Hubbs Marine Research Center. 207pp.

204 De Lestang, J.N. 1993. Status of marine mammals in the eastern African region. Report to UNEP; *Regional* Seas Reports and studies series.

205 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

	dolphins are still killed annually by the Seychelles schooner fleet of some 20 vessels fishing at the edge of the Mahe Plateau and the outlying islands of the Seychelles group[204] The IWC, in 1994, estimated that more than 500 bottlenose dolphins were caught in fisheries off the coast of Sri Lanka, 20-23 were killed in fisheries off the Indian Ocean coast of South Africa south of Natal, and 11-14 were killed in fisheries off the Indian Ocean coast of South Africa north of Natal.[205]
Species	***Grampus griseus* Risso's dolphin.**
Abundance Estimate	5,500 to 13,000[206]
Fisheries	Risso's dolphins are caught in Sri Lankan coastal gillnet and driftnet fisheries
Estimated Annual Mortality	In Sri Lanka, Risso's dolphins are the second most commonly bycaught cetacean in fisheries, providing fish and meat for human consumption and fish bait--stocks may be adversely affected. Risso's dolphins are caught frequently in the Sri Lankan fishery--between 6% and 16% of the total cetacean catch–or roughly 1,300 dolphins.[207] The IWC, in 1994, estimated that more than 1,300 Risso's dolphins were killed in fisheries off the coast of Sri Lanka.[208]
Species	***Stenella longirostris* Spinner dolphin.**
Abundance Estimate	No Abundance Estimate
Fisheries	Spinner dolphins are caught in Sri Lankan coastal gillnet and driftnet fisheries. This species is caught in Pakistani offshore deepwater gillnet fisheries and is commonly entangled in coastal driftnet fisheries for seerfish and tunas on the west coast of India, and is also entangled in other gillnet fisheries for sharks, pomfrets and other species.
Estimated Annual Mortality	Spinner dolphins are the most frequently caught species in the Sri Lankan fishery, where they formed between 33 and 47% of the total cetacean catch in for different surveys, or roughly 7,050-11,750 dolphins per year.[209]

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[206] Kruse S, Caldwell DK, Caldwell MC 1999. Risso's dolphin- *Grampus griseus* (G Cuvier, 1812) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp183-212

[207] Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

[208] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

[209] Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

[210] Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. *South African Journal of Wildlife Research* 20(2), 44–51.

[211] Mohan, R.S.L. 1994. Review of gillnet fisheries and cetacean by-catches in the northeastern Indian Ocean. *Report of the International Whaling Commission* (Special Issue) 15, 329–346.

	A single animal is reported from the Natal shark nets,[210] while in India, spinner dolphins made up more than 50% of the cetacean catch in the gillnet fishery.[211] The IWC, in 1994, estimated that more than 4,000 spinner dolphins were entangled in fisheries off the coast of Sri Lanka.[212]
Species	***Stenella coeruleoalba* Striped dolphin.**
Abundance Estimate	No Abundance Estimate
Fisheries	Striped dolphins are entangled in Sri Lankan coastal gillnet and driftnet fisheries, shark nets in Australian, Indian ocean coastal gillnets, and unquantified catches in the offshore gillnet fisheries of Pakistan.
Estimated Annual Mortality	Between 1980 and 1988, 3 dolphins were entangled in the Natal shark nets to protect bathing beaches along the Natal coast, South Africa [213] Striped dolphins are frequently entangled in the Sri Lankan driftnet fishery where between 6 and 11% of all cetaceans landed were found to be this species—900 to 2,750[214] The IWC, in 1994, estimated that more than 700 striped dolphins were killed in fisheries off the coast of Sri Lanka.[215]
Species	***Stenella attenuata* Pantropical spotted dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	Spotted dolphins are entangled in Sri Lankan coastal gillnet and driftnet fisheries
Estimated Annual Mortality	Up to 27% of all cetaceans landed in Sri Lanka are spotted dolphins, suggesting a total annual catch between 4,050 and 6,750.[216] The IWC, in 1994, estimated that more than 1,500 spotted dolphins were killed in fisheries in the Northern Indian Ocean.[217]
Species	***Delphinus delphis* Common dolphin.**
Abundance Estimate	No Abundance Estimate

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[212] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

[213] Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. *South African Journal of Wildlife Research* 20(2), 44–51.

[214] Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

[215] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

[216] Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

[217] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

Fisheries	Common dolphins are entangled in Sri Lankan coastal gillnet and driftnet fisheries and Indian ocean coastal gillnets. Common dolphins also become entangled in driftnets and bottom set gillnets for pomfrets and other species in Indian.
Estimated Annual Mortality	Common dolphins form around 8% of the total cetacean catches in the Calicut gillnet fishery (14 were recorded in 5 years).[218] The IWC, in 1994, estimated that more than 1,000 common dolphins were killed in fisheries in the Southwestern Indian Ocean, and 33 were entangled in fisheries the Indian Ocean coast of South Africa.[219]

Species	***Neophocaena phocaenoides* Finless porpoise.**
Abundance Estimate	No Abundance Estimate
Fisheries	Finless porpoise are entangled in Sri Lankan coastal gillnet and driftnet fisheries, shark nets in Australian, and Indian ocean coastal gillnets. This species is commonly caught in seerfish and tuna driftnet fisheries throughout the west coast of India. Finless porpoises have been caught in a shrimp trawl in Pakistan in 1989, entangled in beach seines and stake nets for shrimp, and entangled in small and medium mesh finfish gillnets in shallow inshore waters of Pakistan.
Estimated Annual Mortality	No Estimate of Mortality

AREA 57 EASTERN INDIAN OCEAN

Species	***Platanista gangetica* Ganges river dolphin.**
Abundance Estimate	600-700[220]
Fisheries	Ganges river dolphins are entangled in gillnets. The dolphin was deliberately killed for its meat and oil, but that may have decreased.[221]
Estimated Annual Mortality	No Estimate of Mortality

Species	***Sousa plumbea/chinensis* Indian humpback dolphin.**
Abundance Estimate	No Abundance Estimate-may be declining in Australian waters
Fisheries	Humpback dolphins are entangled in coastal gillnet and driftnet fisheries, gillnets set for sharks This species also becomes entangled in Indian

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[218] Mohan, R.S.L. 1994. Review of gillnet fisheries and cetacean by-catches in the northeastern Indian Ocean. *Report of the International Whaling Commission* (Special Issue) **15**, 329–346.

[219] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

[220] Reeves RR, Chaudhry AA. 1998. Status of the Indus River dolphin *Platanista minor*. Oryx 32: 35-44.

[221] Dolphin meat, intestines, and oil are used as fish attractant in the Ganges and Brahmaputra rivers of India and Bangladesh. In the Brahmaputra River, fishermen trail bound pieces of dolphin body parts alongside small boats while sprinkling the water with a mixture of oil and minced dolphin flesh. Small unbaited hooks are used to catch the fish as they come to the surface within the oil slick

	shark and catfish gillnet fisheries along the east coast of India.
Estimated Annual Mortality	No Estimate of Mortality

Species	***Orcaella brevirostris* Irrawaddy (snubfin) river dolphin**
Abundance Estimate	No Total Abundance Estimate
	Chilka Lake, India 20-30
Fisheries	Irrawaddy dolphins are incidentally captured in driftnet fishing nets in Bangladesh and India.
Estimated Annual Mortality	No Estimate of Mortality

Species	***Tursiops truncatus* Bottlenose dolphin**
Abundance Estimate	No Total Abundance Estimate
	south-eastern Shark Bay[222] 400
	Cockburn Sound, Western Australia[223] 150
Fisheries	Bottlenose dolphins are entangled in shark nets in Australia, in anti-predator nets set around tuna feedlots in Port Lincoln, South Australia, and in shark and catfish gillnet fisheries off the east coast off India.
Estimated Annual Mortality	No Estimate of Mortality

Species	***Stenella longirostris* Spinner dolphin.**
Abundance Estimate	No Abundance Estimates
Fisheries	Spinner dolphins are entangled in coastal gillnet and driftnet fisheries in the eastern Indian Ocean and shark and catfish gillnet fisheries in Indian waters.
Estimated Annual Mortality	No Estimate of Mortality

Species	***Delphinus delphis* Common dolphin.**
Abundance Estimate	No Abundance Estimate
Fisheries	Common dolphins are entangled in Indian ocean coastal gillnets and Indian catfish and shark gillnet fisheries.

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[222] Ross, GJB. 2006 Review of the conservation status of Australia' smaller whales and dolphins. Australian Government http://www.deh.gov.au/coasts/publications/pubs/conservation-smaller-whales-dolphins.pdf

[223] Ross, GJB. 2006 Review of the conservation status of Australia' smaller whales and dolphins. Australian Government http://www.deh.gov.au/coasts/publications/pubs/conservation-smaller-whales-dolphins.pdf

Estimated Annual Mortality	No Estimate of Mortality

Species	***Neophocaena phocaenoides* Finless porpoise.**
Abundance Estimate	No Abundance Estimate
Fisheries	Finless porpoise are caught in Indian ocean coastal gillnets for shark and catfish and other coastal gillnet fisheries.
Estimated Annual Mortality	No Estimate of Mortality

AREA 61 NORTHWEST PACIFIC

Species	***Berardius bairdii* Baird's beaked whale.**	
Abundance Estimate[224]	Japanese Pacific coast	5,029/1.0%
	Sea of Japan	1,260/0.6%
	Okhotsk Sea	660/0.3%
Fisheries	Baird's beaked whales have been caught in Japanese salmon driftnets and trap fisheries	
Estimated Annual Mortality	Historically, Japan's coastal whaling stations killed up to 40 Baird's beaked whales per year--now the industry operates with a quota of 8 for the Sea of Japan, 2 for the southern Okhotsk Sea and 52 for the Pacific coasts.[225].	
	Over a 5 year period (1986 to 1990), at least 2 Baird's beaked whales were incidentally killed in Japanese trap nets.	
	From 1998 to 2003, Japan reported killing 62 Baird's beaked whales each year in directed hunts.[226]	
	In 1999, 2001, and 2002, Korea reported killing 1 Baird's beaked whales each year in gillnet fisheries in the East sea.[227]	

Species	***Ziphius cavirostris* Cuvier's beaked whale.**
Abundance Estimate	No Abundance Estimate
Fisheries	Cuvier's beaked whales are caught in purse seine and gillnets fisheries

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[224] Katsuya T. 2002. Giant beaked whales. In: Encyclopedia of marine mammals (Perrin WF, Wursig, B, Thewissen JGM, eds.) Academic Press, San Diego, pp. 519-522.

[225] Katsuya T. 2002. Giant beaked whales. In: Encyclopedia of marine mammals (Perrin WF, Wursig, B, Thewissen JGM, eds.) Academic Press, San Diego, pp. 519-522

[226] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[227] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

Estimated Annual Mortality	In 1985 and 1986, two Cuvier's beaked whales were incidentally captured off the coast of Japan.

Species	***Pseudorca crassidens* False killer whale.**
Abundance Estimate	Coastal waters of China and Japan 16,000[228]
Fisheries	False killer whales are caught in trawl, gillnet and stow gear and are occasionally killed in Japan for food.[229]
Estimated Annual Mortality	In 1988, two false killer whales were caught in Japanese trap nets.[230] Chinese coastal fisheries may capture hundreds of false killer whales. From 1998 to 2002, Japan reported killing 45, 5, 8, 26, and 7 false killer whales in directed hunts.[231] In 2000 and 2002, Korea reported killing 1 false killer whale in gillnet fisheries in the East sea.[232]

Species	***Globicephala macrorhynchus* Short-finned pilot whale.**
Abundance Estimate	Northern form of short-finned pilot whales 5,300[233] Southern form of short-finned pilot whales 53,000[234]
Fisheries	Short-finned pilot whales are caught in Japanese gillnet fisheries and are occasionally harvested in Japan for food.[235]
Estimated Annual	From 1984 to 1988, pilot whales were killed in gillnets, primarily Japanese driftnets, at a rate of approximately 4 per year, and at a slightly

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228 Odell DK, McClune KM 1999. *Pseudorca crassidens* (Owen, 1846) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp213-244

229 The largest documented fisheries interaction is in the waters around Iki Island, Japan, where over 900 false killer whales were killed in drive fisheries from 1965 to 1980 in an attempt to reduce interactions with the yellowtail fishery. Odell DK, McClune KM 1999. *Pseudorca crassidens* (Owen, 1846) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp213-244

230 Odell DK, McClune KM 1999. *Pseudorca crassidens* (Owen, 1846) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp213-244

231 IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

232 IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

233 Bernard HJ, Reilly B. 1999. Pilot whales *Globicephala* Lesson, 1928. In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp245-280

234 Bernard HJ, Reilly B. 1999. Pilot whales *Globicephala* Lesson, 1928. In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp245-280

235 In 1982, the Japanese drive fishery at Taiji expanded and harpooning of the northern form was resumed off Sanriku and Hokkaido. Between 1982 and 1985, 1,755 whales of the southern form were killed, and 519 of the northern form were taken during this same period. From 1985 to 1989, Japan took a total of 2,326 short-finned pilot whales. The drive fishery in Japan and the harpoon fishery continue today. In 1997, Japan recorded a catch of 347 short-finned pilot whales. Olson PA, Reilly SB 2002. Pilot whales—*Globicephala melas* and *G. macrorhynchus*. In: Encyclopedia of marine mammals (Perrin WF, Wursig, B, Thewissen JGM, eds.) Academic Press, San Diego, pp. 898-903.

Mortality	lower rate in trap nets.[236] Between 350 and 750 pilot whales die annually in passive nets and traps set by the Japanese fishery.[237] From 1998 to 2002, Japan reported killing 229, 394, 304, 342, 176 short-finned pilot whales each year in directed hunts.[238]
Species	***Steno bredanensis* Rough-toothed dolphin.**
Abundance Estimate	No Abundance Estimate
Fisheries	Rough-tooth dolphins are caught in driftnet, purse seine and gillnet fisheries and are killed in drive fisheries at Okonawa in the Ryukyus and in the home islands of Japan.[239]
Estimated Annual Mortality	One rough-toothed dolphin was killed in an unspecified Japanese fishery in 1985.
Species	***Lagenorhynchus obliquidens* Pacific white-sided dolphin.**
Abundance Estimate	No Abundance Estimate
Fisheries	White-sided dolphins were caught in gillnet fisheries, longlines and trawls. Japanese drive and harpoon fisheries kill hundreds or even thousands of Pacific white-sided dolphins.[240]
Estimated Annual Mortality	In 1989, the estimated total bycatch for the Japanese squid driftnet fishery was approximately 6,100; in 1990, the total estimate for all driftnet fisheries combined was 5,759.[241] In January 1993, a United Nations moratorium on these high seas driftnet fisheries went into effect.

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[236] Olson PA, Reilly SB 2002. Pilot whales—*Globicephala melas* and *G. macrorhynchus*. In: Encyclopedia of marine mammals (Perrin WF, Wursig, B, Thewissen JGM, eds.) Academic Press, San Diego, pp. 898-903.

[237] Bernard HJ, Reilly B. 1999. Pilot whales *Globicephala* Lesson, 1928. In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp245-280

[238] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[239] From 1976 – 1981, 23 rough-tooth dolphins were captured in Okinawa. Miyazaki N. Perrin WF 1994. Rough-tooth dolphin *Steno bredanensis* (Lesson, 1828). In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp245-280

[240] Jefferson TA, Leatherwood S, Webber MA 1993. FAO Species identification guide. Marine Mammals of the world. UNEP/FAO, Rome, 320pp

[241] Hobbs RC, Jones LL 1993. Impacts of high seas driftnet fisheries on marine mamma populations in the North Pacific. Int North Pacific Fish Comm Bulletin 53: 409-434.

[242] Brownell RL, Walker WA, Forney KA 1999. Pacific white-sided dolphin—*Lagenorhynchus obliquidens*. In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp57-84

[243] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[244] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

	Smaller catches of white-sided dolphins are reported in the Japanese land-based salmon driftnet fishery and in seine, set nets, and trap nets around Japan.[242]
	From 1998 to 2002, Japan reported incidentally killing approximately one white-sided dolphin per year—no directed hunts were reported.[243]
	From 1998 to 2003, Korea reported killing 7, 3, 4, 41, 53, and 18 Pacific white-sided dolphins each year in gillnets, set nets, trap nets and longline fisheries in the East sea.[244]
Species	***Tursiops truncatus* Bottlenose dolphin**
Abundance Estimate	Northwest Pacific 316,935[245]
Fisheries	Bottlenose dolphins are killed in drive fisheries in Taiwan and Japan for human consumption and bait.[246]
Estimated Annual Mortality	Incidental catches in Chinese fisheries reach several hundred per year.
	Incidental catches of bottlenose dolphins are roughly 6 per year in Japanese fisheries
	From 1998 to 2002, Japan reported killing 245, 658, 1,426, 247, and 729 bottlenose dolphins year in directed hunts—no incidental mortality was reported.[247]
	From 2000 to 2003, Korea reported killing 12, 3, 4, and 1, bottlenose dolphins each year in gillnets, set nets, trawl and purse-seine fisheries in the East and South Sea.[248]
Species	***Grampus griseus* Risso's dolphin**
Abundance Estimate	105,000
Fisheries	In Japan, Risso's dolphins are killed for food and fertilizer in set nets and as a limited catch in the small-type whaling industry.[249]
Estimated Annual Mortality	Incidental catches in Chinese fisheries reach several hundred per year.
	About 2 Risso's dolphins per year are reported killed in fishing gear in

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[245] Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

[246] The Japanese drive fishery off Iki Island and the Kii Peninsula takes several hundred bottlenose dolphins annually. Reported catches in Japanese drive fisheries of bottlenose dolphins were 230 in 1986; 1,813 in 1987; and 828 for 1988. Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

[247] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[248] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[249]Kruse S, Caldwell DK, Caldwell MC 1999. Risso's dolphin- *Grampus griseus* (G Cuvier, 1812) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp183-212

	Japan. From 1998 to 2002, Japan reported killing 442, 489, 506, 474, and 386 Risso's dolphins each year in directed hunts—one Risso's dolphin was incidentally take in 2001 and 2002.[250]
	From 1998 to 2003, Korea reported killing 7, 2, 20, 25, 2, and 2 Risso's dolphins each year in gillnets, set nets, trap nets and longline fisheries in the East Sea.[251]
Species	**Stenella longirostris Spinner dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	In Japan, spinner dolphins were killed in drive fisheries in Japan.[252]
Estimated Annual Mortality	Eleven dolphins were killed in Japanese gillnets in 1985--no spinner dolphins were reported caught between 1998 and 2003.[253]

Species	***Stenella coeruleoalba* Striped dolphin**	
Abundance Estimate[254]	Japanese Pacific coast	821,000
	20° and 30° N	7,000
	30° and 40° N	350,000
	Near-shore Japanese waters	2,300
Fisheries	The Japanese have both drive and hand-harpoon fisheries for striped dolphins at several locations that date back to 1868-1912.[255] Striped dolphins are caught in driftnets, (presumably the Japanese large mesh or squid driftnet fisheries), trap nets and other types of gear.	
Estimated Annual Mortality	From 1998 to 2002, Japan reported killing 449, 596, 300, 484, and 642 striped dolphins a year in directed hunts—no incidental mortality was reported.[256]	

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[250] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[251] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[252] Kruse S, Caldwell DK, Caldwell MC 1999. Risso's dolphin- *Grampus griseus* (G Cuvier, 1812) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp183-212

[253] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[254] Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

[255] The catches were voluntarily reduced beginning in 19812 and have since varied between 358 (in 1987) and 4,883 (1981), averaging 2,830 during the period 1981-89. Between 1989-1993, the average catch has dropped to 1,028. Scientists report that the Japanese multispecies dolphin fisheries now receive an annual quota of 725. Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages at 289.

[256] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

Species	***Stenella attenuata* Pantropical spotted dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	Spotted dolphins are caught in coastal gillnet and driftnet fisheries
Estimated Annual Mortality	From 1998 to 2002, Japan reported killing 460, 38, 39, 10, and 418 spotted dolphins a year in directed hunts—one incidental mortality was reported in 2002.[257] No other mortality estimates are available.

Species	***Delphinus delphis* Common dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	In Japan, common dolphins were caught in gillnet fisheries in Japan.
Estimated Annual Mortality	Common dolphins are reported killed by Japanese vessels at a rate of approximately 20 per year, mainly in gillnets (IWC 1986–90). Catches are known to occur at a higher rate than this in the squid driftnet fishery, so presumably not all are reported. No common dolphins were reported taken by Japan between 1998 and 2003.[258] From 1998 to 2003, Korea reported killing 17, 25, 29, 62, 76, and 113 common dolphins each year in gillnets, set nets, trap nets, driftnet, and purse seine fisheries in the East Sea.[259]

Species	***Lissodelphis borealis* Northern right whale dolphin.**
Abundance Estimate	North Pacific 400,000
Fisheries	In Japan and Russia, northern right whale dolphins are caught in purse-seine operations and in salmon drift-net operations.
Estimated Annual Mortality	In the 1980s, the estimated total bycatch for the Japanese, Taiwanese, and South Korean squid driftnet fishery was approximately 15,000-24,000 per year and this mortality is considered to have depleted the population to 24-73% of its pre-exploitation size.[260] In January 1993, a United Nations moratorium on these high seas

[257] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[258] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[259] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[260] Mangel M. 1993. Effects of high seas driftnet fisheries on the northern right whale dolphin *Lissodelphis borealis*. Ecol App 3: 221-229

[261] Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

[262] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

	driftnet fisheries went into effect.	
	The total reported bycatch of northern right whale dolphins by Japan in 1987 was 261 individuals.[261]	
	Reports of northern right whale dolphin accidental mortalities have increased since 1984, notably in gillnet fisheries, from 8 to 268 in 1988. About 2 more per year are reported caught in trapnet fisheries, but no northern right whale dolphins were reported bycaught between 1998 and 2003.[262]	
Species	***Phocoenoides dalli* Dall's porpoise**.[263]	
Abundance Estimate[264]	North Pacific and Bering Sea	1,186,000[265]
	Western North Pacific	141,800
	Off Japan (.50% truei-type)	104,000
	Sea of Okhotsk (all three stocks)	2,150
Fisheries	The Japanese have both drive and hand-harpoon fisheries for Dall's porpoise at several locations that date back to 1868-1912.[266] Dall's porpoise are caught in driftnets, (presumably the Japanese large mesh or squid driftnet fisheries), trap nets and other types of gear.	
Estimated Annual Mortality	Large numbers of Dall's porpoises were killed incidentally in salmon (north-western North Pacific and Bering Sea) and squid (central North Pacific and adjacent seas) driftnet fisheries, starting as long ago as the 1950s. Bycatches were in the thousands if not tens of thousands in the years prior to the United Nations ban on high-seas driftnet fishing came into effect at the end of 1992.[267]	
	In addition, a large-scale hand-harpoon hunt for Dall's porpoises has existed in Japanese waters for many decades.	
	During the 1980s, this hunt intensified reportedly to compensate for the shortage of whale meat (due to the IWC whaling moratorium) and the reduced catch of striped dolphins (due to depletion from over-exploitation; see above). Between 1986 and 1989, approximately 11,500	

263 Two subspecies are recognized based on geographical variation in color patterns. *Dalli*-type animals (*P. d. dalli*) predominate in most of the species' range, except in a limited area of the western Pacific (between approximately 35°N and 54°N) where *truei*-type animals (*P. d. truei*) are more common. As many as eleven stocks have been proposed, each centered on what are thought to be major calving grounds

264 Houck WJ, Jefferson TA 1999. Dall's porpoise—*Phocoenoides dalli* (True, 1885) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp443-472

265 Buckland ST, Cattanach KL, Hobbs RC 1993. Abundance estimates of Pacific white-sided dolphin, northern right whale dolphin, Dall's porpoise and northern fur seal in the North Pacific, 1987-1990. Int North Pacific Fish Comm Bull 53: 387-407.

266 The catches were voluntarily reduced beginning in 19812 and have since varied between 358 (in 1987) and 4,883 (1981), averaging 2,830 during the period 1981-89. Between 1989-1993, the average catch has dropped to 1,028. Scientists report that the Japanese multispecies dolphin fisheries now receive an annual quota of 725. Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages at 289.

267 IWC. 1992. Report of the scientific committee. *Report of the International Whaling Commission* 42, 51–270.

Dall's porpoises were removed each year by hunting from two stocks centered in the Okhotsk Sea.[268] In 1989, the Japanese government established regulations for the hand-harpoon hunt, as a result reported catch levels decreased to fewer than 11,500 in 1992.[269] Thereafter, the quota was increased to 17,700 per year, and the reported catch reached above 18,000 in 1997.[270] The IWC has expressed concerns that this level may not be sustainable by populations in the western Pacific and adjacent seas.

Large numbers of Dall's porpoises die in driftnets within national waters of Japan and Russia, where the UN ban on driftnets does not apply. For the period 1993 to 1999, the estimated bycatch in the Japanese salmon driftnet fishery operating in the Russian EEZ totaled close to 12,000 and ranged from 643–3149 on an annual basis.[271]

The Bering Sea population is estimated to have been reduced to somewhere between 78% and 94% of its pre-exploitation size, and the Western Pacific population to between 66% and 91% of its original size. In 1994, the IWC estimated that 741-4,187 animals were killed each year in the Western North Pacific.[272]

From 1998 to 2002, Japan reported killing 11,385, 14,807, 16,171, 16,650, and 15,949 Dall's porpoise a year in directed hunts, two and 169 incidental deaths were reported in 1998 and 1999 respectively. [273]

In 2001 and 2002, Korea reported killing 2 and 1 Dall's porpoise respectively in gillnets, set net, and driftnet fisheries in the East Sea.[274]

Species	***Phocoena phocoena* Harbor porpoise.**
Abundance Estimate	No Abundance Estimate
Fisheries	In Japan and Russia, harbor porpoises are caught in trap and gillnet fisheries.
Estimated Annual Mortality	Harbor porpoises are reported killed in Japanese trap net fisheries, at a rate of approximately 20–30 per year, and in 1988, 71 were also reported bycaught in gillnets.

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[268] A total of 10,534 Dall's porpoise were taken in 1986, 13,406 in 1987, and 39,000 in 1988 from a population of approximately 105,000. IWC. 1991. Report of the scientific committee. *Report of the International Whaling Commission* 41, 51–219.

[269] IWC. 1994. Report of the scientific committee. *Report of the International Whaling Commission* 44, 41–201.

[270] IWC. 1999. Planning workshop to develop a research program to investigate pollutant cause-effect relationships in cetaceans – "Pollution 2000+." *Journal of Cetacean Research and Management* (Special Issue) 1, 55–72.

[271] IWC. 2002c. Report of the standing sub-committee on small cetaceans. *Journal of Cetacean Research and Management* 4 (Supplement), 325–338.

[272] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 25

[273] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[274] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

	Harbor porpoises are also caught in the salmon driftnet fishery at a much lower rate than Dall's porpoise, possibly in the tens of animals per year. One harbor porpoise was incidentally killed in 2001 and 2 were incidentally killed in 2002.[275]	
Species	***Neophocaena phocaenoides* Finless porpoise**	
Abundance Estimate[276]	Yangtze	2,700
	Inland Sea of Japan	4,900/1.7%
	Ariake/Tachibana Bay	3,100
	Omura Bay	200
Fisheries	The Japanese hunted finless porpoises in the East China Sea. The species is sold for human consumption in Korea.[277] Finless porpoises are entangled in a variety of nets in Japan.	
Estimated Annual Mortality	From 1985 to 1992, 114 finless porpoises were incidentally killed off the coast of western and north-eastern Kyushu, including part of the western inland sea of Japan: 84 were incidentally killed by fisheries—bottom gillnets killed 58; surface gillnets killed 17; trap nets killed 7; trawl nets killed 1 and drifting ghost nets killed 1.[278] Finless porpoises were incidentally captured most frequently in the coastal waters of China—totaling about 2,132 individuals in trawl, gillnet, and stow nets.[279] In 1994, the IWC estimated that 10-20 animals were killed each year in the Yangtze. [280] From 1998 to 2002, 6, 1, 20, 8, and 8 finless porpoises were incidentally taken in Japanese fisheries.[281] From 1998, 1999, 2001 to 2003, Korea reported killing 2, 14, 7, 14, and 82 finless porpoises in gillnets and set net fisheries the East, South, and	

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[275] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[276] Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

[277] Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages at 289.

[278] Kasuy T. 1999. Finless porpoise--*Neophocaena phocoenoides* (G Cuvier, 1829). In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp411-442

[279] Yang G. Zhou K, Xu X, Leatherwood S. 1999. A survey on the incidental catches of small cetaceans in coastal waters of China. Yingyong Shengtai Xuebao 10: 713-716

[280] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 25

[281] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[282] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

Yellow Sea.[282]

Species	***Lipotes vexillifer* Baiji**	
Abundance Estimate[283]	Yangtze	13-100 with the annual rate of population decline at 10%
Fisheries	Baiji are incidentally killed in longline fisheries—electric fishing	
Estimated Annual Mortality	45.5% of known Baiji deaths have been caused by accidental catches on longlines which are intensively used in the winter throughout much of the Baiji's range. Interactions with fisheries appear to be a major threat to the survival of this species.	

AREA 67 NORTHEAST PACIFIC

The Northeast Pacific includes cetaceans within the US EEZ, since the focus of this report is international bycatch, and the assessment and mitigation of bycatch in the United States is governed under the MMPA, the description for this area will focus only on international bycatch of shared cetacean stocks.

Species	***Eschrichtius robustus* Gray whale.**	
Abundance Estimate	Eastern North Pacific Stock	18,813 (CV = 0.07)[284]
Fisheries	Gray whales are caught in purse seine, gillnets, and pot fisheries.	
Estimated Annual Mortality	From 1999 to 2003, the mean annual mortality of gray whales in AK salmon purse seines, pot fisheries, CA white seabass gillnet fishery was >0.5, >1.2, and >0.2 animals respectively.[285] During that same period more than 3.6 gray whales died each year in unknown gillnet fisheries.[286] Since there are no Canadian observer programs, few data concerning the mortality of gray whales incidental to Canadian commercial fisheries are available. Data regarding the level of gray whale mortality related to commercial fisheries in Canadian waters, though thought to be small, are not readily available or reliable which results in an underestimate of the annual mortality for this stock. The estimated minimum annual mortality rate incidental to US commercial fisheries is 6.7 animals.[287]	

Species	***Balaenoptera acutorostrata* Minke whale.**	
Abundance Estimate	Alaska Stock	No Available Estimate

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283 Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

284 Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 153

285 Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 171,172

286 Id.

287 Id.

Fisheries	Fisheries include purse seine, gillnets, and pot fisheries
Estimated Annual Mortality	In 1989, one minke whale mortality (extrapolated to 2 mortalities) was observed in the Bering Sea/Gulf of Alaska joint-venture groundfish trawl fishery, the predecessor to the current Alaska groundfish trawl fishery. The Bering Sea/Aleutian Islands groundfish trawl fishery incurred one mortality of a minke whale in 2000; this extrapolates to an estimated 2 minke whale mortalities for that year. The total estimated mortality and serious injury incurred by this stock as a result of interactions with commercial fisheries is 0.32 (CV = 0.61).[288] Since there are no Canadian observer programs, few data concerning the mortality of minke whales incidental to Canadian commercial fisheries are available.

Species	***Megaptera novaeangliae* Humpback whale.**	
Abundance Estimate	Western North Pacific	394 (CV = 0.08)[289]
	Central North Pacific	4,004 (CV = 0.095)[290]
	CNP—Southeast Alaska	961 (CV = 0.12)

Fisheries	Humpback whales are caught in purse seines, trawl, gillnet, and pot fisheries. Between 2000 and 2004, there were incidental serious injuries and mortalities of Western North Pacific humpback whales in Bering Sea/Aleutian Islands Pollock trawl and Bering Sea/Aleutian Islands sablefish pot fisheries. In the Central North Pacific, in 1994, the incidental entanglment of a humpback whale was reported in the Southeast Alaska salmon purse seine fishery. Another humpback whale is known to have been incidentally entangled in this fishery in 1989. In 1996, a humpback whale was reported entangled and trailing gear as a result of interacting with the Southeast Alaska drift gillnet fishery. This whale is presumed to have died. Together, these two mortalities result in an annual mortality rate of 0.4 (0.2 + 0.2) humpback whales based on self-reported fisheries information.
Estimated Annual Mortality	There were 33 reports of human-related mortalities or injuries to humpback whales from the Central North Pacific stock from 2001 to 2005. Of these, there were 24 incidents which involved commercial fishing gear, and 13 of those incidents involved serious injuries or mortalities. This estimate is considered a minimum because not all entangled animals strand and not all stranded animals are found, reported, or cause of death determined.[291] Average annual mortality from

288 Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 206

289 Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 178

290 Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 187

291 Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 189

	observed fisheries was 0.20 humpbacks from the Western North Pacific stock.[292]	
	The estimated fishery-related minimum mortality and serious injury rate incidental to US commercial fisheries for the northern portion of the stock is 2.0 humpback whales per year, based on observer data from Alaska (0.20), stranding records from Alaska (1.8) The estimated minimum mortality and serious injury rate incidental to the commercial fisheries in Southeast Alaska is 1.0 humpback whales per year, based on stranding records from Alaska (1.0).[293]	
Species	***Delphinapterus leucas* White whale.**	
Abundance Estimate[294]	Beaufort Sea Stock	39,258 (CV = 0.229)
	Eastern Chuckchi Sea Stock	3,710
	Eastern Bering Sea Stock	18,142 (CV = 0.24)
	Bristol Bay Stock	1,888 (CV = .20)
	Cook Inlet Stock	357 (CV = 0.107)
Fisheries	Fisher self-reports in the Bristol Bay salmon set gillnet and drift gillnet fisheries, from 1990 to 2000, recorded 1 mortality in both 1990 and 1991 from these fisheries. Larger fishery-related mortalities resulting from these fisheries have been recorded in the past. During the summer of 1983 the Alaska Department of Fish and Game documented 12 beluga whale mortalities in Bristol Bay related to drift and set gillnet fishing.[295]	
Estimated Annual Mortality	No Estimates Available for Beaufort Sea Stock, Eastern Chuckchi Sea Stock, Eastern Bering Sea Stock, Cook Inlet Stock	
Species	***Orcinus orca* Killer whale.**	
Abundance Estimate[296]	Alaska Resident stock (includes Southeast AK, Prince William Sound, & Western AK)	1,123
	Eastern North Pacific Northern Resident Stock	216

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[292] Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 180 Note, however, that the stock identification is uncertain and the mortality may have involved a whale from the central North Pacific stock f humpback whales. Thus, this mortality is assigned to both the central and western stocks.

[293] Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p at 194

[294] Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 6

[295] Frost, K. J., L. F. Lowry, and R. R. Nelson. 1984. Belukha whale studies in Bristol Bay, Alaska. Pp. 187-200 *In* Proceedings of the workshop on biological interactions among marine mammals and commercial fisheries in the Southeastern Bering Sea. Oct. 18-21, 1983, Anchorage AK. Alaska Sea Grant Rep. 84-1.

[296] Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 6

	Gulf of Alaska, Aleutian Islands and Bering Sea Transient Stock	314
	West Coast Transient Stock	314
Fisheries	Although only small numbers of killer whales are caught in Bering Sea fisheries and there are no observed mortalities or serious injuries in the Gulf of Alaska, there are other interactions between the whales and the fisheries. Interactions between killer whales and longline vessels have been well documented.[297] Data collected from the Japan/U. S. cooperative longline research surveys operating in the Bering Sea indicate that interactions may be increasing and expanding into the Aleutian Islands region.[298] Since 1990, there have been no reported fishery-related standings of killer whales in Canadian waters and there are not reliable estimates of mortality in Canadian fisheries.	
Estimated Annual Mortality	The mean annual (total) mortality rate for all US fisheries for 1999-03 was 2.5 (CV = 0.37). The estimated minimum mortality rate incidental to the Bering Sea-Aleutian Islands (BSAI) flatfish trawl, BSAI Pollock trawl, BSAI Greenland turbot longline, and the BSAI Pacific cod longline is 2.3 animals per year, based exclusively on observer data.[299] The mean annual mortality rate incidental to U.S. commercial fisheries for the west coast transient stock is zero.[300]	

Species	***Lagenorhynchus obliquidens* Pacific white-sided dolphin.**	
Abundance Estimate	Central North Pacific	26,880[301]
Fisheries	White-sided dolphins are caught in gillnet fisheries, longlines and trawls	
Estimated Annual Mortality	Between 1978 and 1991, thousands of Pacific white-sided dolphins were incidentally killed each year in high seas fisheries. Pacific white-sided	

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297 Dahlheim, M. E. 1988. Killer whale (*Orcinus orca*) depredation on longline catches of sablefish (*Anoplopoma fimbria*) in Alaskan waters. NWAFC Processed Report 88-14, 31 pp. (available upon request -Alaska Fisheries Science Center, 7600 Sand Point Way NE, Seattle, WA 98115). See also Yano, K., and M. E. Dahlheim. 1995. Killer whale, *Orcinus orca*, depredation on longline catches of bottomfish in the southeastern Bering Sea and adjacent waters. Fish. Bull., U.S. 93:355-372.

298 Yano, K., and M. E. Dahlheim. 1995. Killer whale, *Orcinus orca*, depredation on longline catches of bottomfish in the southeastern Bering Sea and adjacent waters. Fish. Bull., U.S. 93:355-372. Killer whale predation on sablefish catch has been fairly consistent since 1988, and has occurred mainly east of 170° W in the eastern Bering Sea, and to a lesser extent in the northeast Aleutians. Sigler, M.F., C. R. Lunsford, J. T. Fujioka, and S. A. Lowe. 2002. Alaska Sablefish Assessment for 2003. In: Stock Assessment and Fishery Evaluation Report for the Groundfish Fisheries of the Bering Sea/Aleutian Islands Regions. North Pac. Fish. Mgmt. Council, Anchorage, AK, Section 5:229-294.

299 Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 91 As the animals which were taken incidental to commercial fisheries have not been identified genetically, it is not possible to determine whether they belonged to the Eastern North Pacific Alaska Resident or the Gulf of Alaska, Aleutian Islands, and Bering Sea Transient killer whale stock. Accordingly, these same mortalities are also reported for the Gulf of Alaska, Aleutian Islands, and Bering Sea Transient stock.

300 Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 113

301 Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 117

302 Note that no observers have been assigned to several of the gillnet fisheries that are known to interact with this

dolphins were frequently caught in the high seas squid driftnet fishery. Results from the 1989 Joint Observer Program indicated an observed catch rate on a sample of vessels which, if extrapolated, suggest a total catch of approximately 10,000 animals or more. The impact of this level of catch on the population is unknown. However, these fisheries have not operated in the central North Pacific since 1991.

There were no serious injuries or mortalities incidental to observed U.S. commercial fisheries from 2000-04.[302]

Species	***Phocoenoides dalli* Dall's porpoise.**	
Abundance Estimate	Central North Pacific	83,400 (CV = 0.1)[303]
Fisheries	Dall's porpoise were taken from gillnet fisheries, longlines and trawls	
Estimated Annual Mortality	From 1997-2001, the mean annual (total) mortality of Dall's porpoise was 5.4 (CV = 0.18) for the Bering Sea groundfish trawl fishery, 0.3 (CV = 0.61) for the Gulf of Alaska groundfish trawl fishery, and 0.2 (CV = N/A) for the Bering Sea groundfish longline fishery. In 1990, in the Alaska Peninsula and Aleutian Island salmon driftnet fishery, one Dall's porpoise mortality was observed which extrapolated to an annual (total) incidental mortality of 28 Dall's porpoise. Combining the estimates from the Bering Sea and Gulf of Alaska fisheries presented above (5.4 + 0.3 + 0.2 =5.9) with the estimate from the Alaska Peninsula and Aleutian Island salmon drift gillnet fishery (28) results in an estimated annual incidental kill of 33.9 porpoise per year from the Alaska stock.[304]	

Large numbers of Dall's porpoises were killed incidentally in salmon (north-western North Pacific and Bering Sea) and squid (central North Pacific and adjacent seas) driftnet fisheries, starting as long ago as the 1950s. Bycatches were in the thousands if not tens of thousands in some years before the United Nations ban on high-seas driftnet fishing came into effect at the end of 1992.[305]

Species	***Phocoena phocoena* Harbour porpoise.**	
Abundance Estimate	Southeast Alaska	17,076 (CV = 0.265)[306]
	Gulf of Alaska	41,854 (CV=0.224)[307]

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stock, making the estimated mortality unreliable.

[303] Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 135

[304] Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 136

[305] IWC. 1992. Report of the scientific committee. *Report of the International Whaling Commission* **42**, 51–270. at 212, 213.

[306] Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 137

[307] Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 141

	Bering Sea	66,078 (CV = 0.232)[308]
Fisheries	Harbor porpoise have been caught in gillnet fisheries	
Estimated Annual Mortality	During the period between 1990 and 1998, fisher self-reports from the Southeast Alaska salmon drift gillnet fishery resulted in an annual mean of 3.25 mortalities from interactions with commercial fishing gear. No mortalities from the Southeast Alaska stock of harbor porpoise incidental to commercial groundfish fisheries have been observed. Observers also monitored the Prince William Sound salmon drift gillnet fishery in 1990 and 1991, recording 1 mortality in 1990 and 3 mortalities in 1991. These mortalities extrapolated to 8 (95% CI 1-23) and 32 (95% CI 3-103) kills for the entire fishery, resulting in a mean kill of 20 (CV = 0.60) animals per year for 1990 and 1991. Logbook reports from Prince William Sound salmon drift gillnet fishery detail 6, 5, 6, and 1harbor porpoise mortalities in 1990, 1991, 1992, and 1993, respectively. The extrapolated (estimated) observer mortality accounts for these mortalities. In 1999 and 2000, observers were placed on the Cook Inlet salmon set and drift gillnet vessels, one harbor porpoise mortality was observed in 2000--the mortality extrapolates to an estimated mortality level of 31.2 for that year, and an average of 15.6 per year when averaged over the two years of observer data.[309] In 2002, observers were placed on Kodiak Island set gillnet vessels. Two harbor porpoise mortalities were observed in this fishery. These mortalities extrapolate to an estimated mortality of 32.2 animals per year. Therefore, the estimated minimum annual mortality incidental to commercial fisheries is 68.[310] One harbor porpoise mortality was observed in 2001 in the Bering Sea/Aleutian Islands flatfish trawl. The mean annual (total) mortality resulting from observed mortalities was 0.35 (CV = 0.65).[311] During the period from 1981 to 1987, 7 harbor porpoise mortalities have resulted from gillnet entanglement in the area from Nome to Unalakleet, 3 were reported near Kotzebue from 1989 to 1990, and some take of harbor porpoise is likely in the Bristol Bay gillnet fisheries (Barlow et al. 1994). A similar set gillnet fishery conducted by subsistence fishers incidentally took 6 harbor porpoise in 1991 near Point Barrow, Alaska. When averaged over the period from 1981 to 1990, the resulting annual mortality attributable to subsistence gillnets is 1.4 porpoise ((7 + 3 + 6)/11 = 1.4).[312]	

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308 Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 146

309Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 142

310 Id.

311 Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 142

312 Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 132

AREA 71 WESTERN CENTRAL PACIFIC

Species	***Sousa chinensis* Indopacific humpback dolphin**	
Abundance Estimate	Moreton Bay, Brisbane Aus	119-163
	Central Section Great Barrier Reef	200
Fisheries	Humpback dolphins are incidentally captured in inshore gillnets set across rivers and estuaries to catch barramundi and other fish; the are also captured in offshore driftnet fisheries.	
Estimated Annual Mortality	Shark nets killed 18 humpback dolphins between 1968 and 2001, 11 of which were from nets at Townsville and Cairns [313]	
	One animal was reported in a Taiwanese driftnet fishery for Spanish mackerel, tunas and sharks operating off northern Australia between 1974 and 1986.[314]	
	The IWC, in 1994, estimated that more than 100 humpback dolphins are killed in this area.[315]	

Species	***Pseudorca crassidens* False killer whale**	
Abundance Estimate	No Abundance Estimate	
Fisheries	False killer whales are incidentally captured in Taiwanese pelagic gillnet fisheries in Australian territorial waters off northern Australia; Current threats include culling to protect finfish fisheries off western Japan. False killer whales are also incidentally captured in tuna purse-seine and other net and long-line fisheries elsewhere in Pacific Ocean including possible entanglement in driftnets lost or discarded in international waters.	
Estimated Annual Mortality	A single animal was reported in the Taiwanese driftnet fishery off Northern Australia.[316]	
	The IWC, in 1994, estimated that more than 11 false killer whales are incidentally killed in this area.[317]	

Species	***Tursiops aduncus* Bottlenose dolphin**

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313 Parra, G.J., Corkeron, P.J. and Marsh, H. (2002). The Indo-Pacific Indo-Pacific Humpbacked dolphin, *Sousa chinensis* (Osbeck, 1765) in Australian waters: a summary of current knowledge and recommendations for their conservation. 54th Annual Meeting of the International Whaling Commission, Shimonoseki, Japan, May 2002, SC/54/SM27.

314 Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the* International Whaling Commission. 37: 363-367.

315 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

316 Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the* International Whaling Commission. 37: 363-367.

317 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

Abundance Estimate[318]	Moreton Bay, Brisbane Aus	334
	inshore waters off North Stradbroke Is	321
	open coastal waters off North Stradbroke Is.	700-1000
Fisheries	Bottlenose dolphins are incidentally captured, (possibly substantial) in the Taiwanese gillnet fishery and shark nets to protect bathers. Bottlenose dolphins are also caught in driftnet fisheries in Malabuhan, Siaton, and Negros Island.	
Estimated Annual Mortality	From 1974 to 1986, the Taiwanese gillnet fishery in the Arafura Sea and Timor Seas, northern Australia, incidentally caught an estimated 8400 *T. aduncus,* which comprised 60% of the total dolphin bycatch.[319] The annual mortality perhaps exceeded 2000 animals—severely impacting local populations. As a result the fishery was closed in 1986.	
	The IWC, in 1994, estimated that more than 1700 bottlenose dolphins are incidentally killed in this area.[320]	

Species	***Stenella longirostris* Spinner dolphin**	
Abundance Estimate[321]	Southern part of the Sulu Sea northeastern Malaysian waters	4,000
	Eastern Sulu Sea	30,000
Fisheries	Spinner dolphins are incidentally caught in gillnet fisheries, purse seine fisheries and driftnet fisheries in Malabuhan, Siaton, and Negros Island, and shark nets in Queensland. A small cetacean fishery kills some spinner Dolphins in the Solomon Islands, and they are incidentally killed in Thailand by shrimp trawls.[322]	
Estimated Annual Mortality	Commercial and municipal purse seine fisheries based in the Philippines annually caught an estimated 1,500-2,000 and 2,000 to 3,000 dolphins respectively, including spinner dolphins.[323]	
	Spinner dolphins comprised 35% of the identified cetaceans in the catch of the Taiwanese driftnet fishery in Northern Australian waters, suggesting a total mortality of at least 4900 spinner dolphins over 54	

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318 Ross, GJB. 2006 Review of the conservation status of Australia' smaller whales and dolphins. Australian Government http://www.deh.gov.au/coasts/publications/pubs/conservation-smaller-whales-dolphins.pdf

319 Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the* International Whaling Commission. 37: 363-367.

320 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

321 Dolar ML 1999. Abundance, distribution and feeding ecology of small cetacean in the Eastern Sulu Sea and Tanon Strait, Philippines. PhD Thesis, U of Cal, San Diego, USA

322 Bannister, J.L., Kemper, C.M. and Warneke, R.M. (1996). *The Action Plan for Australian Cetaceans*. Australian Nature Conservation Agency: Canberra vii 242 pp.

323 Dolar, M.L.L. 1994. Incidental takes of small cetaceans in fisheries in Palawan, central Visayas and northern Mindanao in the Philippines. *Report of the International Whaling Commission* (Special Issue) **15**, 355–363.

324 Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the* International Whaling Commission. 37: 363-367.

325 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

	months between 1974 and 1986.[324] Total annual mortality for spinner dolphins numbered around 1000 and 20 dolphins in the purse seine and driftnet fisheries respectively. The IWC, in 1994, estimated that more than 1000 spinner dolphins are incidentally killed in this area.[325]
Species	***Stenella attenuata* Pantropical spotted dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	Spotted dolphins are incidentally captured in northern Australian fisheries; in Taiwanese gillnet fisheries, purse–seine fisheries in the Philippines, and in nets set to capture sharks for the protection of bathers.
Estimated Annual Mortality	From 1974 to 1986, the Taiwanese gillnet fishery in the Arafura Sea and Timor Sea, operating within (northern)Australia's Economic Exclusion Zone (EEZ), incidentally killed an estimated 560 *S. attenuate,* which comprised 4% of the total dolphin bycatch from that gillnet fishery.[326] Directed fisheries and incidental catch kill large numbers of spotted dolphin in the Philippines, where they used for human consumption. Spotted dolphins were caught in purse seine fisheries and a smaller driftnet fishery (for clupeids and needlefish) in the Visayan Sea in the Philippines. Total annual spotted dolphins mortality was <1000 animals in these three fisheries.[327] Spotted dolphins are caught in inshore shark nets in low numbers in Qld and NSW. There is also a drive fishery which operates in the Solomon Is. where Pantropical dolphins are the preferred catch. The IWC, in 1994, estimated that more than 130 spotted dolphins are incidentally or directly killed in this area.[328]
Species	***Lagenodelphis hosei* Fraser's dolphin.**
	Eastern Sulu Sea 8,700
Fisheries	Fraser's dolphins are caught in two purse seine fisheries and a small driftnet fishery in the Visayan Sea in the Philippines.
Estimated Annual Mortality	Fraser's dolphins are incidentally captured in gillnet fisheries in the Philippines (second most frequently caught species there); they are also killed in harpoon fisheries in Indonesia and Taiwan They may also be incidentally and illegally captured within Australian

[326] Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the* International Whaling Commission. 37: 363-367.

[327] Dolar, M.L.L. 1994. Incidental takes of small cetaceans in fisheries in Palawan, central Visayas and northern Mindanao in the Philippines. *Report of the International Whaling Commission* (Special Issue) 15, 355–363

[328] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

[329] Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the* International Whaling Commission. 37: 363-367.

	waters in northern Australia and entangled in driftnets set outside Australian Territorial Waters.[329]	
Species	***Orcaella brevirostris* Irrawaddy (snubfin) dolphin**	
Abundance Estimate	No Total Abundance Estimate	
	Mahakam River, Indonesia	34-50[330]
	Semayang Lake	100-150[331]
	Malampaya Sound in Palawan, Philippines	77[332]
	North Queensland, Australia	38-46[333]
	Gulf of Carpentaria (Blue Mud Bay)	1,000[334]
	Mekong River	69
Fisheries	Irrawaddy dolphins are incidentally captured in northern Australian fisheries, in barramundi nets, for which little data on take is available, and in nets set to capture sharks for the protection of bathers.	
Estimated Annual Mortality	From 1997-1999 an average of three dolphins died per year from gillnet entanglements, representing between 6 and 8.8 percent of the population.[335]	
	In the Mekong River from 2001-2003, an average of four deaths per year were attributed to gillnet entanglement representing 5.8% of a population estimated to number only 69 individuals.[336]	
	In Songkhla Lake, from 1990-2003, at least 15 Irrawaddy dolphins were killed accidentally in gillnets from a population that may number as few as 8-15 individuals.[337]	

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330 Kreb, D. 2002. Density and abundance estimates of the Irrawaddy dolphin, *Orcaella brevirostris*, in the Mahakam River of East Kalimantan, Indonesia: a comparison of survey techniques. *Raffles Bulletin of Zoology*, Supplement, 85–95.

331 Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

332 Dolar, M.L.L., Perrin, W.F., Gaudiano, J.P., Yaptinchay, A.A.S.P., and Tan, J.M.L. 2002. Preliminary report on a small estuarine population of Irrawaddy dolphins *Orcaella brevirostris* in the Philippines. *Raffles Bulletin of Zoology,* Supplement, 155–160.

333 Freeland WJ, Bayliss P. 1989. The Irrawaddy River dolphin (*Orcaella brevirostris*) in coastal waters of the Northern Territory, Australia: Distribution, abundance and seasonal changes. Mammalia 53: 49-58

334 Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

335 Kreb, D. 2002. Density and abundance estimates of the Irrawaddy dolphin, *Orcaella brevirostris*, in the Mahakam River of East Kalimantan, Indonesia: a comparison of survey techniques. *Raffles Bulletin of Zoology*, Supplement, 85–95.

336 Beasley, I., Chooruk, S., and Piwpong, N. 2002. The status of the Irrawaddy dolphin, *Orcaella brevirostris*, in Songkhla Lake, southern Thailand, Raffles Bulletin of Zoology, Supplement 10: 75-83.

337 Beasley, I., Chooruk, S., and Piwpong, N. 2002. The status of the Irrawaddy dolphin, *Orcaella brevirostris*, in Songkhla Lake, southern Thailand, Raffles Bulletin of Zoology, Supplement 10: 75-83.

338 Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the* International Whaling Commission. 37: 363-367.

Two dolphins were caught by the Taiwanese net fishery in the early 1980s.[338]

AREA 77 EASTERN CENTRAL PACIFIC

The Eastern Central Pacific includes cetaceans within the US EEZ, since the focus of this report is international bycatch, and the assessment and mitigation of bycatch in the United States is governed under the MMPA, the description for this area will focus only on international bycatch of shared cetacean stocks.

Species	***Eschrichtius robustus* Grey whale.**	
Abundance Estimate	Eastern North Pacific Stock	18,813 (CV = 0.07)[339]
Fisheries	Gray whales are incidentally caught in purse seine, gillnets, and pot fisheries.	
Estimated Annual Mortality	From 1999 to 2003, the mean annual mortality of gray whales in AK salmon purse seines, pot fisheries, CA white seabass gillnet fishery was >0.5, >1.2, and >0.2 animals respectively.[340] During that same period more than 3.6 gray whales died annually in unknown gillnet fisheries.[341] Since there are no Mexican observer programs, few data concerning the mortality of gray whales incidental to Mexican commercial fisheries are available. Data regarding the level of gray whale mortality related to commercial fisheries in Mexican waters is thought to be small. The estimated minimum annual mortality incidental to US commercial fisheries is 6.7 animals.[342]	

Species	***Megaptera novaeangliae* Humpback whales**	
Abundance Estimate	Eastern North Pacific Stock	1,391 (CV = 0.22)[343]
Fisheries	Humpback whales are incidentally caught in purse seine, gillnet, and pot fisheries.	
Estimated Annual Mortality	Numbers killed in international shark and swordfish driftnet fisheries are unknown, but, in view of the size of the population in this area (1000+ animals), any increase in driftnetting could cause a problem.	

Species	***Pseudorca crassidens* False killer whale.**

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339 Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 153

340 Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 171,172

341 Id.

342 Id.

343 Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 167

Abundance Estimate	Hawaiian Stock	236 (CV = 1.13)[344]
	Eastern Tropical Pacific	47,921 (CV = 0.29)[345]
Fisheries	False killer whales are captured in longlines and troll fisheries.	
Estimated Annual Mortality	Average 5-yr estimates of annual mortality and serious injury for 2000-2004 are 6.8 (CV = 0.36) false killer whales outside of U.S. EEZs, 4.2 (CV = 0.43) within the Hawaiian Islands EEZ, and 1.8 (CV = 0.53) within the EEZ of Palmyra Atoll.[346]	
	Total estimated annual mortality and serious injury for all U.S. EEZs combined averaged 6.0 (CV = 0.35) between 2000 and 2004.[347]	
	No estimates of mortality are available for international fisheries. This mortality may not be sustainable.	

Species	***Steno bredanensis* Rough-toothed dolphin.**	
Abundance Estimate	Hawaiian Stock	19,904 (CV = 0.52)[348]
	Eastern Tropical Pacific	47,921 (CV = 0.29)[349]
Fisheries	Rough-toothed dolphins are captured in gillnet fisheries, purse seine fisheries, longlines, and trawls.	
Estimated Annual Mortality	Rough-toothed dolphins are taken in small number in the tuna purse seine fishery—21 were estimated killed during the period 1970-75 and 36 died in a single net haul in 1982. However, in recent years the mortality has been significantly less, in 1998, 1999, and 2001 there was no mortality and in 2000 and 2002, 27 and 5 rough-tooted dolphins died in the ETP purse-seine fishery.[350]	

Species	***Globicephala macrorhynchus* Short-finned pilot whale.**	
Abundance Estimate	California/Oregon/Washington Stock	304 (CV = 1.02)[351]

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[344] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 228

[345] Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

[346] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 229

[347] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 229

[348] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 196

[349] Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

[350] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[351] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 135

	Hawaiian Stock	8,846 (CV = 0.49)
	Eastern Tropical Pacific	160,000
Fisheries	Pilot whales are caught in gillnet fisheries, purse seine fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture Pilot whales.	
Estimated Annual Mortality	The average 5-yr estimates of annual mortality and serious injury for 2000-2004 are 3.6 (CV = 0.69) short-finned pilot whales outside of the U.S. EEZs, and 0.6 (CV = 1.00) within the U.S. EEZ of Johnston Atoll.[352]	
	Pilot whales are also caught in small numbers in the tuna purse seine fishery, one was captured in 2000 and 2002.[353]	
	No estimates of mortality are available for international fleets	
Species	***Grampus griseus* Risso's dolphin.**	
Abundance Estimate	California/Oregon/Washington Stock	16,066 (CV = 0.28)[354]
	Hawaiian Stock	2,351 (CV = 0.65)[355]
	Eastern Tropical Pacific	76,595 (CV = 0.21)[356]
Fisheries	Risso's dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture Risso's dolphins	
Estimated Annual Mortality	Rarely entangled in the tuna purse seine fishery in the eastern tropical Pacific. The last reported mortality in the tuna purse seine fishery was of 3 Risso's dolphins in 1999.[357]	
	Average 5-yr estimates of annual mortality and serious injury for 1998-2002 in the Hawaiian-based longline fleet are 8.2 (CV = 0.66) Risso's dolphins outside of U.S. EEZs, and none within the Hawaiian Islands EEZ.[358] No estimates of mortality are available for other international longline fleets.	

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352 Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p.

353 IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

354 Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 91

355 Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 199

356 Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

357 IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

358 Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 200

Species	***Lagenorhynchus obliquidens* Pacific white-sided dolphin.**	
Abundance Estimate	California/Oregon/Washington Stock	59,274 (CV = 0.50)[359]
	North Pacific	931,000[360]
Fisheries	Pacific white-sided dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture Pacific white-sided dolphins	
Estimated Annual Mortality	Pacific white-side dolphins are rarely capture in the tuna purse seine fishery in the eastern tropical Pacific because most of the fishing takes place south of the range of these dolphins; there have been no reported entanglements in this fishery from 1999 though 2003.[361] No other estimates of mortality are available.	

Species	***Lagenodelphis hosei* Fraser's dolphin.**	
Abundance Estimate	Hawaiian Stock	16,836 (CV = 1.11)[362]
	Eastern Tropical Pacific	289,500 [363]
Fisheries	Fraser's dolphins are captured in gillnet fisheries, purse seine fisheries, longlines pot fisheries, and trawls.	
Estimated Annual Mortality	Fraser's dolphins are captured in small number in the tuna purse seine fishery; however, from 1999 to 2003 there have been no reported entanglements in this fishery.[364] In 2005, one dolphin was captured;[365] but no other estimates of mortality are available.	

Species	***Tursiops truncatus* Bottlenose dolphin**	
Abundance Estimates	Eastern Tropical Pacific	277,568 (CV = 0.25)[366]

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[359] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 87

[360] Buckland ST, Cattanach KL, Hobbs RC 1993. Abundance estimates of Pacific white-sided dolphin, northern right whale dolphin, Dall's porpoise and northern fur seal in the North Pacific, 1987-1990. Int North Pacific Fish Comm Bull 53: 387-407.

[361] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[362] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 219

[363] Gerrodette, T, Wade, PR. 1991. Monitoring Trends in Dolphin Abundance in the Eastern Tropical Pacific Analysis of 1989 data. (IWC SC/42/SM-42). Rep Int Whal Comm 41:511-515

[364] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[365] Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

[366] Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

	Hawaiian Stock	3,263 (CV = 0.60)[367]
Fisheries	Bottlenose dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture bottlenose dolphins.	
Estimated Annual Mortality	Bottlenose dolphins are rarely caught in the tuna purse seine fishery in the eastern tropical Pacific. From 1998 to 2003 there were 29, 9, 4, 1, 10, and 4 deaths of bottlenose dolphins in this fishery.[368] In 2005, 7 bottlenose dolphins were incidentally killed in the tuna purse seine fishery.[369]	
	Average 5-yr estimates of annual mortality and serious injury for 1998-2002 in the Hawaiian-based longline fleet are 5.8 (CV = 1.00) bottlenose dolphins outside of U.S. EEZs, and none within U.S. EEZs.[370] No other estimates of mortality are available.	

Species	***Stenella longirostris* Spinner dolphin.**		
Abundance Estimate	Hawaiian Stock	2,805 (CV = 0.66)[371]	2005 Mortality 0
	Eastern spinner dolphin	616,662 (CV = 0.22) [372]	274/<0.04%
	Whitebelly spinner dolphin	441,711 (CV = 0.45) [373]	115/0.03%
Fisheries	Spinner dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls.		
Estimated Annual Mortality	See estimates above. In the eastern tropical Pacific, spinner dolphins have been incidentally killed in international tuna purse seine fisheries since the late 1950's. Between 1996 and 2005, annual fishing mortality of eastern spinner dolphins ranged between 224 and 469 animals, with an average of 356.[374]		

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[367] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 204

[368] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[369] Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

[370] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 204

[371] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 212

[372] Estimates for offshore spotted dolphins include mortalities of coastal spotted dolphins

[373] Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

[374] Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

[375] Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

	Between 1996 and 2005, annual fishing mortality of whitebelly spinner dolphins ranged between 115 and 498 animals, with an average of 271.[375]		
Species	***Stenella coeruleoalba* Striped dolphin.**		
Abundance Estimate	California/Oregon/Washington Stock	13,934 (CV = 0.53)[376]	
	Hawaiian Stock	10,385 (CV = 0.48)[377]	
	Eastern Tropical Pacific	1,470,854 (CV = 0.15)[378]	
Fisheries	Striped dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture Striped dolphins		
Estimated Annual Mortality	Striped dolphins are captured in the tuna purse seine fishery in the eastern tropical Pacific. From 1998 to 2003 there were 24, 5, 11, 3, 2, and 11 deaths of striped dolphins in this fishery.[379] In 2005, 15 striped dolphins were incidentally killed in the tuna purse seine fishery.[380]		
Species	***Stenella attenuata* Spotted dolphin.**		
Abundance Estimate	Hawaiian Stock	10,260 (CV = 0.41)[381]	2005 Mortality 0.8
	Northeastern offshore spotted	736, 737 (CV = 0.15) [382]	271/<0.03%
	Western/southern offshore spotted dolphin	627,863 (CV = 0.31)[383]	99/0.01%
	Coastal spotted dolphins	149,393 (CV = .027) [384]	3/<0.01%

[376] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 103

[377] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 216

[378] Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

[379] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[380] Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

[381] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 208

[382] Estimates for offshore spotted dolphins include mortalities of coastal spotted dolphins

[383] Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

[384] Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

Fisheries	Spotted dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls.		
Estimated Annual Mortality	See estimates above. In the eastern tropical Pacific, spotted dolphins have been incidentally killed in international tuna purse seine fisheries since the late 1950's. Between 1996 and 2005, annual fishing mortality of northeastern spotted dolphins ranged between 260 and 818 animals, with an average of 435.[385] Between 1996 and 2005, annual fishing mortality of western/southern spotted dolphins ranged between 99 and 1,044 animals, with an average of 383.[386]		
Species	***Delphinus delphis* Short-Beaked Common dolphin**		
Abundance Estimate	California/Oregon/Washington Stock	449,846 (CV = 0.25)[387]	2005 Mortality N/A
	Long-Beaked Common Dolphin	43,360 (CV = 0.72)	N/A
	Northern Common Dolphins	449,464[388]	114/<0.01%
	Southern Common Dolphins	1,525,207[389]	154/0.01%
	Central Common Dolphins	577,048[390]	57/<0.01%
Fisheries	Common dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture common dolphins		
Estimated Annual Mortality	See estimates above. In the eastern tropical Pacific, 'northern common dolphins' have been incidentally killed in international tuna purse seine fisheries since the late 1950's. Between 1996 and 2005, annual fishing mortality of northern common dolphins (potentially including both short-beaked and long-beaked common dolphins) ranged between 9 and 261 animals, with an average of 105.[391] Although it is unclear whether these animals are part of the same population as short-beaked common dolphins found off California, they are managed separately--specifically		

385 Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

386 Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

387 Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 108

388 Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

389 Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

390 Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

391 Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

392 Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

393 Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

	for the management of dolphins involved in eastern tropical Pacific tuna fisheries. Between 1996 and 2005, annual fishing mortality of central common dolphins ranged between 51 and 223 animals, with an average of 125.[392] Between 1996 and 2005, annual fishing mortality of southern common dolphins ranged between 1 and 222 animals, with an average of 66.[393]
Species	***Phocoena sinus* Vaquita.**
Abundance Estimate	567[394]
Fisheries	Vaquita are incidentally killed in coastal gillnet fisheries totoaba, sharks, rays, mackerels, croaker, and shrimp and shrimp trawls.
Estimated Annual Mortality	143 Vaquita were killed in various fishing operations between March 1985 and January 1994 with an annual incidental mortality of 35. From January 1993 to January 1995, the total estimated incidental mortality caused by the fleet of El Golfo de Santa Clara was 39 vaquitas per year, which is over 17% of the most recent estimate of population size.[395]
Species	***Phocoenoides dalli* Dall's porpoise.**
Abundance Estimate	California/Oregon/Washington Stock 449,846 (CV = 0.25)[396]
Fisheries	Dall's porpoise are entangled in gillnet fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture Dall's porpoise.
Estimated Annual Mortality	No Estimates of Mortality

[394] Jaramillo Legorreta AM, Rojas Bracho L. Gerrodette T. 1999. A new abundance estimate for vaquitas: First step for recovery. Mar Mamm Sci 15: 957-973. In 1986-1993, line-transect boat surveys yielded an estimate of 503; in 1986-1989, aerial surveys yielded 885, 1991 aerial surveys yielded 572 animals, and 224 from a ship survey in 1993.

[395] Vidal O, Brownell RL, Findley LT 1999. Vaquita—Phocoena sinus Norris and McFarland, 1958. In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol 6: The second book of dolphins and porpoises, pp 357-378

[396] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 82

AREA 81 SOUTHWEST PACIFIC

Species	***Hyperoodon ampullatus* Southern bottlenose whale.**	
Abundance Estimate	South of the Antarctic Convergence	599,300[397]
Fisheries	Southern bottlenose whales are entangled in driftnets in the Tasman Sea	
Estimated Annual Mortality	No Estimates of Mortality	

Species	***Delphinus delphis* Common dolphin**
Abundance Estimate	No Abundance Estimate--considered numerous
Fisheries	Common dolphins are entangled in New Zealand trawl fisheries. Common dolphins may also be captured in the albacore driftnet fishery in the Tasman Sea
Estimated Annual Mortality	In New Zealand, In 1994, 1996, and 1997 fisheries incidentally captured 9, 2, and 4 common dolphins respectively.[398]

Species	***Lagenorhynchus obscurus* Dusky dolphin**
Abundance Estimate	12,000 to 20,000
Fisheries	Unknown numbers of dusky dolphins are caught in set nets in New Zealand.
Estimated Annual Mortality	Current catches in set nets appear to have decreased from those of the 1970s and 1980s but are estimated at one port to be 100-200 animals per year.[399] In New Zealand, in 1996 and 1997, fisheries incidentally captured 1 dusky dolphin each year.[400]

Species	***Cephalorhynchus hectori.* Hector's dolphin**[401]	
Abundance	South Island—east coast[403]	1900

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397 Kasamatsu, F. and Joyce, G.G. 1995. Current status of odontocetes in the Antarctic. *Antarctic Science* 7, 365–379.

398 Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 223

399 Jefferson TA, Leatherwood S, Webber MA 1993. FAO Species identification guide. Marine Mammals of the world. UNEP/FAO, Rome, 320pp

400 Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 223

401 Considered Endangered under the IUCN Red List

402 Slooten, E., Dawson, S., and Rayment, W. 2002. Quantifying abundance of Hector's dolphins between Farewell Spit and Milford Sound. Published Client Report on Contract 3076, funded by Conservation Services Levy. Department of Conservation, Wellington, New Zealand. http://csl.doc.govt.nz/ dsis35.pdf.

Estimate[402]	South Island—west coast	5400
Fisheries	Hector's dolphins are caught in coastal gillnets. While there are no quantitative estimates, several dolphins are killed each year in recreational gillnets, and there are at least occasional catches in trawl nets.[404]	
Estimated Annual Mortality	In the mid-1980s an average of 57 Hector's dolphins were caught each year in gillnets in the Canterbury region. Between 1984 and 1988, incidental captures around the Banks Peninsula amounted to at least 223. In 1997-1998, the estimated bycatch by commercial gillnetting vessels north and south of Banks Peninsula was 16 Hector's dolphins (CV 39%).[405] In New Zealand, in 1994 and 1997 fisheries incidentally captured 8 and 2 Hector's dolphins respectively.[406]	

Species	**Cephalorhynchus hectori maui** Maui's dolphin[407]	
Abundance Estimate	Critically endangered	100-150
Fisheries	Set net fishing poses a major threat to Maui's dolphins. A significant number of Maui's dolphins have been caught and killed in gill nets since 1987 when the New Zealand Department of Conservation began investigating dolphin deaths. In the early 2000s over a 20 month period, six Maui's dolphins showed signs of having been entangled in nets.	
Estimated Annual Mortality	No estimates of mortality are available, but New Zealand has banned set netting along part of the North Island west coast and the Manukau Harbor entrance.	

Species	***Orcaella brevirostris* Irrawaddy (snubfin) river dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	Irrawaddy dolphins are incidentally captured in driftnet fisheries and shark nets to protect bathers.
Estimated Annual Mortality	In the Townsville area alone, 41 Irrawaddy (Snubfin) dolphins were caught in shark nets between 1968 and 1990; this number is almost certainly an underestimate, for another 55 unidentified "dolphins" or "porpoises" were caught in the nets in the same period, some of which are likely to be *Orcaella*.[408]

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403 In 1989 the New Zealand government created the Banks Peninsula Marine Mammal Sanctuary off the east coast of the South Island.

404 Baird, S.J. and Bradford, E. 2000. Estimation of Hector's dolphin bycatch from inshore fisheries, 1997/98 fishing year. Published Client Report on Contract 3024, Conservation Services Levy. Available: www.doc.govt.nz/cons/scires/csl.pdf.

405 Baird, S.J. and Bradford, E. 2000. Estimation of Hector's dolphin bycatch from inshore fisheries, 1997/98 fishing year. Published Client Report on Contract 3024, Conservation Services Levy. Available: www.doc.govt.nz/cons/scires/csl.pdf.

406 Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 223

407 Formerly known at North Island Hector's dolphin

408Parra, G.J., Corkeron, P.J. and Marsh, H. (2002). The Indo-Pacific Indo-Pacific Humpbacked dolphin, *Sousa*

AREA 87 SOUTHEAST PACIFIC

Species	***Mesoplodon peruvianus* Peruvian beaked whale**
Abundance Estimate	No Abundance Estimate
Fisheries	Peruvian beaked whales are entangled in the driftnet fishery for sharks off Peru[409]
Estimated Annual Mortality	Ten Peruvian beaked whales have been recorded, at least 9 of which appear to have been captured in the Peruvian coastal driftnet fishery. [410] No Estimates of Mortality

Species	***Physeter macrocephalus* Sperm whale**
Abundance Estimate	Eastern Tropical Pacific and Ecuadorian EEZ 1,179
Fisheries	Sperm whales may be entangled in swordfish driftnets in Chile. Off north-central Chile, sperm whales are known to be attracted to longliners, reportedly to scavenge the targeted Patagonian toothfish (*Dissostichus eleginoides*), and fishermen shoot at them and use other means of deterrence.[411]
Estimated Annual Mortality	Between 1987 and October of 1994, twenty strandings of sperm whales were recorded along the Ecuadorian coast, 11 cases involved interactions with fishing gear amounting to 1.4 whales per year;[412] however, no mortality estimates are available.

Species	***Kogia breviceps* Pygmy sperm whale**
Abundance Estimate	No Abundance Estimate
Fisheries	There is a report a specimen from Peru which had apparently been captured by fishermen.[413]
Estimated Annual Mortality	No Estimates of Mortality

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chinensis (Osbeck, 1765) in Australian waters: a summary of current knowledge and recommendations for their conservation. 54th Annual Meeting of the International Whaling Commission, Shimonoseki, Japan, May 2002, SC/54/SM27.

[409]Jefferson TA, Leatherwood S, Webber MA 1993. FAO Species identification guide. Marine Mammals of the world. UNEP/FAO, Rome, 320pp

[410]Jefferson TA, Leatherwood S, Webber MA 1993. FAO Species identification guide. Marine Mammals of the world. UNEP/FAO, Rome, 320pp

[411] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A. and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans.* IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp. at 69

[412] Haase B and Felix F. 1994. A note on the incidental catches of sperm whales (Physeter macrocephalus) in Ecuador. Report of the International Whaling Commission (Special Issue) 15:481-483.

[413] Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

Species	***Feresa attenuata* Pygmy killer whale.**
Abundance Estimate	No Abundance Estimate
Fisheries	A pygmy killer whale was killed in Peruvian coastal gillnets.[414]
Estimated Annual Mortality	No Estimates of Mortality

Species	***Globicephala macrorhynchus* Short finned pilot whale**
Abundance Estimate	No Abundance Estimate
Fisheries	Short finned pilot whales are caught in gillnet and driftnet fisheries.
Estimated Annual Mortality	During the 1990s, the IWC estimated that less than 10 pilot whales died each year in coastal Peruvian fisheries.[415] At least 5 pilot whales have died in driftnets in Peru in 1988/89.[416] No total estimates of mortality are available.

Species	***Lagenorhynchus obscurus* Dusky dolphin**
Abundance Estimate	No Abundance Estimate (Off the Peruvian coast, the Dusky dolphin is the third most abundant cetacean species.)[417]
Fisheries	Dusky dolphins are taken in Peruvian coastal gillnets.
Estimated Annual Mortality	In 1988 and 1989, 1,725 and 1,893 dusky dolphins were landed at the port of Pucusana, Peru.[418] In 87 days during January-August 1994, 722 cetaceans were captured in multi-filament gillnets and landed at Cerro Azul, central Peru, of those 82.7% or 597 were dusky dolphins.[419]

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[414] Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

[415] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 26

[416] Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

[417] Sanchez R, Aroas Schreiber M, Onton K 1998. Sightings of cetaceans in Peruvian sea and its relation with the main pelagic resources. Cruise RV Humboldt 9803-05 from Tumbes to Tacna. Inf Inst Mar Peru 135: 163-179

[418] Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

[419] The total kill estimate for a seven-month period, stratitied by month, was 1,567 cetaceans. Peruvian fisheries both directed and incidental have killed thousands each year since 1985. In 1991-1993 period, an estimated 7000 animals per year were captured. Circumstantial evidence suggests that, after 1994, increasing enforcement reduced directed takes and illegal trade in meat, but also hampered monitoring.

[420] Van Waerebeek K and Reyes, JC 1994 Post-ban small cetaceans takes off Peru: a review. Report of the International Whaling Commission (Special Issue) 15:503-519.

[421] Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 223

	Between 1990 and 1993, Peruvian fisheries landed 3,144 dusky dolphins at the major ports of Puscana, Cerro Azul, San Andres, and Ancon.[420] In 1994, Peruvian fisheries incidentally killed 1,272 dusky dolphins.[421] In conclusion, during the 1990s, the IWC estimated that more than 1,800 dusky dolphins died each year in coastal Peruvian fisheries.[422]
	Between November 1991 and June 1998, 510 dusky dolphins were landed at the port of San Juan, Peru—most of those animals were captured in 1992 in surface driftnets for cojinova. Capture rates were lower in 1995-1998 when fishers were using fixed bottom-setting gillnets.[423]
	Data collected at 16 other ports showed high levels of dolphin and porpoise mortality persisted in coastal Peru at least until August 1994 when an unimplemented 1990 ban on small cetacean exploitation was renewed.
	In 2000 and 2001 reported catches of dusky dolphins were 12 and 2 respectively.[424] The lack of an abundance estimate precludes any assessment of population level impacts.[425]
Species	***Lagenorhynchus australis* Peale's dolphin**
Abundance Estimate	No Abundance Estimate (Off the Falkland Islands and Chile coast, the Peale's dolphin is the most abundant cetacean species.[426] There has been a marked decrease in the number of sightings in areas of the extreme south where crab fishing takes place.[427]
Fisheries	Peale's dolphins are entangled in nets off the coast of Chile and in Peruvian coastal gillnets.
Estimated Annual Mortality	Dolphins in Beagle Channel, the Magallanes, and southern Tierra del Fuego have been harpooned for crab bait since the 1970s. The scale of this killing was great enough to cause reduced abundance by the late 1980s. However, recent evidence suggests that this exploitation has declined and that some recovery may be occurring.[428] Information on

[422] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 26

[423] Majluf P, Babcock EA, Riveros JC, Schreiber MA, and Alderete W. Catch and Bycatch of Sea Birds and Marine Mammal in the small-scale fishery of Punta San Juan, Peru

[424] Report of the Scientific Committee. Annex L Report of the Standing Sub-Committee on Small Cetaceans 2004. J Cetacean Res. Manage. 6 Suppl.

[425]Van Waerebeek, K., Van Bressem, M.-F., Félix, F., Alfaro-Shigueto, J., García-Godos, A., Chávez-Lisambart, L., Ontón, K., Montes, D., and Bello, R. 1997. Mortality of dolphins and porpoises in coastal fisheries off Peru and southern Ecuador in 1994. *Biological Conservation* 81, 43–49.

[426] Sanchez R, Aroas Schreiber M, Onton K 1998. Sightings of cetaceans in Peruvian sea and its relation with the main pelagic resources. Cruise RV Humboldt 9803-05 from Tumbes to Tacna. Inf Inst Mar Peru 135: 163-179

[427] Goodall, R.N.P., Norris, K.S., Schevill, W.E., Fraga, F., Praderi, R., Iñiguez Jr., M.A., and de Haro, J.C. 1997b. Review and update on the biology of Peale's dolphin, *Lagenorhynchus australis*. *Report of the International Whaling Commission* 47, 777–796.

[428] Goodall, R.N.P., Norris, K.S., Schevill, W.E., Fraga, F., Praderi, R., Iñiguez Jr., M.A., and de Haro, J.C. 1997b. Review and update on the biology of Peale's dolphin, *Lagenorhynchus australis*. *Report of the International Whaling Commission* 47, 777–796.

	population structure and the extent to which Peale's dolphins may still be used as crab bait is unknown. No estimates of total incidental mortality are available, however, the scale of Peale's dolphins entanglement in nearshore gillnets is not considered large.[429]
Species	***Tursiops truncatus* Bottlenose dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	In Peru, coastal fisheries kill *Tursiops* for human consumption, using gillnets, purse seines, and harpoons.[430]
Estimated Annual Mortality	Bottlenose dolphins are entangled in gillnets in Peru; catches at Pucusana were estimated to total 30 in 1987.[431] In 1988 and 1989, 18 and 31 bottlenose dolphins were landed at the port of Pucusana, Peru.[432] Between 1990 and 1993, Peruvian fisheries landed 120 bottlenose dolphins at the major ports of Puscana, Cerro Azul, San Andres, and Ancon.[433] In 1994, Peruvian fisheries incidentally captured 42 bottlenose dolphins.[434] Between November 1991 and June 1998, 75 bottlenose dolphins were landed at the port of San Juan, Peru—most of those animals were captured in 1992 in surface driftnets for cojinova. Capture rates were lower in 1995-1998 when fishers were using fixed bottom-setting gillnets.[435] In 1994, Ecuadorian fisheries incidentally killed 227 bottlenose dolphins.[436]

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[429] There is also concern that the proliferation of salmon-culture facilities in southern Chile, especially along the indented coastline of Chiloé Island, is having a negative effect on Peale's dolphins. Morton, A.B. and Symonds, H.K. 2002. Displacement of *Orcinus orca* (L.) by high amplitude sound in British Columbia, Canada. *ICES Journal of Marine Science* 59, 71–80.

[430] Although direct killing has noticeably decreased since dolphin hunting was banned by law in 1996, around a thousand dolphins and other small whales are still falling victim annually to fishermen to supply bait meat for the shark fishery. Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

[431] Van Waerebeek, K., Reyes, J.C., Read, A.J., and McKinnon, J.S. 1990. Preliminary observations of bottlenose dolphins from the Pacific coast of South America. Pp.143–154 *in: The Bottlenose Dolphin* (eds. S. Leatherwood and R.R. Reeves). Academic Press, San Diego.

[432] Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

[433] Van Waerebeek K and Reyes, JC 1994 Post-ban small cetaceans takes off Peru: a review. Report of the International Whaling Commission (Special Issue) 15:503-519.

[434] Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 223

[435] Majluf P, Babcock EA, Riveros JC, Schreiber MA, and Alderete W. Catch and Bycatch of Sea Birds and Marine Mammal in the small-scale fishery of Punta San Juan, Peru

[436] Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 221

[437] Report of the Scientific Committee. Annex L Report of the Standing Sub-Committee on Small Cetaceans 2004. J Cetacean Res. Manage. 6 Suppl.

	In 2000 and 2001 reported catches of bottlenose dolphins were 6 and 1 respectively.[437] No estimates of total incidental mortality are available.
Species	***Grampus griseus* Risso's dolphin.**
Abundance Estimate	No Abundance Estimate
Fisheries	Risso's dolphins are entangled in coastal gillnets.
Estimated Annual Mortality	At least one animal was landed at Pucusana in Peru.[438] No Estimates of Mortality
Species	***Lissodelphis peronii* Southern right whale dolphin.**
Abundance Estimate	No Abundance Estimate--considered very common off Chile
Fisheries	Southern right whale dolphins are incidentally caught in driftnets off Peru and Chile. They are infrequently caught off the coasts of Peru and Chile where they are used for human consumption and crab bait.[439]
Estimated Annual Mortality	During the 1990s, the IWC estimated that more than 5 southern right whale dolphins died each year off the Pacific coast of South America.[440] No Estimates of Mortality
Species	***Delphinus delphis* Common dolphin.**
Abundance Estimate	No Abundance Estimate
Fisheries	Common dolphins are incidentally caught in coastal gillnets off Peru and Chile.
Estimated Annual Mortality	The estimated catches of common dolphins in coastal driftnets in Peru, were 264 in 1987, 155 in 1988 and 57 in 1989.[441] During the 1990s, the IWC estimated that 50 to 150 common dolphins died each year in coastal Peruvian fisheries.[442] Between 1990 and1993, Peruvian fisheries landed 1087 common dolphins at the major ports of Puscana, Cerro Azul, San Andres, and Ancon.[443]

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438 Van Waerebeek, K., Reyes, J.C., Read, A.J., and McKinnon, J.S. 1990. Preliminary observations of bottlenose dolphins from the Pacific coast of South America. Pp.143–154 *in: The Bottlenose Dolphin* (eds. S. Leatherwood and R.R. Reeves). Academic Press, San Diego.

439 Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.

440 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 26

441 Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

442 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 25

443Van Waerebeek K and Reyes, JC 1994 Post-ban small cetaceans takes off Peru: a review. Report of the International Whaling Commission (Special Issue) 15:503-519.

Species	***Cephalorhynchus eutropia* Chilean dolphin.**
Abundance Estimate	No Abundance Estimate available--total population appears to be very small (low thousands at most).
Fisheries	The crab bait fishery in southern Chile and a variety of other fisheries (particularly coastal gillnet fisheries) are potentially serious threats. Some shooting and harpooning also occurs, and the dolphins are used for bait or human consumption. The species' status is uncertain. In addition to the mortality caused by entanglement and hunting, Chilean dolphins may now be excluded by salmon aquaculture operations from some of the bays and fiords that they traditionally inhabited.[444]
Estimated Annual Mortality	In 1989, 51 Chilean dolphins were caught in Chilean bottom set gillnets. At Queule, near Valdivia, Chilean dolphins account for 45.8% of the dolphins caught in gillnets, translating into a catch of 65-70 animals at this port.[445] No estimates of total incidental mortality are available.

Species	***Cephalorhynchus commersonii* Commerson's dolphin**
Abundance Estimate	No Abundance Estimate--thought to be abundant
Fisheries	Commerson's dolphin are caught in mid-water trawls and coastal gillnets. Commerson's dolphins are also used as crab bait.
Estimated Annual Mortality	No Estimates of Mortality

Species	***Phocoena spinipinnis* Burmeister's porpoise**
Abundance Estimate	No Abundance Estimate
Fisheries	Burmeister's porpoise are frequently killed in set and drift gillnets. Some are killed deliberately in the Peruvian multi-species fishery that employs both gillnets and harpoons to take cetaceans for human consumption[446] and additional animals may be taken at least occasionally for crab bait in southern Chile.[447]
Estimated Annual	Mortality in Peru is estimated at more than 450 animals per year and may be as high as 2,000 animals.[448] In 1988 and 1989, 383 and 331

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444 Claude, M., Oporto, J., Ibáñez, C., Brieva, L., Espinosa P.C., and Arqueros, W.M. 2000. *La ineficiencia de la salmonicultura en chile.* Aspectos sociales, económicos y ambientales. Registro de Problemas Públicos, Informe N° 1.

445 Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.

446 Van Waerebeek, K. and Reyes, J.C. 1994. Post-ban small cetacean takes off Peru: a review. *Report of the International Whaling Commission* (Special Issue) 15, 503–519.

447 Lescrauwaet, A.-C. and Gibbons, J. 1994. Mortality of small cetaceans and the crab bait fishery in the Magallanes area of Chile since 1980. *Report of the International Whaling Commission* (Special Issue) 15, 485–494.

448 Reyes JC 2002. Burmeister's porpoise. In: Encyclopedia of marine mammals (Perring WF, Wursig B, Thewissen JGM, eds) Academic Press, San Diego pp 177-179

Mortality

Burmeister's porpoise were landed at the port of Pucusana, Peru.[449] Between 1990 and 1993, Peruvian fisheries landed 552 Burmeister's porpoise at the major ports of Puscana, Cerro Azul, San Andres, and Ancon.[450] In 1994, Peruvian fisheries incidentally captured 224 Burmeister's porpoise.[451] In 2000, 2001, and 2003 reported catches of Burmeister's porpoise were 39, 14, and 125 respectively.[452] Scientists consider these levels unsustainable.

In 1989, 57 Burmeister's porpoise were caught in Chilean bottom set gillnets.

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[449] Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

[450] Van Waerebeek K and Reyes, JC 1994 Post-ban small cetaceans takes off Peru: a review. Report of the International Whaling Commission (Special Issue) 15:503-519.

[451] Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 223

[452] Report of the Scientific Committee. Annex L Report of the Standing Sub-Committee on Small Cetaceans 2004. J Cetacean Res. Manage. 6 Suppl.

APPENDIX B. Parties to International Treaties

Third United Nations Convention on the Law of the Sea, Dec. 10, 1982, 21 I.L.M. 1245. (Entered into force 16 November 1994.) As of June 2007, 155 countries were parties to the Law of the Sea. A chronological list of ratifications of, accessions and successions to the convention is available at http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm#

The Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conversation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks. U.N. Doc. A/Conf./164/37. A list of the 66 nations signatory to the Straddling Stocks Agreement is available at http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm#

Convention on the Conservation of Antarctic Marine Living Resources, 20 May 1980. 33 U.S.T. 3476. The original 12 contracting parties were United Kingdom, South Africa, Belgium, Japan, United States, Norway, France, New Zealand, Russia, Poland, Argentina, and Australia. Additional members are Brazil, Chile, European Community, Germany, India, Italy, Republic of Korea, Namibia, Spain, Sweden, Ukraine, and Uruguay. States Party to the Convention but not Members of the Commission are Bulgaria, Canada, Cook Islands, Finland, Greece, Mauritius, Netherlands, Peru, and Vanuatu.

International Convention for the Conservation of Atlantic Tunas. Done at Rio de Janeiro, 14 May 1966. 20 U.S.T. 2887. Algeria, Angola, Barbados, Brazil, Canada, Cape Verde, China, Cote d'Ivoire, Croatia, Equatorial Guinea, European Community, France (St. Pierre & Miquelon), Gabon, Ghana, Guatamala, Guinea-Conakry, Honduras, Iceland, Japan, Korea (Republic), Libya, Mexico, Morocco, Namibia, Nicaragua, Norway, Panama, Philippines, Russian Federation, Sao Tome and Principe, South Africa, Trinidad and Tobago, Tunisia, Turkey, United Kingdom (Anguilla, Bermuda, St. Helena, Turks and Caicos), United States, Uruguay, Vanuatu, Venezuela.

Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. Done at Honolulu, 5 September 2000. Entered into force 19 June 2004. Nineteen states signed the convention. Australia, Cook Islands, Federated States of Micronesia, Fiji, Republic of Kiribati, Republic of the Marshall Islands, Republic of Nauru, New Zealand, Niue, Papua New Guinea, Independent State of Samoa, Solomon Islands, Kingdom of Tonga and Tuvalu and the United States have ratified it.

Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries. Done at Ottawa 24 October 1978. Senate Executive Treaty Series 96th Cong. 1st Sess. (Entered into force 1 January 1979.) Bulgaria, Canada, Cuba, Denmark, Europe Union (EU), France (in respect of St. Pierre et Miquelon) Iceland, Japan, Korea, Norway, Russia, and the United States. Estonia, Latvia, Lithuania, Poland, Portugal, Spain and Germany were contracting parties, but acceded to the European Union. Romania withdrew from the convention.

Convention on the Conservation and Management of Fishery Resources in the Southeast Atlantic Ocean. Done at Windhoek. 20 April 2001. Entered into force April 2003. Angola, Iceland, Namibia, Norway, Republic of Korea, South Africa, the United Kingdom (on behalf of St. Helena and its dependencies, Tristan Da Cuhna and Ascension Island), the United States and the European Community.

Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea. Done at Washington, D.C. 16 June 1995. Entered into force 8 December 1995. U.S. Treaty Document 103-27. Parties: China, South Korea, Poland, the Russian Federation, and the United States.

International Convention for the Regulation of Whaling, Done at Washington, 2 November 1946. 4

Bevans 248, TIAS 1849. The original signatories to the convention were Argentina, Australia, Brazil, Canada, Chile, Denmark, France, Netherlands, New Zealand, Norway, Peru, Russia, United Kingdom, United States, Union of South Africa. Additional signatories since then are Antigua & Barbuda, Austria, Belgium, Belize, Benin,

Cambodia, Cameroon, China, People's Rep of, Costa Rica, Côte d'Ivoire, Croatia, Cyprus, Czech Republic, Dominica, Ecuador, Finland, Gabon, The Gambia, Germany, Greece, Grenada, Guatemala, Guinea-Bissau, Guinea, Rep of, Hungary, Iceland, India, Ireland, Israel, Italy, Japan, Kenya, Kiribati, Korea, Rep of, Laos, Luxembourg, Mali, Marshall Islands, Rep of Mauritania, Mexico, Monaco, Mongolia, Morocco, Nauru, Nicaragua, Oman, Palau, Panama, Portugal, San Marino, St. Kitts & Nevis, St. Lucia, St. Vincent & The Grenadines, Senegal, Slovak Republic, Slovenia, Solomon Islands, Spain, Suriname, Sweden, Switzerland, Togo, Tuvalu.

Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean. Done at Moscow 11 February 1992. Entered into force 16 February 1993. Senate Treaty Document 102-30, 102nd Cong. 2nd Sess.

Convention on International Trade in Endangered Species of Wild Fauna and Flora (Done at Washington 3 March 1973. Entered into force 1 July 1975. 27 UST 1087, TIAS 8249) A list of 172 contracting parties in order of entry into force is available at http://www.cites.org/eng/disc/parties/chronolo.shtml

Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas ASCOBANS entered into force in 1994. Parties include Albania, Bulgaria, Croatia, Cyprus, France, Georgia, Greece, Italy, Lebanon, Libya, Malta, Monaco, Morocco, Portugal, Romania, Spain, Syria, Tunisia, Ukraine.

Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area. ACCOBAMS entered into force in 2001. Parties are Belgium, Denmark, European Community, Finland, Germany, Netherlands, Poland, Sweden, United Kingdom.

Pacific Salmon Treaty, March 18, 1985, U.S.-Can., 99 Stat. 7. United States and Canada.

The Wellington Convention done at Wellington, New Zealand. 17 May 1991. Parties are Australia, Cook Islands, Federated States of Micronesia, Fiji, France, Kiribati, Marshall Islands, Nauru, New Zealand, Niue, Palau, Samoa, Solomon Islands, Tokelau, Tuvalu, United States, Vanuatu.

Convention on the Conservation of Migratory Species of Wild Animals. Done at Bonn 23 June 1979. 19 ILM 15 (1980).

1952 Agreements on the Exploitation and Conservation of the Maritime Resources of the South Pacific. Done at Santiago, Chile, 18 August 1952. Ecuador, Peru and Chile.

Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America. Done at Port Moresby, 2 April 1987. Entered into force 15 June 1988. TIAS 11100. The Treaty on Fisheries between the Governments of Certain Pacific Island States and the Government of the United States of America is a unique instrument in international fisheries law, being the only multilateral agreement between a distant-water fishing nation, on the one hand, and a group of coastal States, on the other hand, concerning access to the latter’s fisheries zones. Thus, although multilateral in form, the agreement is in many respects bilateral in nature. Consultation is conducted through the South Pacific Forum Fisheries Agency, which has an open membership. As of 2005 members were Australia, Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu and Western Samoa.

Convention for the Conservation of Southern Bluefin Tuna. Done at Canberra, May 1993. Entered into force 20 May 1994 (hereinafter CCSBT). Australia, Japan and New Zealand Taiwan, South Korea. The Philippines was accepted as a formal cooperating non-member in 2004, and parties

continue discussions with Indonesia and South Africa.

Asia Pacific Fisheries Commission. Members include Australia, Bangladesh, Cambodia, China, France, India, Indonesia, Japan, Korea, Malaysia, Myanmar, Nepal, New Zealand, Pakistan, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America, and Vietnam.

The Convention for the Establishment of an Inter-American Tropical Tuna Commission. Done at Washington, 31 May 1949. Entered into force 3 March 1950. 1 UST 230, TIAS 2044. Members are Costa Rica, Ecuador, El Salvador, France, Guatemala, Japan, Mexico, Nicaragua, Panama, Peru, Republic of Korea, United States, Vanuatu and Venezuela. Belize, Canada, China, Cook Islands, the European Union, Honduras and Chinese Taipei are Cooperating Non Parties or Cooperating Fishing Entities.

ICES: Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Netherlands, Norway, Poland, Portugal, Spain, Sweden, United Kingdom, the United States, Russian Federation, Latvia, Lithuania, and Estonia.

PICES: Canada, United States, Japan, People’s Republic of China, Russian Federation, Republic of Korea.

SPC: Australian territory of Papua and the Trust Territory of New Guinea (now Papua New Guinea and Irian Jaya), and Guam and the Trust Territory of the Pacific Islands.

APPENDIX C. Sample Cetacean Bycatch Resolution

RESOLUTION TO ASSESS AND MITIGATE THE IMPACT OF FISHING ON WHALES AND DOLPHINS

The Commission [insert name of the regional fisheries management organization]

In accordance with the Convention [insert the name of the convention under which the rfmo operates]:

Recognizing the ecological and cultural significance of all species of whales and dolphins in the convention area;

Noting the recent international scientific studies indicate that bycatch in commercial fisheries is one of the greatest threats facing whales and dolphins;

Recognizing the need to assess population abundance of and evaluate the incidental mortality of dolphins and whales during fishing operations in the convention area;

Aware that measures to reduce bycatch may require modified or new procedures, technologies, or management measures;

The [insert name of convention] Convention, resolves as follows:

1. Contracting Parties (CPs) [or other appropriate terminology for the Convention or Agreement] should collect, and provide to the Secretariat, all available information on whale and dolphin abundance and stock structure within their waters and within the Convention Area.

2. CPs should collect, and provide to the Secretariat, all available information on interactions with whales and dolphins in fisheries within the Convention Area and urges them to foster collaboration with other CPs in the exchange of information in this area.

3. Each CP should provide all information on its national legislation and international efforts to which it is a party to conserve whales and dolphins.

4. CPs should, as appropriate, individually and collectively, continue to enhance the implementation of their existing whale and dolphin mitigation measures using best available scientific information on mitigation techniques.

5. Beginning in 2008, CPs should provide to the Secretariat a detailing of whale and dolphin population and fishery interaction data (e.g., species identification, fate and condition at

release, relevant biological information and gear configuration), including data collected by their respective national observer programs, in fisheries managed by [Name of the Convention] in the Convention Area and any marine mammal-specific training provided to these observers. This information will be compiled by the Secretariat and reported to the [Name of the Scientific Body or Bycatch Body within the Convention].

6. [Name of the Convention] should cooperate with other regional, subregional and global organizations to share data on whale and dolphin bycatch and to develop and apply compatible bycatch reduction measures as appropriate, given the migration patterns of many species of

7. As the [Name of the Convention] develops its regional observer program and considers improving observer coverage in the Convention Area, existing observer programs should be reviewed to ensure that the appropriate information on whale and dolphin interactions is being collected (e.g. species identification, fate and condition at release, relevant biological information and gear configuration).

8. The Secretariat, in cooperation with the [Name of the Scientific Body or Bycatch Body within the Convention], should develop a centralize bycatch and observer database to obtain better estimates of total catch and mortality of whales and dolphins by fisheries within the Convention Area.

9. The [Name of the Scientific Body or Bycatch Body within the Convention] should develop a program that includes: abundance research and research and development of gear alternatives, promotion of the use of available bycatch mitigation technology, promotion and strengthening of data collection programs to obtain standardized information to develop reliable estimates of the bycatch of whales and dolphins, biological research on whales and dolphins, including the identification of migration routes or other areas of spatial or temporal importance, industry education, development and promotion of safe handling techniques and other techniques to improve whale and dolphin conservation.

10. The [Name of the Scientific Body or Bycatch Body within the Convention] shall take practical steps necessary to improve monitoring and reporting of whales and dolphins interactions in the Convention Area, including the development of data standards and specifications and reporting requirements.

11. [Name of the Convention] will monitor the progress of CPs in applying this resolution and develop relevant strategies for the further consideration of the [Name of the Convention] in 2009. Information produced as a result of this resolution will be provided by the Secretariat to the FAO.

APPENDIX D. Sea Turtle Resolution Adopted at NAFO

Resolution to Reduce Sea Turtle Mortality in NAFO Fishing Operations

Proposal by the United States of America and Japan

Background/Explanatory Memorandum:

At its 26th Annual Symposium on Sea Turtle Biology and Conservation, the members of the International Sea Turtle Society (ISTS) adopted a resolution calling upon the world's regional fisheries management organizations (RFMOs) to urge their members to adopt and implement the FAO "Guidelines to Reduce the Mortality of Sea Turtles in Fishing Operations" (the FAO Guidelines). This ISTS resolution was forwarded to NAFO with a request for action.

It is generally agreed that RFMOs can play a valuable role in support of global adoption and implementation of the FAO Guidelines. Given NAFO's on-going efforts to minimize bycatch and the fledging NAFO initiative on application of ecosystem considerations to the Organization's fisheries management decision-making, NAFO should support global implementation of the FAO Guidelines as appropriate. As the waters of the Convention area include critical foraging habitat for the leatherback turtle (*Dermochelys coriacea*), adoption and implementation of the FAO Guidelines would be both proactive and precautionary.

Thus, it is proposed that, in addition to generally supporting adoption and implementation of the FAO Guidelines, NAFO Contracting Parties should provide information on existing domestic data collection (e.g., species identification, fate and condition at release, relevant biological information, and gear configuration) and/or observer training efforts relating to sea turtle interactions in NAFO-managed fisheries in the NAFO Convention Area.

NAFO should also consider, where appropriate, increasing cooperation both among NAFO Contracting Parties and with other regional, subregional and global organizations, to facilitate sharing of data and development of compatible and appropriate bycatch reduction measures. Such efforts may be enhanced by integration of sea turtle interaction data collection by NAFO observers.

Draft Proposal:

Resolution to Reduce Sea Turtle Mortality in NAFO Fishing Operations

Preamble:

Recognizing the cultural and ecological significance of sea turtles in the Northwest Atlantic Ocean;

Recognizing that the FAO Committee on Fisheries (COFI) endorsed "Guidelines to Reduce Sea Turtle Mortality in Fishing Operations" at its Twenty-sixth Session, held in March 2005, and that these guidelines are directed towards members and non-members of FAO, fishing entities, subregional, regional and global organizations, whether governmental or non-governmental concerned with fisheries management and sustainable use of aquatic ecosystems;

Further recognizing that implementation of these guidelines should be consistent with the Code of Conduct for Responsible Fisheries as well as with the Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem with regard to ecosystem considerations and based on the use of the best available science;

Taking into account the importance placed by the guidelines on research, monitoring, the sharing of information, and public education on sea turtles;

The Contracting Parties of NAFO resolve as follows:

1. NAFO Contracting Parties (CPs) should, as appropriate, individually and collectively implement the FAO "Guidelines to Reduce Sea Turtle Mortality in Fishing Operations" (the Guidelines) to reduce the incidental catch of sea turtles and ensure the safe handling of all turtles that are captured.

2. NAFO CPs should continue to enhance the implementation of their existing turtle mitigation measures using best available scientific information on mitigation techniques.

3. NAFO should encourage CPs to collect, and provide to the NAFO Secretariat, all available information on interactions with sea turtles in fisheries managed by NAFO in the NAFO Convention Area and urges them to foster collaboration with other CPs in the exchange of information in this area.

4. NAFO should cooperate with other regional, subregional and global organizations to share data on sea turtle bycatch and to develop and apply compatible bycatch reduction measures as appropriate.

5. Beginning in 2007, CPs should provide to the NAFO Secretariat a detailing of sea turtle fishery interaction data (e.g., species identification, fate and condition at release, relevant biological information and gear configuration), including data collected by their respective national observer programs, in fisheries managed by NAFO in the NAFO Convention Area and any sea turtle-specific training provided to these observers. This information will be compiled by the NAFO Secretariat and reported to the Scientific Council and to the Fisheries Commission.

6. The Fisheries Commission should monitor the progress of CPs in applying this resolution and develop relevant strategies for the further consideration of the Commission in 2008. Information produced as a result of this resolution will be provided by the NAFO Secretariat to the FAO.

APPENDIX E. National Oceans Protection Act of 2005 (S. 1224)

National Oceans Protection Act of 2005 (Introduced in Senate)

Subtitle C--Cetacean and Sea Turtle Conservation

SEC. 331. SHORT TITLE.

This subtitle may be cited as the `Cetacean and Sea Turtle Conservation Act of 2005'.

SEC. 332. PURPOSES.

The purposes of this subtitle are--

(1) to restore and perpetuate healthy populations of cetaceans and sea turtles by reducing bycatch of cetaceans and sea turtles to sustainable levels through the development of bilateral and multilateral efforts among the United States and other fishing nations;

(2) to increase the technical capacity, financial resources, and political will necessary to reduce bycatch of cetaceans and sea turtles to sustainable levels globally;

(3) to promote international standards and guidelines to reduce bycatch of cetaceans and sea turtles; and

(4) to authorize financial resources for the purposes described in paragraphs (1) through (3).

SEC. 333. DEFINITIONS.

In this subtitle:

(1) APPROPRIATE FISHING GEAR AND METHODS- The term `appropriate fishing gear and methods' means gear and methods used in fishing operations that are proven to be effective in reducing bycatch of cetaceans or sea turtles to sustainable levels.

(2) BYCATCH - The term `bycatch' means the incidental mortality or serious injury of an animal that is not the target of a fishing operation that occurs in the course of the fishing operation.

(3) CETACEAN - The term `cetacean' means an aquatic mammal that is a member of the order Cetacea, including whales, dolphins, and porpoises.

(4) INDEPENDENT EXPERTS- The term `independent experts' means individuals with expertise in issues related to cetaceans or sea turtles including representatives of academic and scientific organizations, nongovernmental organizations that promote conservation of cetacean populations, and the fishing industry.

(5) POPULATION- The term `population' means a distinct group of

individuals of a species or smaller taxa in a common spatial arrangement that interbreed when mature.

(6) SEA TURTLE- The term `sea turtle' means a member of--

(A) the family Cheloniidae; or

(B) the family Dermochelyidae.

(7) SUSTAINABLE LEVELS- The term `sustainable levels' means, with respect to bycatch , a level of bycatch that, in combination with other mortality caused by humans, does not exceed the maximum number of individuals that may be removed from a population while allowing that population to recover to a level at which such population maintains its maximum productivity.

SEC. 334. INTERNATIONAL AGREEMENTS AND STANDARDS.

(a) International Agreements- The Secretary, with the consent of the President and in consultation with independent experts and with the Secretary of State, shall negotiate with foreign governments that are engaged in, or that have persons or companies engaged in, commercial fishing operations that are adversely impacting populations of cetaceans or populations of sea turtles for the purpose of developing bilateral or multilateral agreements that require such governments to reduce bycatch of cetaceans or sea turtles to at least sustainable levels.

(b) Standards- An international agreement negotiated under subsection (a) shall include provisions to promote the development and implementation of standards for commercial fishing operations that interact with cetaceans or sea turtles that--

(1) require such operations to use appropriate fishing gear and methods; and

(2) are intended to reduce bycatch of cetaceans and sea turtles to at least sustainable levels.

(c) United Nations- The Secretary may consult and coordinate with the Committee on Fisheries of the Food and Agriculture Organization of the United Nations in developing international agreements under subsection (a) or standards under subsection (b).

SEC. 335. RESEARCH AND DEVELOPMENT GRANTS.

(a) Authority- The Secretary is authorized to award grants and to provide other assistance that the Secretary determines is appropriate to an eligible person to carry out the research or development of appropriate fishing gear and methods, including appropriate fishing gear and methods for use--

(1) in the North Sea, where harbor porpoise bycatch is severe;

(2) in Mexico's Gulf of California, where the vaquita porpoise faces extinction unless gillnets are banned;

(3) in the east coast of South America, including waters off the coasts of

Brazil, Uruguay, and Argentina, where bycatch of franciscana dolphins is contributing to the precipitous decline of that species; or

(4) in areas where bycatch of sea turtles associated with longline fishing has been found to occur frequently, as follows:

(A) The central Pacific Ocean.

(B) The southern Pacific Ocean.

(C) The southern Atlantic Ocean.

(D) The Mediterranean Sea.

(b) Definitions- In this section:

(1) APPROPRIATE CONGRESSIONAL COMMITTEES- The term `appropriate congressional committees' means the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Resources of the House of Representatives.

(2) FOREIGN PERSON DEFINED- The term `foreign person' means--

(A) an individual who is not a United States citizen;

(B) any corporation, partnership, business association, society, trust, organization, or other nongovernmental entity created or organized under the laws of a foreign country or that has its principal place of business outside the United States; or

(C) any governmental entity of a foreign country.

(3) MARINE MAMMAL COMMISSION- The term `Marine Mammal Commission' means the Marine Mammal Commission established by section 201 of the Marine Mammal Protection Act of 1972 (16 U.S.C. 1401).

(c) Eligibility-

(1) IN GENERAL- The Secretary shall determine if a person, including any governmental entity or any foreign person, is eligible to receive a grant under this section.

(d) Application- A person seeking a grant under this section shall submit an application to the Secretary at such time, in such manner, and including such information as the Secretary may reasonably require.

(e) Terms and Conditions-

(1) IN GENERAL- A recipient of a grant or other financial assistance provided by the Secretary under this section shall agree to such terms and conditions as the Secretary determines are necessary to protect the interests of the United States.

(2) REQUIREMENT FOR CONSULTATION- The Secretary shall consult with the Marine Mammal Commission prior to determining the terms and conditions described in paragraph (1) for a recipient of a grant or other financial assistance to be used to reduce bycatch of cetaceans.

(f) Report- Not later than one year after the date of enactment of this Act, and annually thereafter, the Secretary shall submit a report to the appropriate

congressional committees on the grants and other assistance provided under this section.

SEC. 336. BYCATCH DATABASE.

(a) Requirement for Database- The Secretary shall establish a database of bycatch data for cetaceans and sea turtles from fisheries around the world for the purpose described in subsection (b).

(b) Purpose of Database- The purpose of the database is to make information related to bycatch , including cetacean or sea turtles species affected by bycatch , the development and use of appropriate fishing gear and methods, and efforts to reduce the bycatch of cetaceans and sea turtles, available to scientists, resource managers, and the public.

(c) Availability- The Secretary shall make the database established pursuant to subsection (a) available by public posting through an Internet Web site.

SEC. 337. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated $5,000,000 for each fiscal year 2005 through 2008 to carry out the provisions of this subtitle.

APPENDIX F. Sample Cetacean Bycatch Legislation

110th Congress

1st Session

S.

To promote the conservation of cetacean species, and for other purposes.

IN THE SENATE OF THE UNITED STATES

introduced the following bill; which was read twice and referred to the Committee on _____

A Bill

To promote the conservation of cetacean species, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE

This Act may be cited as the "Cetacean Conservation Act of 2007."

SEC. 2. FINDINGS.

Congress makes the following findings:

(1) Cetaceans are a group of approximately 80 species of whales, dolphins, and porpoises that occur worldwide and are a biologically significant global resource. In the United States marine mammals are provided protection under the Marine Mammal Protection Act; some species are included on the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.). A number of species are listed as endangered by international agreements.

(2) The maintenance of healthy cetacean populations is essential to the maintenance of healthy ocean ecosystems.

(3) Cetaceans often inhabit international waters and are highly migratory, resulting in the management of a population of cetaceans frequently being shared by 2 or more countries.

(4) Eco-tourism based on whale watching, enjoyed by millions of people around the world, has grown into more than a $1,000,000,000 a year industry.

(5) Many species of cetaceans are threatened with extinction. Bycatch of cetaceans in fishing

operations is a major threat to cetaceans worldwide. Several species and many populations of cetaceans could be lost in the next few decades if nothing is done.

(6) The final report of the United States Commission on Ocean Policy (2004) identifies the severity of threats to cetaceans posed by accidental capture in fishing gear. The Report states that the greatest threat to marine mammals worldwide is the accidental capture or entanglement in fishing gear, with hundreds of thousands of such mammals unintentionally killed each year.

(7) The Report recommends that the United States use international agreements and other diplomatic means to strengthen protections for marine mammals, sea turtles, and other endangered marine species, including through the development and adoption of bycatch reduction methods.

(8) Considerable advances have been made in a few fisheries to address the problem of cetacean bycatch. However, progress to address this problem in other fisheries has been slow or non-existent throughout much of the world, in many cases due to a lack of technical capacity, financial resources, and political will to combat the problem. Fishing pressure on cetaceans is increasing with the expansion of fishing fleets and the establishment of new fisheries.

(9) From 1993 through 2006, the United States implemented measures that reduced cetacean bycatch in United States fisheries to less than one-third the previous rate of such bycatch.

(10) It is appropriate for the United States to build on its success in reducing cetacean bycatch by leading an international effort to implement measures to reduce such bycatch around the world and to promote an international regulatory framework in which countries adopt standards for reducing bycatch that are comparable to the standards adopted by the United States.

(11) Commercial fishing operations that are subject to United States regulations to reduce cetacean bycatch may be at a competitive disadvantage because, while the operations are required to mitigate such bycatch and bear the costs for doing so for most fisheries, the United States continues to allow the importation of fisheries products from countries that do not require comparable mitigation. U.S. longline fishermen represent at most no more than 2 percent of the total number of global pelagic longline fishermen.

(12) Global standards and international agreements to reduce such bycatch would help remedy this imbalance, and the United States can be instrumental in providing guidance and support toward this goal.

(13) Many developing countries require technical and financial assistance in order to effectively reduce cetacean bycatch.

(14) Bycatch of cetaceans is occurring at unsustainable levels in many locations, including----------

(A) the North Sea, where harbor porpoise bycatch is severe;

(B) Mexico's Gulf of California, where the vaquita porpoise faces extinction unless gillnets are banned; and

(C) The east coast of South America, including waters off the coasts of Brazil, Uruguay, and Argentina, where bycatch of franciscana dolphins is contributing to the precipitous decline of that species.

(15) An international effort led by the United States to increase technical capacity, financial resources, and political will necessary to reduce cetacean bycatch to sustainable levels globally and to develop international standards and guidelines to reduce such bycatch is necessary to ensure the conservation of cetaceans for the health of the world's oceans, the economic security of commercial fishing in the United States, and the enjoyment of future

generations.

SEC. 3. PURPOSES

The purposes of this Act are---

(1) to restore and perpetuate healthy populations of cetaceans by reducing bycatch to sustainable levels through the development of bilateral and multilateral efforts among the United States and other fishing nations;

(2) to increase the technical capacity, financial resources and political will necessary to reduce bycatch of cetaceans to sustainable levels globally;

(3) to promote international standards and guidelines to reduce bycatch of cetaceans; and

(4) to authorize financial resources for the purposes described in paragraphs (1) through (3).

SEC. 4. DEFINITIONS

In this Act:

(1) APPROPRIATE FISHING GEAR AND METHODS.---- The term “appropriate fishing gear and methods” means gear and methods used in fishing operations that are proven to be effective in reducing cetacean bycatch to sustainable levels.

(2) BYCATCH--- The term “bycatch” means the incidental mortality, serious injury, injury, or capture of an animal that is not the target of a fishing operation that occurs in the course of the fishing operation.

(3) CETACEAN--- The term “cetacean” means an aquatic mammal that is a member of the order Cetacea, including whales, dolphins and porpoises.

(4) INDEPENDENT EXPERTS--- The term “independent experts” means individuals with expertise in issues related to cetaceans including representatives of academic and scientific organizations, nongovernmental organizations that promote conservation of cetacean populations, and the fishing industry.

(5) POPULATION--- The term “population” means a distinct group of individuals of a species or smaller taxa in a common spatial arrangement that interbreed when mature.

(6) SUSTAINABLE LEVELS--- The term “sustainable levels” means, with respect to bycatch, a level of bycatch that, in combination with other mortality, does not exceed the maximum number of individuals that may be removed from a population while allowing that population to recover to a level at which such population maintains its maximum productivity.

SEC. 5. INTERNATIONAL AGREEMENTS AND STANDARDS

(a) INTERNATIONAL AGREEMENTS—The Secretary of Commerce, [with the consent of the President and] in consultation with independent experts and with the Secretary of State, shall negotiate with foreign governments that are engaged in, or that have persons or companies engaged in, commercial fishing operations that are adversely impacting populations of cetaceans for the purpose of developing bilateral or multilateral agreements that require such governments to reduce bycatch of cetaceans to at least sustainable levels.

(b) STANDARDS.--- An international agreement negotiated under subsection (a) shall include provisions to promote the development and implementation of standards for commercial fishing operations that interact with cetaceans that---

(1) require such operations to use appropriate fishing gear and methods; and

(2) are intended to reduce bycatch of cetaceans to at least sustainable levels.

(c) UNITED NATIONS.--- The Secretary of Commerce may consult and coordinate with the Committee on Fisheries of the Food and Agriculture Organization of the United Nations in developing international agreements under subsection (a) or standards under subsection (b).

SEC. 6 RESEARCHAND DEVELOPMENT GRANTS.

(a) AUTHORITY---The Secretary of Commerce is authorized to award grants and to provide other assistance that the Secretary determines is appropriate to an eligible person to carry out the research or development of appropriate fishing gear and methods, including appropriate fishing gear and methods for use in areas that the Secretary deems as priorities for such research.

(b) DEFINITIONS.---In this section:

(1) APPROPRIATE CONGRESSIONAL COMMITTEES.---The term “appropriate congressional committees” means the Committee on Commerce, Science and Transportation of the Senate and the Committee on Resources of the House of Representatives.

(2) FOREIGN PERSON DEFINED.---The term “foreign person” means—

(A) an individual who is not a United States citizen;

(B) any corporation, partnership, business association, society, trust, organization, or other nongovernmental entity created or organized under the laws of a foreign country or that has its principal place of business outside the United States; or

(C) any governmental entity of a foreign country.

(3) MARINE MAMMAL COMMISSION.--- The term “Marine Mammal Commission” means the Marine Mammals Commission established by section 201 of the Marine Mammals Protection Act of 1972 (16 U.S.C. 1401).

(c) ELIGIBILITY.---

(1) IN GENERAL.---The Secretary of Commerce shall determine if a person, including any governmental entity or any foreign person, is eligible to receive a grant under this section.

(d) APPLICATION----A person seeking a grant under this section shall submit an application to the Secretary of Commerce at such time, in such manner, and including such information as the Secretary may reasonably require.

(e) TERMS AND CONDITIONS.---

(1) IN GENERAL--- A recipient of a grant or other financial assistance provided by the Secretary of Commerce under this section shall agree to such terms and conditions as the Secretary determines are necessary to protect the interests of the United States.

(2) REQUIREMENT FOR CONSULTATION---The Secretary of Commerce shall consult

with the Marine Mammal Commission prior to determining the terms and conditions described in paragraph (1) for a recipient of a grant or other financial assistance to be used to reduce bycatch of cetaceans.

(f) REPORT--- Not later than one year after the date of enactment of this Act, and annually thereafter, the Secretary of Commerce shall submit a report to the appropriate congressional committees on the grants and other assistance provided under this section.

SEC. 7. BYCATCH DATABASE

(a) REQUIREMENT FOR DATABASE--- The Secretary of Commerce shall establish a database of bycatch data for cetaceans from fisheries around the world for the purpose described in subsection (b).

(b) PURPOSE OF DATABASE--- The purpose of the database is to make information related to bycatch, including cetacean species affected by bycatch, the development and use of appropriate fishing gear and methods, and efforts to reduce the bycatch of cetaceans, available to scientists, resource managers, and the public.

(c) AVAILABILITY--- The Secretary of Commerce shall make the database established pursuant to subsection (a) available by public posting through an Internet website.

SEC.8. AUTHORIZATION OF APPROPRIATIONS

There are authorized to be appropriated $10,000,000 for each fiscal year 2007 through 20012 to carry out the provisions of this Act.

APPENDIX F

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APPENDIX C

AN EVALUATION OF THE MOST SIGNIFICANT THREATS TO CETACEANS, THE AFFECTED SPECIES AND THE GEOGRAPHIC AREAS OF HIGH RISK, AND THE RECOMMENDED ACTIONS FROM VARIOUS INDEPENDENT INSTITUTIONS.

WORLDWIDE BYCATCH OF CETACEANS

An evaluation of the most significant threats to cetaceans, the affected species and the geographic areas of high risk, and the recommended actions from various independent institutions.

N.M. Young and S. Iudicello

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A Report to the NOAA Fisheries Office of International Affairs

NOAA Technical Memorandum NMFS-OPR-36
July 2007

U.S. Department of Commerce
Carlos M. Gutiérrez, Secretary

National Oceanic and Atmospheric Administration
Vice Admiral Conrad C. Lautenbacher, Jr., USN (Ret.), Under Secretary for Oceans and Atmosphere

National Marine Fisheries Service
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Silver Spring, MD 20910

Or online at:
http://www.nmfs.noaa.gov/

Worldwide Bycatch of Cetaceans

ANALYSIS AND ACTION PLAN

Order No.
DG133F06SE4641

A Report to the NOAA Fisheries Office of International Affairs

Nina Young, Principal Investigator.
With S. Iudicello and MRAG Americas

30 June 2007

Photo Credits : Dall’s porpoise—National Oceanic and Atmospheric Administration
Harbor Porpoise—Duke University, Andy Read
Harbor Porpoise-- National Oceanic and Atmospheric Administration
Hector's dolphin (*Cephalorhynchus hectori*) calf killed in gillnet, New Zealand.© WWF / Stephen Dawson

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EXECUTIVE SUMMARY

Humans have exploited cetaceans (whales, dolphins, and porpoises) since primitive whaling activities began in Japan and Scandinavia many centuries ago. The U.S. Ocean Commission in 2005 judged incidental catch in fisheries the "biggest threat to marine mammals worldwide . . .[killing] hundreds of thousands of them each year." Fishing gear, especially gillnets, indiscriminately catches an undetermined number of marine species, including dolphins and porpoises. Still, progress on quantifying the scale of this mortality, identifying the magnitude of this threat, and mitigating or reducing the mortality has been slow, sporadic, and limited to a few specific fisheries or circumstances.

Cetaceans are "migratory." They spend several months each year traveling from one area to another, often covering vast distances in search of food, a particular climate, or a safe breeding ground. From a conservation and management perspective migratory species are exposed to an array of threats because they do not confine themselves to one location. Moreover, because they periodically cross through a number of jurisdictions, the level of protection afforded to cetaceans fluctuates according to their geographical location. Inevitably, migrating animals will pass through jurisdictions where cetacean conservation is less of a priority than in other areas. The protection of small cetaceans has largely been left to the domestic regimes of coastal states, and a number of nations have enacted legislation to protect dolphins and porpoises—particularly Australia, New Zealand, the United Kingdom, and the U.S.

With bycatch a serious and widespread threat to cetaceans, there is an urgent need to better document the extent of this threat, assess cetacean populations, develop alternative fishing gear and practices and, at the same time, institute effective regional agreements that call for mitigation measures ranging from temporal and spatial closures to deterrents. There is also the need to foster greater engagement by inter-governmental bodies (e.g. Food and Agriculture Organization of the United Nations (FAO), the United Nations, and the International Union for the Conservation of Nature (IUCN)) as well as international regional fishery management bodies. Because it requires a country to outline specific measures to address bycatch, the FAO's International Plan of Action model and resolutions adopted through regional fishery management organizations may provide useful mechanisms to address interactions between cetaceans and fisheries. Finally technology transfer is necessary to develop the scientific infrastructure necessary to monitor cetacean populations, fisheries, and any accompanying bycatch.

There are other recognized threats to cetaceans including toxic pollution, acoustic pollution, ship strikes, environmental change, global warming, and habitat degradation. The occurrence and effects of these threats are even more poorly documented than bycatch. With provisions in U.S. law and international attention turning toward cetacean bycatch, it is appropriate that the focus of this report is the assessment and mitigation of global cetacean bycatch. Any efforts to better document and mitigate bycatch will have collateral benefit to address other threats to cetaceans. Therefore, this report will evaluate the magnitude of the bycatch problem, the affected species and the geographic areas of high risk, and the recommended actions from various independent institutions. The report will describe the tools afforded through the MMPA and international agreements relevant to marine mammal conservation and bycatch; identify gaps in conservation and management efforts related to cetacean bycatch and identify opportunities for international action, cooperative research, and information exchange. The final element will prioritize and recommend strategic actions that NMFS' Office of International Affairs can undertake to address the international cetacean bycatch threat.

Methodology

The report was completed under contract with the Office of International Affairs of the National Marine Fisheries Service (NMFS) of NOAA for a study that details steps it could take to engage foreign nations and multilateral organizations in reducing marine mammal bycatch. The project scope of work called for an evaluation of the most significant threats to cetaceans, the affected species and the geographic areas of high risk, and the recommended actions from various independent institutions. The report identifies gaps in conservation and management efforts related to threats to cetacean populations and opportunities for international action, cooperative research, and information exchange.

As a structure for examining bycatch of cetacean species, the report is organized geographically, using area designations similar to the Statistical Areas of the FAO. This alignment enables the analysis to overlay the activity of the principal fisheries of the world and the existence of multi- or bi-lateral agreements on areas of occurrence or migration of cetaceans. Following the first general geographic cut, the next level of focus is on populations that are affected by bycatch that represents more than 2 percent of the population. The next screen is for high-risk populations in areas where bycatch occurs in the absence of conservation measures, lack of enforcement of authorized measures, or lack of a policy framework for taking action. Where a policy framework is available, the analysis examines feasibility of implementing conservation measures and the likelihood of their success.

The investigation was undertaken primarily by a review of the scientific literature, but also included some follow-up personal contacts with key authors, managers and policy experts. The summary of legal instruments was conducted through examination of U.S. law and relevant international materials, particularly treaties summarized in 1997 by the U.S. Marine Mammal Commission in a *Compendium of Selected Treaties, International Agreements and Other Relevant Documents*. The analysis of potential tools examines the domestic and international framework available to the U.S., either unilaterally or multilaterally, to implement protection measures, initiate discussions or foster programs in high-risk areas. Exemplary agreements are discussed and similar regional schemes are listed in text boxes.

A comparison of the highest risk populations to agreements in place, parties to those agreements, and whether actions are being taken to reduce bycatch produced a gap analysis that highlights both gaps in information and mitigation measures. Recommendations were drawn from the literature, in response to the gap analysis, and from discussion with key authors, managers and policy experts. A ranking of the recommendations was completed by sorting possible actions according to the level of risk and potential benefit to cetacean species and examining the feasibility and likelihood of success of possible actions. This template for priority setting based on considerations of risk and feasibility results in recommendations for high, second-tier and low priority action options.

The Magnitude of Cetacean Bycatch

Through a review of the literature, several overarching themes or issues emerged. The first is the consistent need that permeates all species in all regions for cetacean abundance and bycatch estimates. Even though most species of cetaceans have been recorded at some time caught in some type of fishing gear, very few studies, with the exception of a few in the U.S., have successfully assessed and quantified the actual impact of a fishery or fisheries bycatch on cetacean populations. Part of the problem is that only a very small proportion of cetacean catches are ever actually recorded using some type of quantifiable process or an independent observer program. Consequently, the evidence for or estimates of bycatch tends to be anecdotal or non-quantitative, consisting of stranding reports, interviews, port monitoring, self-reporting by countries, and opportunistic observations by scientists and fishery observers. Such information can result in underestimates of bycatch. Also, estimates of total bycatch or bycatch rate are difficult to obtain, especially in developing countries where extensive coastal or artisanal fisheries account for most of the bycatch. Further compounding the problem is that in many regions of the world data generally are lacking statistics on fisheries catch, fishing capacity and fishing effort. Additionally, for most cetacean species, it is very difficult and costly to assess population size and trends or to assess the consequences of an uncertain and unpredictable bycatch rate. Adding to the intractability of this problem is the fact that where fisheries are coastal, local, or artisanal, international or even bi- or multi-lateral agreements do not provide mechanisms for action because these activities are solely within the purview of the coastal states. This problem is exacerbated in developing coastal states where fisheries management does not rank high as a national priority, and thus funds are frequently unavailable to undertake such assessments. Furthermore, reporting significant cetacean bycatch may be a low priority, or politically unacceptable, in countries where fishery development is considered vital for food security or maintaining the balance of trade.

There are large areas of the world where it seems likely there may well be interactions between cetaceans and fisheries, but for which there are, as yet, no data, and no idea of any impact that such fisheries may cause. This lack of information on the impacts of a fishery does not imply, however, that there is no problem, especially since reporting of just a few individuals in a specific fishery may be indicative of a larger interaction. Only when scientists can accomplish a detailed study of the cetacean stock abundance, the fishing effort, and the bycatch rate in each fishery can a thorough and accurate assessment be made.

Such assessments are integral to the development of long-term solutions to mitigate bycatch. Solutions to the problem of cetacean entanglement have been sought in several parts of the world with a variety of techniques. No universal solution to the problem has been found, but in one or two cases some reduction in the numbers of cetaceans caught in gillnets has been accomplished through gear modifications (e.g., rigging driftnets to fish a few meters below the surface or increasing twine size) or technological aids (e.g., pingers). Because banning the use of gillnets worldwide is not an option and site-specific gear prohibitions are not always effective, approaches will have to be found on a fishery-by-fishery basis, and such solutions should consider socio-economic alternatives (e.g., eco-tourism opportunities).

For several cetacean species—including the harbor porpoise, vaquita, Hector's and Maui's dolphin, finless porpoise, humpback and bottlenose dolphins, Irrawaddy dolphins, dusky dolphin, and Burmeister's porpoise—operational interactions with fisheries may threaten survival or recovery. In the report, the authors review by FAO statistical area the known fisheries interactions for species for which this interaction is either unsustainable (> than two percent of the population estimate) or may be approaching an unsustainable level (one to two percent of the population estimate). The material in boxes highlights those species that are considered a

priority for the Atlantic and Pacific, based on the level of incidental mortality. Chapter 2 of the report describes and highlights research needs that have been identified in the literature and by scientists and managers; offers preliminary recommendations for action in each area based on scientific data and available mitigation strategies (e.g., national laws, closed areas, or technological fixes); and provides a thorough analysis and review of the literature for all cetaceans incidentally killed in fisheries in each FAO statistical area. Appendix A provides a detailed listing of these findings.

Most notably, in almost all the statistical areas where studies have been conducted, large numbers of small cetaceans, especially coastally distributed species, are affected by coastal gillnet, purse seine, trawl, and trap fisheries. Major (in the top 20 for global, wild-capture landings) fisheries in the Atlantic include Atlantic herring, skipjack tuna, chub mackerel, Atlantic cod, Argentine shortfin squid, European pilchard, Gulf menhaden, European sprat, Atlantic mackerel, and European anchovy. Major fishing nations in the Atlantic are the U.S., Norway, Iceland, Denmark, Spain, and Canada. In the Atlantic Ocean, the major bycaught species and gear types in which this bycatch occurs are north Atlantic right whales off eastern North America, trap lines and gillnets; harbor porpoises in the North Sea, Celtic Sea, and Baltic Sea, gillnets; tucuxis in Caribbean coastal waters, gillnets; humpback dolphins in West Africa, coastal gillnets; sperm whales, striped dolphins, and short-beaked common dolphins in the Mediterranean, pelagic driftnets and gillnets; harbor porpoises in Black Sea, coastal gillnets; tucuxis in eastern South American coastal waters, gillnets; dusky and Commerson's dolphins in Argentina, coastal gillnets and midwater trawls and franciscanas in coastal gillnets.

Atlantic Species at Risk from Fishery Bycatch

- *Northwest Atlantic—Northern right whale*
- *Northeast Atlantic—harbor porpoise, common and striped dolphins*
- *Western Central Atlantic—tucuxi*
- *Eastern Central Atlantic—humpback dolphin*
- *Mediterranean and Black Sea—sperm whale, striped and common dolphins, harbor porpoise*
- *Southwest Atlantic—tucuxi, dusky and Commerson's dolphins, Franciscana*

Nine FAO statistical areas make up the Pacific region, including the Indian Ocean. Many areas in the Pacific are characterized by a lack of information about cetacean population size and incidental bycatch, making difficult an assessment of highest risk. Based on what is known about comparable fisheries and gear types elsewhere, it is likely that critical issues arise for a dozen species of marine and fresh water dolphins, three species of porpoise, and the false killer whale in the waters of 17 countries covering the entire Pacific Rim.

Developed nations such as the United States and Japan, as well as developing countries such as Natal and Sri Lanka, all have fisheries that interact with cetaceans. Challenges include gathering the most basic information on abundance and fishing effort to providing more complex technological solutions and implementation of action plans.

Major (in the top 20 for global, wild-capture landings) fisheries in the Pacific include Peruvian anchovy, Alaska pollock, skipjack tuna, chub mackerel, Japanese anchovy, Chilean jack mackerel, largehead hairtail, blue whiting, yellowfin tuna, capelin, Araucanian herring, and Akiami paste shrimp. Major fishing nations in the Pacific are China, Peru, Japan, Chile, U.S., Indonesia, Russian Federation, India, Thailand, Republic of Korea, Philippines, Malaysia, Mexico, Vietnam, and Taiwan. In the Pacific Ocean, the major bycaught species and gear types in which this bycatch occurs are Risso's dolphins in Sri Lanka, drift and set gillnets in combination with direct harpooning; bottlenose dolphins off the coast of Natal, South Africa, anti-shark gillnets, south coast of Zanzibar (Tanzania), drift and bottom-set gillnets; Indo-Pacific humpback dolphins in Natal (South Africa), anti-shark nets south coast of Zanzibar (Tanzania), drift and bottom-set gillnets, Madagascar and East Africa, coastal gillnets; Ganges river dolphins in India and Bangladesh, gillnets; Irrawaddy dolphins in Chilka Lake (India), gillnets, Bay of Bengal, heavy-mesh drift gillnets for elasmobranches; Dall's porpoise in direct harvests and salmon driftnets off Japan and Russia; Finless porpoises in Korea and Japan, coastal nets and traps, in Inland Sea (Japan), gillnets, Yangtze River, gillnets and electrofishing; marine waters of China and Southeast Asia, coastal nets and traps; Baijis in China, electrofishing and rolling hooks; Spinner dolphins and Fraser's dolphins in the Philippines, driftnets for large pelagics and flying fish, purse seines for small pelagics; Irrawaddy dolphin (marine), Phillippines, (matang quarto) crab nets; (freshwater) Mekong River, Mahakam River, Songkhla Lake, and Ayeyarwady River, gillnets; False killer whales, Hawaii, longlines; Vaquitas, Gulf of California (Mexico), gillnets; Hector's dolphins, North Island (New Zealand), coastal gillnets; Dusky dolphin, Peru, drift gillnets; Burmeister's porpoises, Peru, coastal gillnets.

Pacific Species at Risk from Fishery Bycatch

- *Northwest Pacific (including the Sea of Japan, East and South China Seas, Yangtze River)—finless porpoise, baijiis, Dall's porpoise, finless porpoise*
- *Western Central Pacific (including Mekong River, Mahakam River, Songkhla Lake, and Ayeyarwady River) —spinner dolphin, Fraser's dolphin, Irrawaddy dolphin,*
- *Eastern Central Pacific—Vaquita and false killer whales ,*
- *Southwest Pacific--Hector's dolphin and Maui's dolphin*
- *Southeast Pacific—Dusky dolphin, Burmeister's porpoise*
- *Western Indian Ocean—Spinner, Risso's, bottlenosed and humpback dolphins*
- *Eastern Indian Ocean—Ganges and Irrawaddy river dolphins*

Tools for Action to Reduce Bycatch

U.S. law and policy provide mechanisms for action to reduce bycatch of cetaceans and other marine mammals in fishing operations. The Marine Mammal Protection Act, the Endangered Species Act and the Magnuson-Stevens Fishery Conservation and Management Act provide policy statements, action mandates and research direction for U.S. actions. The MMPA, and more recently the M-SFCMA also direct U.S. managers to work in the international arena to protect marine mammals.

The Marine Mammal Protection Act of 1972 (MMPA) contains international sections that provide tools to address international threats to cetaceans. The MMPA requires the Secretary of Commerce or the Secretary of the Interior, working through the Secretary of State, to negotiate agreements with other nations to protect and conserve marine mammals. The act's international provisions are particularly strong in the area of bycatch and provide the U.S. with the tools to take a leadership role in initiating negotiations with all foreign governments engaged in commercial fishing found to be unduly harmful to any species or population stock of marine mammal and in developing bilateral and multilateral treaties with such countries to protect marine mammals. However, the U.S. has rarely applied these measures nor has it taken actions to reduce cetacean bycatch or to protect ecosystems abroad.

In 2006, the Congress reauthorized provisions of the Magnuson-Stevens Fishery Conservation and Management Act (M-SFCMA), the law governing how the U.S. manages fisheries within its EEZ. The reauthorization also directed substantial attention on fishing issues outside U.S. waters, particularly illegal, unregulated and unreported fishing (IUU) and bycatch. Although aimed primarily at strengthening U.S. leadership in international conservation and management of fisheries for purposes of leveling the playing field between the U.S. fleet and those of other nations, the new provisions have strong bycatch language calling for measures comparable to U.S. policy.

The international title of the reauthorization creates a new section in the M-SFCMA authorizing the Secretary to promote improved monitoring and compliance for high seas fisheries or fisheries governed by international or regional fishery management agreements. The provisions call for improved communication and cooperation among law enforcement organizations, an international monitoring network, an international vessel registry, remote sensing technology, technical assistance, and a listing and certification process to decide whether sanctions should be applied to nations that participate in IUU fishing or do not reduce bycatch of protected living marine resources.

The U.S. is party to numerous international agreements related to cetacean protection as well as to fishery agreements that have bycatch-reduction provisions. Another source of authority for action or diplomatic initiatives arises from the numerous regional agreements to which the U.S. is party. Finally, the increasing role of regional fishery management organizations in reaching out to both coastal states and fishing nations, whether they are contracting parties or not, may provide an additional venue for discussion of cetacean bycatch in fisheries.

The global framework for conservation of living marine resources includes agreements that apply to all the seas, some that cover specific seas or regions, and some that govern ocean areas that are used by numerous coastal and flag nations. Fishery conservation agreements, particularly those that create new regional fishery management organizations (RFMOs) have potential to prevent bycatch of non-target species and protected species in the course of fishing. The report examines the emergence of an increased role for regional fishery management organizations in bycatch reduction. This report summarizes relevant and applicable examples in

key regions, concentrating on a few international tools and the agreements that relate to the “hot spots,” or areas where the most significant incidental bycatch require urgent action.

International agreements examined include the International Convention for the Regulation of Whaling, the Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention) and the Convention on International Trade in Endangered Species among others. Under the auspices of the Bonn Convention, parties have negotiated additional regional agreements such as the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas, the Agreement on the Conservation of Cetaceans of the Black Sea, and the Mediterranean Sea and Contiguous Atlantic Area. The report describes and posits options for action under regional measures such as the UN Regional Seas Programme and specific area protocols that are relevant to cetacean conservation. In addition to wildlife, environmental and specific marine mammal conventions, treaties that govern fisheries can be brought to bear on cetacean bycatch problems.

Attempts at widespread international agreement on fishery management were unsuccessful until the 1982 United Nations Conference on the Law of the Sea (UNCLOS III). With it came recognition of the extension of coastal state jurisdiction to 200 miles, and for the first time, the freedom of fishing on the high seas was circumscribed. Article 56 of the Convention gives coastal states sovereign rights over resources out to 200 miles. (UNCLOS III) This includes the authority to conserve and manage living resources. The UN Law of the Sea, and measures that flow from it, such as the voluntary Code of Conduct for Responsible Fisheries and the Straddling Stocks agreement provide numerous alternatives for tackling cetacean bycatch, such as General Assembly resolutions or creation of new regional management authorities, including ones that may be specific to cetacean conservation.

Exemplary regional authorities discussed include the Northwest Atlantic Fisheries Organization, the International Convention for the Conservation of Atlantic Tunas, Convention on the Conservation and Management of Fishery resources in the Southeast Atlantic Ocean, the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean, and the Convention for the Conservation of Antarctic Marine Living Resources. In addition to treaties and other legal instruments, tools such as information exchange, training and technical assistance, gear workshops, professional exchanges and other capacity building activities can contribute to reducing cetacean bycatch.

Analysis

The analysis examines problems by region. It sets out species at risk, gaps in abundance and bycatch information, gaps in management frameworks and gaps in implementation or enforcement of existing measures. The table below illustrates the gaps in elements critical to conservation.

AREA/ SPECIES	ABUND.EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS[1] IUCN	CITES	CMS	AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES[2] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT. Monitoring Mitigation Observers Enforcement
ATLANTIC OCEAN, MEDITERRANEAN & BLACK SEAS										
AREA 21-NORTHWEST ATLANTIC										
PHOCOENA PHOCOENA - HARBOR PORPOISE										
Gulf of Maine/Bay of Fundy	89,700		55/year (2000-2004)		NE (VU-over all)		II	BILAT	US-Canada	Pingers
EUBALAENA GLACIALIS NORTHERN RIGHT WHALE										
	300		1.2/year		E	I &II	I&II	BILAT	US-Canada	
AREA 27-NORTHEAST ATLANTIC										
PHOCOENA PHOCOENA - HARBOR PORPOISE										
Northern and Central North Sea	61,335		2,700/4.1%		VU		II	Reg	CS/FS/PS	
Kattegat and Oeresund	36,046 (20,276-64,083)		83/0.2%		VU		II	Reg	CS/FS/PS	
Skagerrak	4,738		114/2.4%		VU		II	Reg	CS/FS/PS	Pingers
Kattegat	4,009		50/1.2%		VU		II	Reg	CS/FS/PS	
Kiel & Mecklenburg Bight	588 (240-1,430)				VU		II	Reg	CS/FS/PS	

[1] For IUCN Red List, Categories are: LC, Least Concern; LR, Lower Risk, NT Near Threatened; NE, Not Evaluated; DD, Data Deficient; VU, Vulnerable; EN, Endangered; CR, Critically Endangered. LR/cd, Conservation Dependent (cd). Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years. If listed on CITES, the Appendix is indicated as I, II or both. For the Convention on Migratory Species, Appendix II listings are shown.

[2] The parties to the international, regional and bi-lateral agreements discussed in Chapters 4 and 5 and summarized in this table are listed in Appendix B.

AREA/ SPECIES	ABUND.EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS[1] IUCN	CITES	CMS	AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES[2] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT. Monitoring Mitigation Observers Enforcement
Southwestern Baltic proper	599 (200-3,300)		13/2.1%		VU		II	Reg	CS/FS/PS	
Northern North Sea	98,564 (66,679-145,697)		5,000/5%		VU		II	Reg	CS/FS/PS	Pingers (DMK) gillnet fishery Aug - Oct
Southern & Central North Sea	169,888 (124,121-232,530)		7,493/4.3%		VU		II	Reg	CS/FS/PS	
Celtic Sea	36,280 (12, 828-102,604)		2,200/6.2%		VU		II	Reg	CS/FS/PS	
North Sea	268,800		3,410/1.3%		VU		II	Reg	CS/FS/PS	
DELPHINUS DELPHIS-COMMON DOLPHINS										
Celtic Sea	75,449 (22,900 - 284,900)				LC	nl	II	Reg	CS/FS/PS	
Bay of Biscay	61,888 (35,461 - 108,010)		410-419 /0.67%		LC	nl	II	Reg	CS/FS/PS	Driftnet fishery banned
Celtic Sea & Western Waters	101,205 (55,125 – 185,802)		356-8353 614-2005/ 0.6-1.1%		LC	nl	II	Reg	CS/FS/PS	
STENELLA COERULEOALBA-STRIPED DOLPHINS										
Bay of Biscay	73,843		1193-1526 /1.6-1.56%		LR/cd	nl	II	Reg	CS/FS/PS	
Celtic Sea & Western Waters	66,825		136-5287 448/ 0.27-0.79%		LR/cd	nl	II	Reg	CS/FS/PS	
AREA 31-WESTERN CENTRAL ATLANTIC										

AREA/ SPECIES	ABUND.EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS[1] IUCN	CITES	CMS	AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES[2] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT. Monitoring Mitigation Observers Enforcement
SOTALIA FLUVIATILIS TUCUXI										
Cananeia estuary	156-380 No estimate for rest of range				DD	I&II	II	Reg	CS (US)	Marine Mammal Action Plan under SPAW Protocol
AREA 34-EASTERN CENTRAL ATLANTIC										
SOUSA TEUSZII-ATLANTIC HUMPBACK DOLPHIN										
Dakhla Bay	Considered small				DD	I&II	II	Int'l/Reg	CS	
Parc National du Banc d' Arguin in Mauritania.	Considered small				DD	I&II	II	Int'l/Reg	CS	
Saloum delta, Senegal	100				DD	I&II	II	Int'l/Reg	CS	
Canal do Geba-Bijagos	< 1,000 animals				DD	I&II	II	Int'l/Reg	CS	
South Guinea					DD	I&II	II	Int'l/Reg	CS	
Cameroon					DD	I&II	II	Int'l/Reg	CS	
Gaboon Estuaries					DD	I&II	II	Int'l/Reg	CS	
Angola	Considered small				DD	I&II	II	Int'l/Reg	CS	
AREA 37-MEDITERRANEAN AND BLACK SEA										
STENELLA COERULEOALBA – STRIPED DOLPHINS										
Alboran Sea	14,736 (6,923 – 31,366)		145-201/1.2%		LR/cd	nl	II	Int'l/Reg	CS/FS/PS	Swordfish driftnet fishery banned
Corsican/Ligurian Sea	25,614 (15,377 – 42,685)		51-326 (+/-146) 0.19 – 1.3%		LR/cd	nl	II	Int'l/Reg	CS/PS	Swordfish driftnet fishery banned
Western Mediterranean	117, 880 (68,379-214,800)		14-15/0.006%		LR/cd	nl	II	Int'l/Reg	CS/FS/PS	

AREA/ SPECIES	ABUND.EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS[1] IUCN	CITES	CMS	AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES[2] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT. Monitoring Mitigation Observers Enforcement
DELPHINUS DELPHIS -COMMON DOLPHINS										
Alboran Sea	14,736 (6,923 – 31,366)		145-201/1.2%		LC	nl	II	Reg	CS/FS/PS	Swordfish driftnet fishery banned
PHYETER MACROCEPHALUS—SPERM WHALE										
Mediterranean			7-14/year		VU	I	II	Reg	CS/FS/PS	Swordfish driftnet fishery banned
PHOCOENA PHOCOENA – HARBOR PORPOISE										
Azov Sea in total	2,922 (1,333–6,403l)				DD		II	Reg	CS/FS/PS	
Kerch Strait	54 (12–245)				DD		II	Reg	CS/FS/PS	
NW, N and NE Black Sea within Ukrainian and Russian territorial waters	1,215 (492–3,002)				VU		II	Reg& Nat (EC Direct.)	CS/FS/PS	
SE Black Sea < Georgian terr waters	3,565 (2,071–6,137)				VU		II	Reg	CS/FS/PS	
Central Black Sea> waters Ukraine/Turkey	8,240 (1,714–39,605)				VU		II	Reg	CS/FS/PS	
AREA 41-SOUTHWEST ATLANTIC										
SOTALIA FLUVIATILIS-TUCUXI										
Cananéia estuaryBrazil	156-380				DD	I&II	II			
Southwest Atlantic			141		DD	I&II	II			
LAGENORHYNCHUS OBSCURUS – DUSKY DOLPHIN										
Patagonian coast	7,252		70-200/		DD	nl	II			

AREA/ SPECIES	ABUND.EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS[1] IUCN	CITES	CMS	AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES[2] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT. Monitoring Mitigation Observers Enforcement
coast			.96%-2.7%							
Punta Ninfas and Cabo Blanco, Argentina	6,628				DD	nl	II			
CEPHALORHYNCHUS COMMERSONII – COMMERSON'S DOLPHIN										
Southwest Atlantic	21,000		141-212/ .67%-1.0% 25-170/ .1%-.8%		DD	nl	I			
Tierra del Fuego	14,000		5-30/.03%-.2%		DD	nl	I			
PONTOPORIA BLAINVILLEI FRANCISCANA										
FMA I			110		DD	nl	I&II			
FMA II			375		DD	nl	I&II			
FMA III	42,078 (33,047 – 53,542)		1,374 (694-2,215) 3.2%		DD	nl	I&II			
FMA IV	34,131 (16,360-74,397)		651 (398-1097) 1.9%		DD	nl	I&II			

PACIFIC AND INDIAN OCEANS

AREA 51 – WESTERN INDIAN OCEAN

SOUSA CHINENSIS – INDIAN HUMPBACK DOLPHIN										
Natal coast	200		7.5/3.75%		DD	I&II	II	Reg	CS/FS	
Zanzibar (Tanzaniza)	71		5.6%		DD	I&II	II	Reg	CS/FS	
TURSIOPS TRUNCATES – BOTTLENOSE DOLPHINS										
Indian Ocean coast south of Natal SAfrica	250		20-23/8-9%		DD		II	Reg	CS/FS	

AREA/ SPECIES	ABUND.EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS[1] IUCN	CITES	CMS	AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES[2] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT. Monitoring Mitigation Observers Enforcement
Indian Ocean coast north of Natal S Africa	1,000		11-14/1-1.4%		DD		II	Reg	CS/FS	
TURSIOPS ADUNCUS – BOTTLENOSE DOLPHINS										
Zanzibar (Tanzania)	161		8%				II	Reg	CS/FS	
GRAMPUS GRISEUS – RISSO'S DOLPHIN										
Western Indian Ocean	5,500 to 13,000		1,300/24% - 10%		DD		II	Reg	CS/FS	
AREA 57 – EASTERN INDIAN OCEAN										
ORCAELLA BREVIROSTRIS – IRRAWADDY RIVER DOLPHIN										
Chilka Lake, India	20-30				DD		II	Reg	CS/FS	
PLATANISTA GANGETICA GANGES RIVER DOLPHIN.										
Ganges River	600-700				EN	I&II	I&II	Reg	CS/FS	
AREA 61 – NORTHWEST PACIFIC										
PHOCOENOIDES DALLI – DALL'S PORPOISE										
Western N Pacific	141,800		643-4,187/0.4-3.0%		LR		II	Reg	CS/FS	
NEOPHOCAENA PHOCAENOIDES – FINLESS PORPOISE										
Inland Sea Japan	4,900		84/1.7%		DD EN	I&II	II	Reg	CS/FS	
LIPOTES VEXILLIFER - BAIJI										
Yangtze	100-300		5/1.6-5.0%		CR	I&II				
AREA 71 – WESTERN CENTRAL PACIFIC										
TURSIOPS ADUNCUS – BOTTLENOSE DOLPHINS										
Northern Australia	700-1000		1700		nl	nl	II	Int'l/Reg	CS/FS/PS	
STENELLA LONGIROSTRIS – SPINNER DOLPHINS										
Northern Australia			1000		LR	nl	II	Int'l/Reg	CS/FS/PS	
Sulu Sea	30,000		1,500-3,000/5		LR	nl	II	Int'l/Reg	CS/FS/PS	

AREA/ SPECIES	ABUND.EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS[1] IUCN	CITES	CMS	AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES[2] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT. Monitoring Mitigation Observers Enforcement
			3,000/5-10%							
LAGENODELPHIS HOSEI—FRASER'S DOLPHIN										
Eastern Sulu Sea	8,700				DD	nl	II	Int'l/Reg	CS/FS/PS	
SOUSA CHINENSIS—INDO-PACIFIC HUMPBACK DOLPHIN										
Northern Australian—Central Section Great Barrier Reef	200		11-100/5.5-50%		DD	I&II	I	Int'l/Reg	CS/FS/PS	
ORCAELLA BREVIOSTRIS – IRRAWADDY (SNUBFIN) DOLPHIN										
Mahakam River, Indonesia	34-50		3/6-8%		CR		II			
Malampaya Sound, Palawan Philippines	77		2-5/2.5-6.5%		CR		II			
Mekong River	69		4/5.8		CR		II			
AREA 77 – EASTERN CENTRAL PACIFIC										
PSEUDORCA CRASSIDENS – FALSE KILLER WHALES										
Hawaiian stock	236		4-6/1.6-2.5%					Reg'l/Nat'l	FS (US)	
PHOCOENA SINUS – VAQUITA										
	567		35-39/6.2-6.9%		CR	I&II		BilatUS/ Mex	CS/FS(US)	Biosphere reserve
AREA 81 – SOUTHWEST PACIFIC										
CEPHALORHYNCHUS HECTORI – HECTOR'S DOLPHIN										
South Island east	1,900		16/.8%		EN			Nat'l	CS	Sanctuary regs, voluntary pingers
South Island west	5,400							Nat'l	CS	Regs, pingers
CEPHALORHYNCHUS HECTORI MAUI – MAUI'S DOLPHIN										

AREA/ SPECIES	ABUND.EST.	Recent Update	BYCATCH ESTIMATE/ % POP. AFFECTED	Bycat > 2%	STATUS[1] IUCN	CITES	CMS	AGRMNT. IN PLACE? Int'l/ Regl/Bilat	PARTIES[2] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENT. Monitoring Mitigation Observers Enforcement
North Island	100-150		3/3-2%		CR			Nat'l	CS	Protected area
AREA 87 – SOUTHEAST PACIFIC										
LAGENORHYNCHUS OBSCURUS – DUSKY DOLPHIN										
			500-1,800		DD		II	Nat'l/Reg	CS/FS	
PHOCOENA SPINIPINNIS – BURMEISTER'S PORPOISE										
			450-200		DD		II	Nat'l	CS/FS	

Following the problem assessment by region, the next step of the analysis examines actions that could be taken under a variety of mechanisms: U.S. law, agreements to which U.S. is a party, and areas with potential for negotiation of amendments to existing treaties or development of new instruments. In addition, the report examines actions the U.S. could pursue outside the legal and diplomatic arena, using grants programs, technology transfer, incentives, partnerships with the private and non-governmental organization sectors, and employing its convening power to foster information exchange.

Recommendations

Throughout this report the authors identify a combination of research needs and recommendations for agency action. With more than twenty recommendations provided in Chapter 6, but limited agency resources, priority setting is needed. While recognizing that there will be agency considerations, budget and policy guidance and diplomatic opportunities that will arise and that cannot be predicted here, the authors attempted to rank the recommended actions by using a set of scoring criteria.

The first overarching criterion analyses the level of risk to the population and the conservation benefit of implementing a particular recommendation. The subcriteria ask whether the recommendation:

1. Assists a critically endangered species;
2. Assists a species at risk (listed under the IUCN Red List);
3. Addresses unsustainable bycatch;
4. Aids a trans-boundary species;
5. Will help meet a critical research need (e.g., provide information on cetacean abundance or bycatch estimates).

The second overarching criterion evaluates the ease and effectiveness of implementation. The subcriteria query whether legal frameworks and capacity to implement mitigation measures exist:

1. Regional agreement is in place that can be used to implement the recommendation;
2. Bilateral agreement is in place that can bring about prompt action;
3. National legislation is in place that either requires enforcement or modification to strengthen conservation requirements;
4. Mitigation strategies or possible solutions are available to be used or tested;
5. Institutional capacity is such that intervention is feasible.

Each recommendation was analyzed, and a point value assigned based on the number of subcriteria that it satisfied. The results of that evaluation are graphed and summarized Chapter 7 (Table 7.1).

Top Priority

Ten recommendations fall within the Top Priority. Four of these can be categorized as bilateral negotiations that are either ongoing or should be initiated. They are the US/Mexico (MexBi) bilateral, the US/Canada bilateral (CanBi), negotiations related to Pelly Certification of Italy and other Mediterranean nations for the use of driftnets (MedDrift), and the initiation of bilateral negotiations (possibly in response to an MMPA Section 101 Pelly petition) with Peru to reduce cetacean bycatch and bring about greater enforcement of its national laws. The Canada, Mexico, and Mediterranean driftnet negotiations all have a lengthy history but joint efforts to take the necessary action to begin to resolve the bycatch problems have been slow. With additional effort substantial progress could be made to reduce cetacean bycatch through these negotiations over the next one to two years. The same is true if the Office of International Affairs initiated discussions with Peru similar to those that it has undertaken with Chile to reduce cetacean harvests. Peru has both the legal framework and the scientific infrastructure in place to better assess cetacean abundance and bycatch and to control it.

Three recommendations that occur in the Top Priority fall under actions that can be taken to reduce cetacean bycatch under existing multi-lateral agreements and will likely require two to three years of effort to achieve progress. These are: the Northwestern Atlantic Fisheries Organization (NAFO); Western Central Pacific Fisheries Commission (WCPFC); and a subset of the Western Central Pacific tuna/dolphin interactions. NAFO and the WCPFC have recently adopted resolutions to assess and mitigate sea turtle bycatch in longline and purse seine fisheries. In these agreements the Office of International Affairs can put forward a resolution (see example Appendix C) that calls upon member nations to estimate cetacean stock abundance and bycatch within their waters and to report the results of their findings back to the Secretariat of that particular agreement. It also could call upon member nations to take action where possible to reduce cetacean bycatch. The purpose of such a resolution is to use existing multilateral fisheries commissions or agreements as a mechanism to gather and share scientific information and to work collaboratively on techniques to reduce cetacean bycatch. In the situation where interactions are either suspected or scantily documented between purse seine fishing vessels fishing for tuna and dolphins, the WCPFC provides the framework to allow the U.S. to investigate the frequency and magnitude of this interaction and to mitigate any potential bycatch.

The final three recommendations will take three to five years to achieve and require either the adoption of new legislation or the negotiation of new multilateral agreements specifically focused on cetaceans within a particular geographic region such as the Pacific Ocean Multilateral Agreement or the Americas Multilateral Agreement. The cetacean bycatch legislation referred to here (Appendix E) was introduced in the 108th Congress. While many of its mandates calling for international negotiations to reduce cetacean bycatch overlap with

existing mandates in both the MMPA and the M-SFCMA, the provisions calling for the development of an international bycatch database are sorely needed and well worth the effort to secure passage of such legislation. This database could ultimately provide the baseline information needed by both the Office of International Affairs and the Office of Protected Resources to improve cetacean conservation and management and to meet the mandates of both the MMPA and the M-SFCMA. Section 108 provides the authority for the Secretary of Commerce to work through the Secretary of State to negotiate multilateral agreements to protect and conserve cetaceans. The areas most in need of such an agreement are the Pacific Ocean and the east and west coasts of Mexico, Central and South America. For these multilaterals, an agreement similar to the Inter-American Convention for the Protection and Conservation of Sea Turtles would provide an appropriate model. An international effort to negotiate this type of agreement would likely take five years to complete and ratify, yet it would provide the framework to assess cetacean abundance and bycatch and would likely have benefits beyond cetacean bycatch reduction including reducing direct harvests and consumption, preventing habitat degradation, and providing a mechanism to address issues such as climate change and the adverse impacts of anthropogenic sound and contaminants.

Second Tier Priority

The second tier priority includes adoption of a United Nations General Assembly Resolution on cetacean bycatch; workshop for science and technology transfer; an Indian Ocean Multilateral Agreement; modifications to the International Whaling Commission (IWC) to recognize its competence to manage small cetaceans; and investigations into West Coast of Africa tuna/dolphin interactions. While there is potentially great conservation benefit in either modifying the mandate of the IWC or negotiating a new cetacean specific multilateral, the likelihood of success is remote. The current membership composition of the IWC makes such changes unlikely and progress on the issues already identified through the Small Cetacean Subcommittee has been slow. In the Indian Ocean, the U.S. has little capacity or leverage to either spark negotiations for such an agreement (given the geography, it is unlikely that the U.S. would be a party to such an agreement) or to take action against nations like Sri Lanka or India for cetacean bycatch or harvests.

Within the next two to three years the U.S. could make progress in two areas. First, it could take a leadership role to hold a series of regional bycatch workshops, similar to the one held in La Jolla in the early 1990s. These workshops could review the status of cetacean populations and what is known about cetacean bycatch in each participating country. They could also become a forum to discuss the use of existing mitigation measures and testing and development of new technologies to reduce bycatch. This information provides the foundation for actions recommended in association with other bilateral and multilateral negotiations or agreements and mandates under the MMPA and the MS-FCMA. Second, the U.S. could use the framework of both ICCAT and SEAFO to investigate the interaction between tuna purse seine vessels fishing for tuna off the coast of West Africa and whales and dolphins. Allegations and sparse documentation of these interactions have existed for more than twenty years. By placing observers on tuna vessels fishing in these areas through the auspices of the RFMOs, the organizations could help document the occurrence of association of tuna schools with whales and dolphins and the frequency of encirclement and magnitude of any bycatch.

Finally, the Office of International Affairs could work to introduce a measure that calls upon parties to reduce cetacean bycatch as part of the sustainable fisheries resolution. This resolution relates to implementation of the provisions of the United Nations Convention for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks and it recalls and reaffirms the provisions of this agreement and calls upon parties to take specific actions. Although U.N. resolutions are not binding, passage of a measure that includes precise

language on cetacean bycatch and requests that parties take a specified course of action (e.g. assess cetacean abundance, estimate bycatch, establish bycatch limits, and mandate bycatch mitigation) might provide impetus to regional fishery management bodies and parties to other regional agreements to carry out efforts described earlier for venues such as NAFO, ICCAT, WCPFC, and SEAFO.

Third Tier Low Priority

These recommendations fall in the bottom two quadrants of the graph and encompass five recommendations. Four of these call for continued work within existing multilateral agreements to elevate the issue of cetacean bycatch. They are: Southeast Atlantic Fisheries Organization; the Caribbean Specially Protected Areas and Wildlife Protocol; the Marine Mammal Action Plan in the Southeast Pacific Ocean; and the South Pacific Regional Environment Program. The three organizations all have some form of marine mammal/cetacean action plan that provides a framework from which to assess cetacean stock abundance and to estimate bycatch. Because these plans encourage technology transfer and scientific exchange they would be fertile ground for the regional workshops previously discussed. And although they ranked lower than the recommendations pertaining to action within the IWC, ocean multilaterals or the UN, they should likely be elevated in priority to the second tier, given the framework that already exists and the natural alignment with other recommendations.

Finally, for the reasons outlined in Chapter 6 and earlier in this chapter related to agreements in the Indian Ocean, efforts to achieve bycatch reduction through the Southwest Indian Ocean Fisheries Organization should be a low priority. The U.S. will have little leverage and a great deal of difficulty in affecting change within this agreement.

Conclusion

Based on the analysis the table below illustrates the ranking of recommendations and priorities. As part of an overall action plan to reduce cetacean bycatch and comply with the mandates under the MMPA and the M-SFCMA over the next one to three years, it is recommended that the Office of International Affairs focus its efforts on the short term top and second tier priorities.

Table ES.2 Priority Recommendations

Short Term (1-3 yrs)—Top Priorities--Bilateral Agreements
US/Mexico Bilateral
US/Canada Bilateral
Mediterranean Driftnets
Peruvian Fisheries Bycatch
Workshops for Science and Technology Transfer
Short Term (1-3 yrs)—Second Tier Priorities—Multilateral Agreements
Northwestern Atlantic Fisheries Organization
Western Central Pacific Fisheries Commission
Western Central Pacific--tuna/dolphin interactions
Southeast Atlantic Fisheries Organization

Table ES.2 Priority Recommendations
West Coast of Africa--tuna/dolphin interactions
Plan of Action for Marine Mammals in the Southeast Pacific Ocean
Caribbean SPAW Protocol
South Pacific Regional Environment Program
Long Term (3-5 yrs)—Top Priorities—Multilateral Agreements
Pacific Ocean Multilateral Agreement
Americas Multilateral Agreement
Bycatch Legislation
United Nations General Assembly Resolution
Low Priority Recommendations
Amend IWC
Southwest Indian Ocean Fisheries Commission
Indian Ocean Multilateral Agreement

CHAPTER 1. INTRODUCTION

Humans have exploited cetaceans (whales, dolphins, and porpoises) since primitive whaling activities began in Japan and Scandinavia many centuries ago. Now the threats facing cetaceans go beyond whaling, to include toxic pollution, acoustic noise, ship strikes, environmental change, global warming, and habitat degradation. Even though the complexity and magnitude of these threats are increasing, there are still few international mechanisms to address these threats. Little is being done under the authorities that do exist to bring about any significant improvement. Another difficulty arises in that there is no single international entity with the authority to govern and focus solely on cetacean conservation issues.

The U.S. Ocean Commission stated in its 2005 report: the "biggest threat to marine mammals worldwide is their accidental capture or entanglement in fishing gear (bycatch)[9], which kills hundreds of thousands of them each year."[10] In particular, bycatch represents a major threat to the survival of cetaceans, particularly small cetaceans. Fishing gear, especially gillnets, indiscriminately catches an undetermined number of marine species, including dolphins and porpoises. Still, progress on assessing cetacean populations, quantifying cetacean bycatch, evaluating the scale and magnitude of this problem, identifying specific conservation actions, and reducing the mortality has been slow, sporadic, and limited to a few specific fisheries or circumstances.[11] Therefore, as a matter of priority, the focus of this report is the assessment and mitigation of global cetacean bycatch

Cetaceans, like many other animals, can be described as "migratory" because they spend several months each year traveling from one area to another, often covering vast distances in search of food, a particular climate, or a safe breeding ground. From a conservation and management perspective, migratory species are not exposed to specific threats because they do not confine themselves to one location; instead they periodically cross through a number of jurisdictions and encounter several threats as they do so. The level of protection afforded to cetaceans fluctuates according to their particular geographical location. Inevitably, migrating animals will pass through jurisdictions where cetacean conservation is less of a priority than in other areas. The protection of small cetaceans has largely been left to the domestic regimes of coastal states, and a number of nations have enacted legislation to protect dolphins and porpoises—particularly Australia, New Zealand, the United Kingdom, and the U.S.

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[9] Bycatch is defined in U.S. law as "fish which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic discards and regulatory discards. Such term does not include fish released alive under a recreational catch and release fishery management program." 16 U.S.C.1802(2). The Marine Mammal Protection Act uses the term "take," defined as "harass, hunt, capture, or kill…any marine mammal." 16 U.S.C. 1362(13). Bycatch is defined internationally as "Fish or other fauna (e.g. birds or marine mammals) that are caught during fishing, but which are not sold or kept for personal use. In commercial fishing these include both fish discarded for economic reasons (economic discards) and because regulations require it (regulatory discards)." Organisation for Economic Co-operation and Development Glossary of Statistical Terms, 2001. Available at http://stats.oecd.org/glossary/detail.asp?ID=252. Last visited 3 May 2007. For purposes of this report, the term "bycatch" will be used to describe all types of incidental capture of marine mammals in fishing gear, rather than the MMPA terminology "take," unless the discussion is about MMPA provisions. The term "incidental mortality" will be used when deaths are documented. However, it is generally understood that most bycatch of marine mammals results in death, with limited circumstances where live release is accomplished.

[10] U.S. Commission on Ocean Policy. An Ocean Blueprint for the 21st Century. Final Report. Washington DC, 20004 ISBN#0-9759462-0-X at 306.

[11] Reeves R.R., Berggren, P., Crespo, E.A., Gales, N., Northridge, S.P., Notarbartolo di Sciara, G., Perrin, W.F., Read, A.J., Rogan, E., Smith, B.D., and Van Waerebeek, K. 2005. Global Priorities for Reduction of Cetacean Bycatch. World Wildlife Fund

With bycatch a serious and widespread threat to marine mammals, there is an urgent international need to develop alternative fishing gear and practices and, at the same time, put into place effective regional agreements that call for the assessment of cetacean populations, documentation of bycatch, and the implementation of mitigation measures ranging from temporal and spatial closures to deterrents. Greater involvement of inter-governmental bodies such as regional fishery management organizations, the United Nations Environment Program, The World Conservation Union (IUCN), and the Food and Agriculture Organization of the United Nations (FAO) is necessary. Because it requires a country to outline a series of specific measures to deal with such interactions, FAO's International Plan of Action model may provide a useful mechanism to address interactions between cetaceans and fisheries. In some regions, FAO is the only body competent to engage countries on a multinational level.

The Marine Mammal Protection Act of 1972[12] (MMPA) contains an international program that includes tools to address international threats to marine mammals. Specifically, the MMPA requires the Secretary of Commerce or the Secretary of the Interior, working through the Secretary of State, to "initiate negotiations as soon as possible for the development of bilateral or multinational agreements with other nations for the protection and conservation of all marine mammals."[13] It also directs the federal government to encourage other agreements to protect specific ocean and land regions "which are of special significance to the health and stability of marine mammals" and to amend any existing treaty to make it consistent with the purposes and policies of the Act.[14]

The act's international provisions are particularly strong in the area of bycatch and provide the U.S. with the tools to take a leadership role in initiating negotiations with all foreign governments engaged in commercial fishing found to be unduly harmful to any species or population stock of marine mammal and in developing bilateral and multilateral treaties with such countries to protect marine mammals.[15] However, with the exception of the provisions associated with the Agreement on the International Dolphin Conservation Program (AIDCP), rarely has the U.S. applied these measures nor has it taken actions to reduce marine mammal bycatch or to protect ecosystems abroad.

In 2006 the Congress reauthorized provisions of the Magnuson-Stevens Fishery Conservation and Management Act (M-SFCMA),[16] the law governing how the U.S. manages fisheries within its Exclusive Economic Zone (EEZ). The reauthorization also directed substantial attention on fishing issues outside U.S. waters, particularly illegal, unregulated and unreported fishing (IUU) and bycatch. Although aimed primarily at strengthening U.S. leadership in international conservation and management of fisheries[17] for purposes of leveling the playing

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[12] Marine Mammal Protection Act of 1972, (16 U.S.C. 1361-1407, P.L. 92-522, October 21, 1972, 86 Stat. 1027) as amended.

[13] 16 U.S.C 1378(a)(1)

[14] 16 U.S.C 1378(a)(3)-16 U.S.C 1378(a)(4)

[15] 16 U.S.C 1378 (a)(2)

[16] 16 U.S.C. §§1801-1882 (1976), Pub. L. 94-265, as amended by H.R. 5946, Dec. 2006. Signed into law Jan 12, 2007.

[17] Report of the Committee on Commerce, Science & Transportation on S.2012, Magnuson-Stevens Fishery Conservation and Management Act Reauthorization Act of 2005. April 4, 2006. S. Rpt. 109-229. The Senate Report notes that restrictions placed on U.S. vessels to protect endangered or protected species "disadvantage U.S. fleets and fail to address the problem" because the harmful fishing practices continue by other fleets in high seas fisheries. S.Rpt. at 43.

field between the U.S. fleet and those of other nations, the new provisions have strong bycatch language calling for measures comparable to U.S. policy to protected species at risk, including marine mammals.

The Office of International Affairs of the NOAA National Marine Fisheries Service (NMFS) contracted development of a study that details steps it could take to engage foreign nations and multilateral organizations in reducing cetacean bycatch. The report produced under this contract reviews information on cetacean population abundance and documented bycatch, evaluates international cetacean conservation activities, describes the tools afforded through the MMPA and M-SA and international agreements relevant to cetacean conservation and bycatch, and makes recommendations for U.S. action.

Methodology

The project scope of work calls for an evaluation of the most significant threats to cetaceans, the affected species and the geographic areas of high risk, and the recommended actions from various independent institutions. The report is to identify gaps in conservation and management efforts related to threats to cetacean populations and identify opportunities for international action, cooperative research, and information exchange. The final element of the work is to develop a strategic plan of action for NOAA that identifies priorities for action, existing tools, necessary mechanisms, and required resources.

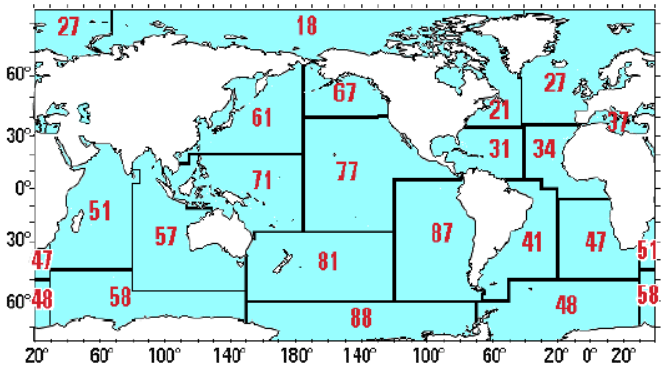

Figure 1

As a structure for examining bycatch of cetacean species, the report is organized geographically, using area designations similar to the Statistical Areas of the FAO (see Figure 1). This alignment enables the analysis to overlay the activity of the principal fisheries of the world and the existence of multi- or bi-lateral agreements on areas of cetacean occurrence or and documented bycatch. Part of the methodology includes a detailed review of cetacean abundance and bycatch within each statistical area (Appendix A) and every species at risk is summarized in Tables A1-A137. This is followed by a distillation of this information, placing a priority for action on species based on their status and the sustainability of the level of bycatch. The methodology then evaluates U.S. domestic authorities and international treaties and agreements. In this analysis, rising to priority level are instances where bycatch occurs in the absence of conservation measures, lack of enforcement of authorized measures, or lack of a policy framework for taking action. Where a policy framework is available, the analysis examines feasibility of implementing conservation measures and the likelihood of their success.

Chapter 2 describes incidental bycatch of cetaceans in fisheries by FAO statistical area and summarizes the species and areas of greatest interest. The analysis examines the areas and nature of bycatch and suggests which interactions represent the highest risk to these populations. It also discusses needs that have been raised in the literature by scientific or management bodies as necessary to assess the population abundance and status, estimate

and evaluate current bycatch levels, or mitigate cetacean bycatch. Chapter 3 describes the U.S. legal framework for international cetacean protection and management. Chapter 4 analyzes the international framework and tools that are available to the U.S., either unilaterally or multilaterally, to implement protection measures, initiate discussions or foster programs in high-risk areas. Exemplary agreements are discussed and similar regional schemes are listed in text boxes. Appendix B provides a list of parties to the agreements discussed, as of the date of this report. Chapter 5 compares the highest risk populations to agreements in place, parties to those agreements, and whether actions are being taken to reduce bycatch. It also identifies gaps in information and mitigation measures. This analysis is summarized in Table 5.1. Chapter 6 makes recommendations on the types of actions the United States could take or could urge upon states party to mutual marine mammal conservation agreements. It also examines actions the U.S. could pursue outside the diplomatic arena, using grants programs, technology transfer, incentives, partnerships with the private and non-governmental organization (NGO) sectors, and employing its convening power to foster information exchange. Appendices C, D and E provide sample language for resolutions and legislation discussed in Chapter 6. Chapter 7 concludes the report with a template for priority setting based on considerations of risk and feasibility and makes recommendations for high, second-tier and low priority action options.

CHAPTER 2. BYCATCH CRITICAL ISSUES

For decades scientists have known that large numbers of cetaceans are incidentally killed in fisheries each year throughout the world. The information provided in Appendix A substantiates this allegation and indicates an extensive worldwide interaction between cetaceans and fisheries. Most notably, in almost all the statistical areas where studies have been conducted, large numbers of small cetaceans, especially coastally distributed species, are affected by coastal gillnet, purse seine, trawl, and trap fisheries.

Most species of cetaceans have been recorded at some time caught in some type of fishing gear. However, very few studies, with the exception of a few in the U.S., have successfully assessed and quantified the actual impact of a fishery or fisheries bycatch on cetacean populations. Part of the problem is that only a very small proportion of cetacean catches are ever actually recorded using some type of quantifiable process or an independent observer program. Generally, data are still lacking on fisheries catch statistics, fishing capacity (number of vessels and fishers), and fishing effort in many regions of the world. Additionally, for most cetacean species, it is very difficult and costly to assess population size and trends or to assess the consequences of an uncertain and unpredictable bycatch rate. This problem is further compounded in developing nations where fisheries management does not rank high as a national priority, and thus funds are frequently unavailable to undertake such assessments. Furthermore, reporting significant cetacean bycatch may be a low priority, or politically unacceptable, in countries where fishery development is considered vital for food security or maintaining the balance of trade.

There are large areas of the world where it seems likely there may well be interactions between cetaceans and fisheries, but for which there are, as yet, no data, and no idea of any impact that such fisheries may cause. This lack of information on the impacts of a fishery does not imply, however, that there is no problem, especially since reporting of just a few individuals in a specific fishery may be indicative of a larger interaction. Only when scientists can accomplish a detailed study of the cetacean stock abundance, fishing effort, and the bycatch rate in each fishery can a thorough and accurate assessment be made.[18]

Such assessments are integral to the development of long-term solutions to mitigate bycatch. Solutions to the problem of cetacean entanglement have been sought in several parts of the world with a variety of techniques. No universal solution to the problem has been found, but in one or two cases some reduction in the numbers of cetaceans caught in gillnets has been accomplished through gear modifications (e.g., rigging driftnets to fish a few meters below the surface or increasing twine size) or technological aids (e.g., pingers). Because banning the use of gillnets worldwide is not an option and site-specific gear prohibitions are not always effective, approaches will have to be found on a fishery-by-fishery basis, and such solutions should consider socio-economic alternatives (e.g., eco-tourism opportunities).

For several cetacean species—including the harbor porpoise, vaquita, Hector's and Maui's dolphin, finless porpoise, hump-backed and bottlenose dolphins, Irrawaddy dolphins, dusky dolphin, and Burmeister's porpoise—operational interactions with fisheries may threaten their survival or recovery. The following sections review, by FAO statistical area, the known fisheries interactions for species for which the interaction is either unsustainable or may be approaching an unsustainable level. The descriptions highlight only those species that are considered a priority for this area, based on the level of incidental mortality. Text boxes highlight needs for

[18] The estimates in the U.S. Ocean Commission Report were derived from extrapolations and models, and are not estimates of actual bycatch.

abundance estimates, observer data or recommended actions that have been drawn from the scientific literature, proceedings of scientific bodies, or available mitigation strategies (e.g., national laws, closed areas, or technological or gear modifications). A more thorough analysis and review of the literature for all cetaceans incidentally killed in fisheries in each FAO statistical area is provided in Appendix A.

Atlantic Areas and Populations Analyzed for Highest Risk

The following sections examine incidental bycatch of cetaceans in FAO statistical areas in the Atlantic. Where available, an assessment of the level of bycatch against estimated population is made. There are eight areas examined in the Atlantic, including the Mediterranean and Baltic Seas. Figure 2 shows the boundaries of these areas. Critical issues that arise include bycatch of critically endangered northern right whales and sperm whales, incidental mortality of harbor porpoises from populations numbering only in the hundreds of animals, and bycatch of numerous species of dolphins in fisheries from the northernmost reaches of the Atlantic south to Tierra del Fuego.

Developed nations such as the U.S., Canada and the European Union (EU), as well as developing countries such as Ghana and Caribbean Island nations, all have fisheries that interact with cetaceans. Challenges include gathering the most basic information on abundance and fishing effort to more complex technologic solutions and implementation of action plans. Necessary actions that have been identified in the literature or by scientific or management organizations are summarized in boxes for each area. High priority recommendations are included in Chapter 6.

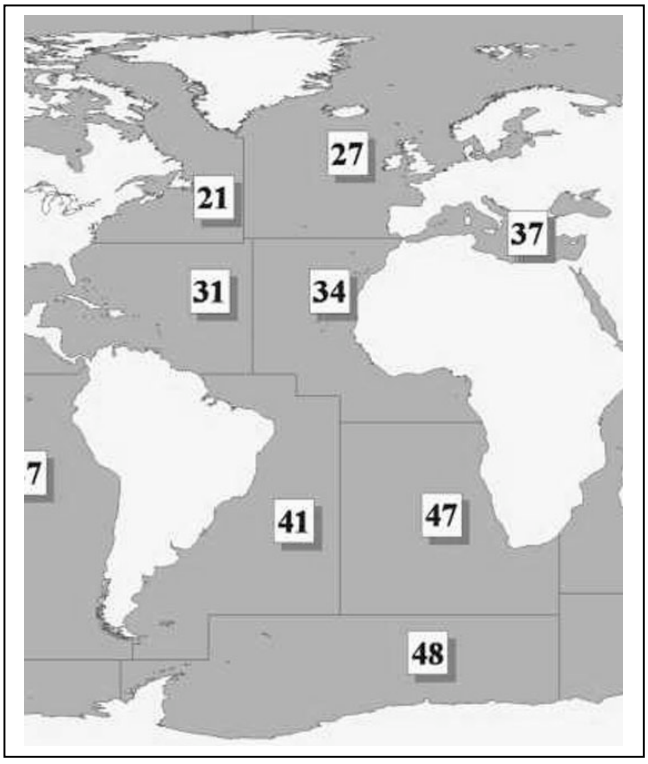

Figure 2: FAO Statistical Areas of the Atlantic

Area 21 Northwest Atlantic

Although the Northwest Atlantic includes the U.S. Exclusive Economic Zone (EEZ), because the focus of this report is international bycatch, the description for this area will focus only on international bycatch of shared cetacean stocks in the area. The assessment and mitigation of bycatch of these marine mammals within U.S. jurisdiction is governed under the MMPA and, as such, is not discussed here.

The species most affected by accidental entrapments in fishing gear in this area is the harbor porpoise. Catches of certain of the large whales, notably humpback and right whales, are also considered significant. The major fisheries involved with cetaceans are the Greenlandic driftnet fishery for salmon, the inshore trap and gillnet fisheries of Newfoundland (and probably elsewhere in eastern Canada, which remains comparatively less well-studied), Canadian herring weir fishery, and Canadian and U.S. gillnet fisheries and lobster trap fisheries.

The harbor porpoise may be most severely affected by gillnet fisheries in the Bay of Fundy–Gulf of Maine region, but also possibly in other gillnet and trap fisheries farther north. From 2000 through 2004, the total average annual mortality in Canadian fisheries is 55 animals (51 in the Canadian groundfish sink gillnet fishery and 4.4 in the Canadian herring weir fishery). This bycatch level is a significant decline from the high of 424 harbor porpoises incidentally killed in Canadian gillnets fisheries in 1993. The reduction in bycatch is due to a combination of closed areas and the implementation of pingers in the fishery beginning in 1996. In 2002, the Canadian Department of Fisheries and Oceans (DFO) suspended its Bay of Fundy monitoring program because of financial constraints. Without a monitoring program, it will be difficult to estimate overall bycatch.

In 1995, the International Whaling Commission (IWC) small cetacean subcommittee suggested that current levels of incidental mortality pose a serious threat to the harbor porpoise subpopulation in this area. However, subpopulations in the Gulf of St Lawrence, Newfoundland, Labrador, and Greenland are also subjected to large directed or incidental catch, but population status in these areas remains unknown. The U.S. must work with Canada to develop abundance and bycatch estimates for these stocks and an effective conservation plan for harbor porpoises.

Bycatch of right whales internationally is one of the leading causes of right whale mortality around the world. It is responsible for both the failure of the population to recover and its continuing current decline. While right whale bycatch numbers fewer than five animals per year, the precarious state of the population means this incidental mortality is considered a potential threat to population recovery. Northern right whales are entangled in cod traps, lobster trap lines, groundfish gillnets, and herring weirs at the rate of 1.2 whales per year (2000–2004). While this number may appear insignificant, it is unsustainable for a population that numbers only 300 animals. The DFO listed right whales as endangered under a Canadian Species At Risk Act, which is similar to the U.S. Endangered Species Act. DFO has developed a recovery plan and established a recovery-implementation team. The plan includes a number of recommendations to mitigate threats such as ship collisions and fishing gear entanglements, as well as recommendations on research, communications, whale watching, and regulations and enforcement. The U.S. right whale recovery plan calls on the federal government to engage in bilateral cooperative efforts with Canada to recover right whales.

Area 27 Northeast Atlantic

In the Northeast Atlantic, the major species affected by accidental catch in fishing gear are the harbor porpoise and the common dolphin. The fisheries that most frequently interact with cetaceans are gillnet fisheries, mainly set gillnet fisheries, which are distributed throughout coastal waters of this region and in some places extend for many tens of kilometers offshore. Trawls may also catch relatively large numbers of some species in some places (e.g., harbor porpoises in Shetland, common dolphins in mackerel mid-water trawls). Depending on tow times, most interactions with trawl fisheries result in death from drowning.

Overall, harbor porpoises are killed in more types of fishing gear, and possibly in larger numbers, than any other cetacean species in this area. Specifically, harbor porpoise bycatch from bottom-set gill nets is estimated as more than 7,000 animals annually in the North Sea. This exceeds 2 percent of the population and is considered unsustainable; in most cases, estimated mortality levels exceed the 1.7 percent of minimum population size established by the

Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS),[19] indicating that past or current bycatch levels are unsustainable.

Of particular concern are harbor porpoise mortality levels in the Celtic Sea, where more than 6 percent of the minimum population estimates are killed annually as bycatch. Likewise, bycatch in the Northern and central North Sea, Northern North Sea, and Southern and central North Sea are at unsustainable levels amounting to 4.1, 5.0, and 4.3 percent, respectively, of the population estimates for those areas. Removal levels are lower in other areas. For example, in Danish and UK fisheries that use mitigation measures such as pingers, more recent analyses are based on much lower estimated bycatch. However, these comparisons are made between recent bycatch estimates and relatively old abundance estimates and therefore do not take into account the potential decrease of harbor porpoise numbers due to bycatch that occurred between the two estimates.[20] The true impact to the various harbor porpoise stocks cannot be assessed until more current estimates of both abundance and bycatch are gathered, and the latter must be acquired through an effective independent monitoring program. Only when these data are available can effective mitigation strategies be developed and evaluated over time.

Dolphins tend to be caught more often in pelagic trawls. For example, vessels using large pelagic trawls to target horse mackerel southwest of Ireland are known to catch white-sided and common dolphins and long fin pilot whales, with a bycatch rate of one dolphin per 93 towing hours. From 2001 through 2003, 91 common dolphins were caught in 313 hauls in the pelagic trawl fisheries for bass (southwest England).[21] Prior to the introduction of EU legislation to ban the use of driftnets for tuna, dolphins—particularly striped and common—were caught in large numbers (more than 750 individuals in 1,420 hauls).[22] The impact of this bycatch on common dolphins is unknown. Common dolphin populations don't appear to be declining in this region, even though bycatch of common dolphins still numbers around 1,000 animals annually. It has been suggested that harbor porpoise populations may have declined in some areas such as the Baltic and southern North Seas, but what role, if any, fisheries may have had in such a decline is not clear. Up-to-date abundance and bycatch estimates for common dolphins in ASCOBANS waters are needed to determine the potential impact of known high mortalities in pelagic trawls.

Identified Needs

Information: regular abundance surveys, estimates of bycatch rates in fixed gear fisheries, knowledge of stock structure and growth.

Monitoring: Entanglement monitoring in pair trawl and drift net fisheries.

Mitigation: Employ pingers.

Legal Framework: Develop and implement European-wide framework, including enforceable bycatch mortality limits.

Enforcement: Enforce existing EU and ASCOBANS regulations and policies

Recent studies indicate that mortalities of delphinids such as white-sided and white-beaked dolphins and pilot whales may be substantial in pelagic trawl fisheries operating in the North

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[19] Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas. Done at New York 17 March 1992. Not in force. Concluded under the Convention on Migratory Species. ASCOBANS is principally intended to address the problems of fishery bycatch in the Baltic and North Seas. The focal species of ASCOBANS is the harbor porpoise although a variety of other odontocetes are regular inhabitants of the region.

[20] Furthermore, removal levels may be substantially underestimated, because bycatch remains to be assessed in many fisheries operating in the same area (e.g., Norwegian gillnet fisheries).

[21] Website for the Joint Nature Conservation Committee—Marine Mammal Bycatch.

[22] *Id.*

Sea, the English Channel, the Celtic Shelf, and the Bay of Biscay.[23] Similarly, abundance estimates are either outdated or lacking for these species, and bycatch estimates are unreliable.

The bottlenose dolphin populations in the nearshore Atlantic waters of Europe number only in the tens of animals for each stock. This species (along with harbor porpoise) is listed on Appendix II of the EU's Habitats Directive (Council Directive 92/43/EEC) as requiring special conservation measures. There is cause for concern that this "population" is low and declining and therefore requires particular measures to ensure that it suffers no further incidental mortality. Incidental mortality estimates are largely not available for this species and should be made a priority given the small population size.

There are very few recent comprehensive studies on cetacean abundance or population sizes; very little is actually known about stock structure in this region.

Estimates of abundance are either out-dated or completely lacking for cetacean species in these waters (e.g., Risso's dolphin, long-finned pilot whales, and killer whales). Alternatively, estimates are only available for some small regions (e.g., the Celtic Sea for common dolphins or striped dolphins) or have been combined for several species (e.g., white-beaked and Atlantic white-sided dolphins). More up-to-date estimates of cetacean abundance are needed because current impact assessments based on the 1994 abundance estimates and more recent bycatch numbers cannot take into account the potential depletion of stocks resulting from bycatch and other factors over the last decade. Scientists agree that it is necessity to carry out further comprehensive surveys to estimate cetacean abundance in ASCOBANS waters at regular intervals.[24] Moreover, scientists have said that, given the high costs of such surveys and the problems of current estimation techniques in low-density areas, there is a need to further develop existing techniques to overcome these problems.[25]

Additionally, monitoring cetacean entanglement is urgently needed for all single and pair pelagic trawling operations, particularly those targeting sea bass, mackerel, and horse mackerel in the Channel (as well as in the Celtic Sea and Bay of Biscay), especially between December and March where there is considerable evidence for high levels of bycatch. These include British, French, Dutch, Danish, and German fisheries, though there may be others. Monitoring the various—usually relatively small—driftnet fisheries operating in the Baltic also is needed, as is expansion and continuation of existing observer programs of all bottom-set gillnet fisheries in the North and Baltic seas and adjacent waters, including the English Channel.

Identified Needs

Information: Research investigating stock structure and maximum population growth rates, document bycatch rates in set nets.

Monitoring: Monitoring in set net and drift net fisheries.

Mitigation: Employ pingers.

Legal Framework: Develop and implement European-wide framework, including enforceable bycatch mortality limits.

Enforcement: Enforcement strategy for European-wide implementation of EU and ASCOBANS regulations.

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[23] Northridge S., 2003. Investigations into cetacean bycatch in a pelagic trawl fishery in the English Channel: preliminary results (SC/55/SM26). Berlin, Germany, (unpublished); 10.

[24] CEC, 2002b. Incidental catches of small cetaceans. Report of the second meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC(2002) 1134, Brussels, BL, Commission of the European Communities; 63.

[25] *Id*., at 63.

Information about bycatch rates is especially needed for the Norwegian setnet fisheries and German fixed gear fisheries operating in the North Sea and in the Kiel & Mecklenburg Bight. Scientists within ASCOBANS recommend observer coverage of 5 percent to 10 percent of total fishing effort for all bycatch monitoring programs.

In March 2004, the European Commission introduced a new regulation aimed at reducing the bycatch of harbor porpoises in bottom-set gillnets and entangling nets. From the summer of 2005, pinger Use was to become mandatory on bottom-set gillnets or entangling nets in the North Sea and the Skaggerak & Kattegat region that were deployed from vessels greater than 12m in length. Similar rules were to apply to the western English Channel and South Western approaches from January 2006 and to the east English Channel from January 2007. This regulation also made provision for the monitoring of dolphin bycatch in trawl fisheries from January 2005 in the English Channel, Irish Sea, and off western Britain and Ireland and from January 2006 in the North Sea and west Scotland.

On a larger scale, EU Commission scientists have stressed that a European wide management framework, including legally accepted bycatch limits and enforcement strategies, must be developed and implemented. Scientists generally agree that using an approach similar to the MMPA's potential biological removal (PBR), incorporating the ASCOBANS management goal of maintaining stocks at 80 percent of the carrying capacity, is useful in determining critical bycatch mortality limits.[26] However, they point out that the development of species-specific critical mortality limits for species other than harbor porpoises is necessary. More research investigating stock structure and maximum population growth rates would be necessary to achieve this objective.

Area 31 Western Central Atlantic

The Western-Central Atlantic encompasses the Mid-Atlantic, Southeast Atlantic, and Gulf of Mexico, U.S. EEZ. The abundance and mortality estimates for these areas are summarized in the U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments and will not be reviewed here. Instead, this section will focus on the incidental mortality in the Caribbean and off the Yucatan Peninsula and Central America.

Identified Needs

Information: Collaborative studies to understand and document range and abundance.

Monitoring: Training activities to aid in documentation of fishery bycatch and directed catch.

Legal Framework: Regional networks and collaboration under UNEP regional seas.

There has been a limited effort to document cetacean bycatch in the Mexican side of the Gulf of Mexico and Caribbean Sea, Colombia, the Dominican Republic, French Guyana, Puerto Rico, and Venezuela. Despite these valuable efforts, the magnitude of threat posed to cetacean populations in the wider Caribbean region as a consequence of fisheries operations is difficult to asses, and published information on bycatch is scarce. Systematic survey effort in the Caribbean and tropical Atlantic has been very limited; this results in sparse quantitative information on populations of cetaceans.

Small-scale and subsistence gillnet fisheries occur along the entire Gulf of Mexico and Caribbean. Cetacean species caught in these fisheries include pygmy sperm whale, tucuxi, Risso's dolphin, bottlenose dolphin, Atlantic spotted dolphin, killer whale, clymene dolphin,

[26] CEC, 2002b. Incidental catches of small cetaceans. Report of the second meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC(2002) 1134, Brussels, BL, Commission of the European Communities; 63.

spinner dolphin, and humpback whale. The annual incidental mortality has not been estimated for any species or fishery, and abundance estimates are sorely needed for most species.

In particular, studies call for scientific effort on Sotalia along coastal waters of Honduras, Nicaragua, Costa Rica, Panama, Colombia, Venezuela, Guyana, Surinam, and French Guyana. A recent study of bycatch in the mouth of the Amazon indicated incidental mortality of more than 1,050 tucuxis in a single year. Along with franciscanas, tucuxis are the most commonly caught cetaceans in Brazilian coastal gillnet fisheries.[27] The tucuxi may also be the cetacean most commonly caught as bycatch in coastal fisheries of the southern Caribbean Sea.

Given the sparse nature of the data, it is difficult to identify the species most frequently involved in fishery interactions. The Caribbean regional seas program of the United Nations Environment Programme (UNEP) has recently promulgated a regional marine mammal action plan. It also has established a Regional Activity Centre (RAC) in Guadeloupe for implementation of the protocol on Specially Protected Areas and Wildlife (SPAW). It has been suggested that local scientists and UNEP's RAC/SPAW officials develop regional networks, collaborative studies, and training activities to understand and document the range and abundance of cetaceans and the impacts of fishery bycatch and directed catch on cetacean populations in the wider Caribbean.

Area 34 Eastern Central Atlantic

In 1997, the IWC Scientific Committee concluded that information on small cetaceans in Africa (outside southern Africa) is very sparse and that issues of cetacean fishery bycatch must be addressed.[28] Projects that have sampled landing sites of small-scale coastal fisheries in Ghana since 1998 show that bycatch and directed harvests of small cetaceans are commonplace and possibly increasing. The largest catches, by far, are the result of deployment of large-meshed drift gillnets targeting tuna, sharks, billfish, manta rays, and dolphins. The species most frequently caught are clymene (Ghanaians call it the "common dolphin"), bottlenose, pan-tropical spotted, Risso's, long-beaked common, and rough-toothed dolphins, together with short-finned pilot and melon-headed whales.[29] Dwarf sperm and Cuvier's beaked whales may also be caught with some regularity.

Identified Needs

Information: Research to establish the range, distribution, natural history, taxonomy, abundance, and fishery interactions of Atlantic humpback dolphins.

Monitoring: Systematic data collection supported by training and resources.

Mitigation: Close RAMSAR site to gillnet fishing; add humpback dolphin to conservation program.

Legal Framework: CMS, national wildlife agencies.

Enforcement: Ban or limit commerce in cetacean products.

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[27] Beltrán, S. 1998. "Captura accidental de *Sotalia fluviatilis* (Gervais, 1853) na pescaria artesanal do Estuário Amazônico". M.Sc. thesis. Universidade do Amazonas, Manaus, Brasil. 100 pp.[In Portuguese] See also: Siciliano, S. 1994. Review of small cetaceans and fishery interactions in coastal waters of Brazil. *Report of the International Whaling Commission* (Special Issue) **15**: 241–250.

[28] IWC. 1998. Report of the scientific committee. Report of the International Whaling Commission **48**: 53–302.

[29] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A., and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans.* IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139 pp.

Off Mauritania, common dolphins and *Stenella* (spp.) are caught by eastern European pelagic trawlers. It is estimated these fisheries catch a minimum of about 500 to 1,000 dolphins per year. The artisanal lobster fishery near the border between Mauritania and Morocco is estimated to catch 20 harbor porpoises and other dolphins annually.[30]

Recent surveys sponsored by UNEP and the Convention on the Conservation of Migratory Species of Wild Animals (CMS or "Bonn Convention")[31] in Senegal and Gambia indicate continuing bycatch and deliberate takes of small cetaceans in artisanal and semi-industrial fisheries. Most of the animals caught are bottlenose, Atlantic hump-backed, and long- and short-beaked common dolphins and, on Senegal's Petite Côte, harbor porpoises.[32] The total bycatch in the artisanal fisheries in Senegal probably does not exceed 100 cetaceans per year.[33]

In West Africa, bycatch threatens the continued existence of Atlantic humpback dolphins. While bycatch of humpback dolphins is well documented in other West African countries, bycatch monitoring of coastal fisheries in Ghana and Togo has failed to yield a single record because of the severely depleted population.[34] Research is needed to establish the range, distribution, natural history, taxonomy, abundance, and fishery interactions of Atlantic humpback dolphins. A high priority area for dedicated field investigations is Ghana's Volta River region and western Togo.

Conservation efforts are needed for Atlantic humpback dolphins. For example, if research indicates cross-border movements between Ghana and Togo, the chances of international attention and investment in humpback dolphin conservation may be greatly improved through the Bonn Convention. The Ghana and Togo fisheries and wildlife departments must become engaged and cooperate to ban or at least limit commerce in cetacean products (e.g., restrict consumption to local fishing communities). One action Ghana could take to facilitate humpback dolphin conservation would be to add this species to the conservation program of Ada Sanctuary at the mouth of the Volta (Songhor RAMSAR site) and perhaps prohibit gillnet fishing in this area.

With sufficient funding and appropriate training, it should be possible to achieve systematic data collection at the national level and, in turn, to make progress toward assessing trends and implementing sound conservation measures. In the longer term, introduction of tourism focused

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[30] Maigret, J. 1994. Marine Mammals and Fisheries Along the West African Coast. In Gillnets and Cetaceans. Report of the International Whaling Commission. Special Issue 15.

[31] Convention on the Conservation of Migratory Species of Wild Animals, Done at Bonn, 23 June 1979. Entered into force 11 January 1983. 19 ILM 15 (1980). See Chapter 3.

[32] Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Drammeh, F., Jallow, A., Ndiaye, E., and Samba Ould Bilal, A.O. 2001a. Conservation efforts and field research on cetaceans in Senegal and The Gambia. Report to UNEP/CMS Secretariat, Bonn, Germany. See also Van Waerebeek, K., Ndiaye, E., Djiba, A., Diallo, M., Murphy, P., Jallow, A., Camara, A., Ndiaye, P., and Tous, P. 2000. A survey of the conservation status of cetaceans in Senegal, The Gambia and Guinea-Bissau. Report to UNEP/CMS Secretariat, Bonn, Germany. 80 pp.

[33] Maigret, J. 1994. Marine Mammals and Fisheries Along the West African Coast. In Gillnets and Cetaceans. Report of the International Whaling Commission. Special Issue 15.

[34] Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Drammeh, F., Jallow, A., Ndiaye, E. and Samba Ould Bilal, A.O. 2001a. Conservation efforts and field research on cetaceans in Senegal and The Gambia. Report to UNEP/CMS Secretariat, Bonn, Germany.

on dolphin watching seems feasible because species diversity is unusually high, seas are calm, and tourism to exotic Ghana is rising.[35]

A new Dakar-based non-governmental organization, Conservation and Research of West African Aquatic Mammals, or COREWAM, and an interdepartmental Gambian Aquatic Mammal Working Group are now in place. These organizations and other scientists must work together to obtain baseline abundance data and establish seasonal patterns of distribution of coastal cetaceans at subregional, rather than national, scales. These organizations and national bodies must also systematically collect data at the national level to assess trends in bycatch and develop practical measures for the reduction of net entanglements. Such actions are crucial to the survival of cetacean communities—especially the Atlantic humpback dolphin.

Finally, since at least the late-1960s, scientists have speculated that dolphins are involved in the tuna purse seine fishery in the eastern tropical Atlantic Ocean. The tuna vessels are registered in several countries, including France, Spain, and the U.S., as well as in several West African countries. The levels of mortality, stock sizes, and even exact species involved are not known with certainty, and there is conflicting information on the extent of the problem. It has been suggested that dolphin mortality in this fishery could be very high, as many as 30,000 or more animals per year.[36] The species involved likely include several species of the genus *Stenella*, as well as common dolphins (*Delphinus* spp.).[37] Tuna–whale interactions are also known to occur, and baleen whales are considered good indicators of tuna schools.[38] Despite claims to the contrary, there is reason to suspect a serious problem that has been neglected for more than 30 years. Independent observer data on the composition and extent of bycatch need to be obtained and published. Although observer programs may already exist in this fishery, adequate information to assess cetacean bycatch is currently lacking.

Area 37 Mediterranean and Black Seas

The species most affected by interactions with fisheries in this area appear to be harbor porpoise, striped dolphins, and sperm whales. Bottlenose dolphins are also caught in a wide variety of gear and are reported to cause damage to some fisheries locally. Common dolphins are also caught in high numbers in some fisheries in the Alboran Sea. The fisheries with the greatest level of cetacean–fishery interactions are generally gillnet fisheries. One major driftnet fishery has been banned since 1992, but others continue on a smaller scale, and setnet fisheries are widespread. Illegal driftnet fishing poses a major threat to all of these species.

The Black Sea population of harbor porpoises is classified as Vulnerable on the IUCN Red List. Harbor porpoises in the Black Sea are isolated from Atlantic populations by a range hiatus in the Mediterranean Sea. Harbor porpoises that occur in Greek waters of the Aegean Sea may

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[35] Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Drammeh, F., Jallow, A., Ndiaye, E. and Samba Ould Bilal, A.O. 2001a. Conservation efforts and field research on cetaceans in Senegal and The Gambia. Report to UNEP/CMS Secretariat, Bonn, Germany.

[36] Alverson, F.G. 1991. Tuna purse seine and gill/drift net fisheries in the oceans of the world and their relationship to tuna-dolphin, tuna-whale and tuna-whale shark associated schools. Unpublished Report Submitted to the CANAINPES Seccion Especializada en Pesca de Atun Programa Atun-delfin, Camara Nacional de la Industria Pesquera. 110 pp.

[37] Maigret, J. 1981. Introduction à l'étude des rapports entre les cétacés et la pêche thonière dans l'Atlantique tropical. *Bull. du Centre Natl. Rech. Oceanogr.* Pêches Mouadhibou **10**, 89–101.

[38] Alverson, F.G. 1991. Tuna purse seine and gill/drift net fisheries in the oceans of the world and their relationship to tuna-dolphin, tuna-whale and tuna-whale shark associated schools. Unpublished Report Submitted to the CANAINPES Seccion Especializada en Pesca de Atun Programa Atun-delfin, Camara Nacional de la Industria Pesquera. 110 pp.

belong to the Black Sea population or, alternatively, may be a remnant of a separate Mediterranean population.[39] Cetacean fisheries ended in the Soviet Union, Bulgaria, and Romania in 1966 but continued until 1983 in Turkey, mainly in the southeastern Black Sea.[40]

Identified Needs

Information: Determine the distribution and abundance of harbor porpoise in the Mediterranean and Black seas and connecting waters. Assess bycatch and develop a conservation plan.

Legal Framework: Implementation of ACCOBAMS.

Enforcement: Enforce existing gear regulations.

Harbor porpoises in the Black Sea are also threatened by accidental killing in large-mesh bottom-set gillnets for turbot, sturgeon, and dogfish. At present, incidental mortality in fishing nets is the most serious threat to harbor porpoises, with the majority (95 percent) of recorded cetacean entanglements being porpoises. Mortality estimates are not available. However, available data indicate that the annual level of harbor porpoise bycatch may be in the thousands.[41] This area needs a comprehensive effort to determine distribution patterns and to estimate abundance of harbor porpoises; it also needs a program—through interview surveys, visits to fish markets and landing sites, and on-board observer programs—to evaluate incidental catch and illegal hunting. Results of the population and threat assessments should lead to the development of a basin-wide conservation plan.

Large numbers of sperm whales are known to have been killed incidentally in the high-seas driftnet fishery for swordfish, possibly reducing their abundance in the Mediterranean. Entanglement in high seas swordfish driftnets has caused and continues to cause considerable mortality since the mid-1980s.[42] The recorded number of sperm whales found dead or entangled

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[39] Frantzis, A., Gordon, J., Hassidis, G., and Komnenou, A. 2001. The enigma of harbor porpoise presence in the Mediterranean Sea. *Marine Mammal Science* **17**, 937–944.

[40] From 1976 through 81, harbor porpoises accounted for 80% of the total catch of cetaceans in Turkey, with 34,000–44,000 killed annually. With an estimated loss rate (porpoises killed but not recovered) of 50% total mortality could have been as much as double these numbers. Illegal catches of unknown magnitude were also reported in 1990. Klinowska, M. 1991. *Dolphins, Porpoises, and Whales of the World. The IUCN Red Data Book.* IUCN, Gland, Switzerland and Cambridge, UK. See also IWC. 1992. Report of the scientific committee. *Report of the International Whaling Commission* **42**, 51–270.

[41] Commercial hunting of Black Sea cetaceans, including harbor porpoises, was banned in 1966 in the former U.S.S.R (present Georgia, Russia, and Ukraine), Bulgaria, and Romania and in 1983 in Turkey. The riparian states assumed international obligations to protect Black Sea cetaceans as contracting parties of the Convention on Biological Diversity (CBD), Convention on the Conservation of Migratory Species of Wild Animals (CMS), Convention on the Conservation of European Wildlife and Natural Habitats (Berne Convention), Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, Appendix II), and the Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea, and Contiguous Atlantic Area (ACCOBAMS). The harbor porpoise, *P. phocoena*, is mentioned in Annex II of the EC Directive No.92/43/EEC on the conservation of natural habitats of wild fauna and flora. In 1996, the Ministers of Environment of Black Sea countries adopted cetacean conservation and research measures within the framework of the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea (paragraph 62). The harbor porpoise is included as Data Deficient in the regional Black Sea Red Data Book (1999). In 2002, however, it was listed as Endangered in the Provisional List of Species of the Black Sea Importance, an annex to the Black Sea Biodiversity and Landscape Conservation Protocol of the Bucharest Convention.

[42] International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15:1–72. See also: Pace, D.S., Miragliuolo, A., Mussi, B. 2005.

from 1971 through 2004 in Spain, France, and Italy (combined) was 229. Surveys are needed to assess the abundance and distribution of sperm whales in the Mediterranean.

Likewise, large numbers of striped dolphins have been killed incidentally in the high-seas driftnet fishery for swordfish, possibly reducing their abundance in the Mediterranean. Entanglement in high seas swordfish driftnets has caused and continues to cause considerable mortality since the mid-1980s and may approach 1 percent of the population in the Alboran Sea and the Corsican–Ligurian Sea.[43] The recorded number of striped dolphins killed annually in driftnet fisheries may be in the thousands. With no recent estimates of abundance or incidental mortality available, surveys are needed to assess the abundance, distribution, and incidental mortality of striped dolphins in the Mediterranean.

Identified Needs

Information: Determine distribution and abundance of common dolphins; evaluate extent and risk posed by incidental mortality.

Monitoring: Monitor incidental mortality, develop bycatch estimates.

Mitigation: Eliminate driftnets in region.

Legal Framework: Implement ACCOBAMS actions and measures to regulate and reduce incidental mortality.

Enforcement: Enforce existing regulations on driftnets.

In the Mediterranean and Black seas, bottlenose dolphins occur in scattered inshore communities of perhaps 50–150 individuals. Incidental kills of bottlenose dolphins in trammel and gillnets occur frequently in some areas.[44] In some Mediterranean areas and the Black Sea, the incidental mortality rates are probably unsustainable.[45] There is a need for intensive population assessments in areas of the Mediterranean and Black seas and interconnecting waters where bottlenose dolphins are known to occur. Efforts are also required to monitor incidental catches (best accomplished through on-board observer programs).

Short-beaked common dolphins in the Mediterranean and Black seas have undergone a dramatic decline in abundance during the last few decades, and have almost completely disappeared from large portions of their former range, including the northern Adriatic Sea, Balearic Sea, Provençal basin, and Ligurian Sea.[46] No credible information exists on the abundance of common dolphins (and other cetaceans) in the Black Sea, but massive directed

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Behaviour of a nursery group of entangled sperm whales (*Physeter macrocephalus*) off Capo Palinuro (Southern Tyrrhenian Sea, Italy). Abstracts, 19Th Annual Conference of the European Cetacean Society, La Rochelle, France, 2–7 April 2005:69.

[43] International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15:1–72. See also: Pace D.S., Miragliuolo A., Mussi B. 2005. Behaviour of a nursery group of entangled sperm whales (*Physeter macrocephalus*) off Capo Palinuro (Southern Tyrrhenian Sea, Italy). Abstracts, 19th Annual Conference of the European Cetacean Society, La Rochelle, France, 2–7 April 2005: 69.

[44] Silvani, L., Gazo, M., and Aguilar, A. 1999. Spanish driftnet fishing and incidental catches in the western Mediterranean. Biological Conservation 90, 79–85.

[45] Silvani L., Raich J., Aguilar A. 1992. Bottlenose dolphins, *Tursiops truncatus,* interacting with fisheries in the Balearic Islands, Spain. European Research on Cetaceans 6:32–34.

[46] UNEP/IUCN. 1994. Technical report on the state of cetaceans in the Mediterranean. Mediterranean Action Plan Technical Reports Series No. 82, United Nations Environment Programme (UNEP), Regional Activity Centre for Specially Protected Areas, Tunis. 37 pp.

killing, which continued to the early 1980s, is believed to have considerably reduced the population size. [47] Other than the reported bycatch of 145–200 common dolphins in the Spanish swordfish driftnet fishery in 1993-1994, the threats posed to common dolphins by accidental killing in fishing gear are virtually undocumented.

Pelagic driftnets have been prohibited in Spain since 1992, and their use has been limited by EU regulations since 2002. However, a reduced Italian fleet still fishes with such gear in an unregulated manner, as does a large Moroccan fleet and the French *tonnaille* vessels.[48] All of these operations are known to cause substantial cetacean mortality.

The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)[49] calls for actions to address fishery bycatch for these species. ACCOBAMS came into force in 2001 and therefore is still in its early stages of development. In the near future, ACCOBAMS should coordinate among various national agencies and scientists to undertake the needed abundance surveys and to monitor incidental mortality to develop accurate bycatch estimates. Without such estimates, ACCOBAMS's ability to effectively regulate incidental mortality and develop conservation plans and measures will be severely diminished.

Area 41 Southwest Atlantic

The large number of species present and the wide range of geographical zones encompassed by this area make analyses difficult. The franciscana *(Pontoporia blainvillei)* is the most threatened cetacean species in the southwestern Atlantic Ocean. Although the franciscana is the species of greatest concern, the tucuxi has also experienced relatively high levels of incidental mortality in some areas. Commerson's dolphins are also reportedly caught quite frequently in Argentina; again, however, the impact on populations is not known. Other species—including bottlenose, spinner, Risso's, rough-toothed, Atlantic spotted, and common dolphins and false killer, killer, pilot, minke, humpback, and southern right whales—have been caught in lower numbers; current bycatch estimates for these species are either nonexistent or extremely poor.

Identified Needs

Information: Identify and delineate management units; acquire up-to-date abundance estimates for all populations in this region.

Monitoring: On-board observers.

Mitigation: Pingers.

The major fisheries in this area with cetacean bycatch are shark gillnet and other inshore gillnet fisheries. Trawls and seines also take a proportion of cetaceans, but apparently to a lesser extent than do gillnets. Driftnet fisheries in southern Brazil are also of concern because of their potential to incidentally kill humpback, sperm, dwarf sperm, and pilot whales and spinner, Atlantic spotted, common, striped, clymene, and bottlenose dolphins.

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[47] Buckland, S.T., Smith, T., and Cattanach, K. L. 1992. Status of small cetacean populations in the Black Sea: a review of current information and suggestions for future research. Report of the International Whaling Commission 42, 513–516.

[48] Imbert, G., Gaertner, J.-C., and Laubier, L. 2001b. Prevention a l'aide de repulsifs acoustiques des captures de dauphins par les thonailles. 10e Conference International sur les cetaces Mediterranee de la RIMMO. Juan-les Pins 16–18 Nov. 2001 (Abstract).

[49] Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea, and Contiguous Atlantic Area. Done at Monaco, 1996. Entered into Force 2001. Source citation from CMS Secretariat.

Between 1 and 10 percent of the population of franciscana are incidentally killed in gillnet fisheries. The total estimated mortality throughout the range could be in the order of 1,500–2,000 animals per year. Most animals incidentally captured in fisheries are juveniles with an average age of one year, and 64 percent of the individuals are under three years.[50] There has been significant progress made in the assessment of franciscana populations, mostly because of strong collaboration among researchers from Brazil, Uruguay, and Argentina, but work must continue to secure a more accurate abundance estimate for each of the four management areas.

Although workshops have been held in that region to address scientific questions regarding the status of franciscana and to identify research and conservation priorities, there is still a need to gather biological information on ecology, genetics, and mortality rates. The range states must (at the national and provincial level) focus on monitoring and mitigation of franciscanas bycatch, including mechanisms to evaluate potential mitigation measures and their implementation and monitoring.

The IWC Scientific Committee's Subcommittee on Small Cetaceans discussed the status of franciscanas at the 2004 meeting of the IWC. That group recommended further testing, implementation trials, and development of both pingers[51] and the replacement of gillnets with less harmful gear. The committee recommended developing educational programs with artisanal fishermen and fishing communities to promote awareness of the franciscana's vulnerability and to engage stakeholders in the search for solutions to the bycatch problem.

Pelagic trawls for hake and shrimp off Patagonia are harmful to pelagic dolphins such as dusky, short-beaked common, and Commerson's dolphins *(Lagenorhynchus obscurus*, *Delphinus delphis*, and *Cephalorhynchus commersonii)* that feed on anchovies, mackerels, or sardines.[52] This fishery incidentally kills less than 1 percent of the Commerson's and common dolphin populations, and 1 to 2 percent of the dusky dolphin population.

In addition to pelagic trawling, a shore-based gillnet fishery operates seasonally for Patagonian blenny *(Eleginops maclovinus)*, hoki *(Macruronus magellanicus)*, and silversides *(Odonthestes* spp). This artisanal fishery operates off southern Santa Cruz and Tierra del Fuego, from Cabo Espíritu Santo in the north to Río Irigoyen. Neither local nor regional authorities has made any attempt to estimate cetacean mortality in this gillnet fishery.

Bycatch has not been a priority in fishery management. Since 2002, provincial government authorities have been calling for an assessment of cetacean and seabird bycatch to take place prior to expansion of the anchovy fishery southward from 41ºS. Still, estimates of mortality levels or rates are sorely lacking. There is a clear need for detailed information on fleet characteristics and dynamics and on the numbers and species composition of the bycatch. On-board observers are essential to assessing bycatch and must be made a priority. Moreover, the impacts of fishery mortality on cetacean populations can only be assessed if abundance estimates are available. Consequently further research is needed to identify and delineate

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[50] Culik, B.M. (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pp.

[51] Pingers have shown promise for reducing bycatch mortality of franciscanas. Bordino, P., Kraus, S., Albareda, D., Fazio A., Palmerio, M. Mendez, A., and Botta, S. 2002. Reducing incidental mortality of franciscana dolphin *Pontoporia blainvillei* with acoustic warning devices attached to fishing nets. Marine Mammal Science 18:833–842.

[52] Crespo, E.A., Koen Alonso, M., Dans, S.L., García, N.A., Pedraza, S.N., Coscarella, M.A., and González, R. 2000. Incidental catch of dolphins in mid-water trawls for southern anchovy off Patagonia. Journal of Cetacean Research and Management 2:11–16.

management units and acquire up-to-date abundance estimates for all populations in this region. Finally, range states should develop and test devices to prevent dolphins from entering trawls and possibly also to assess the effectiveness and feasibility of using pingers to reduce dolphin mortality in the gillnet fisheries.

Area 47 Southeast Atlantic

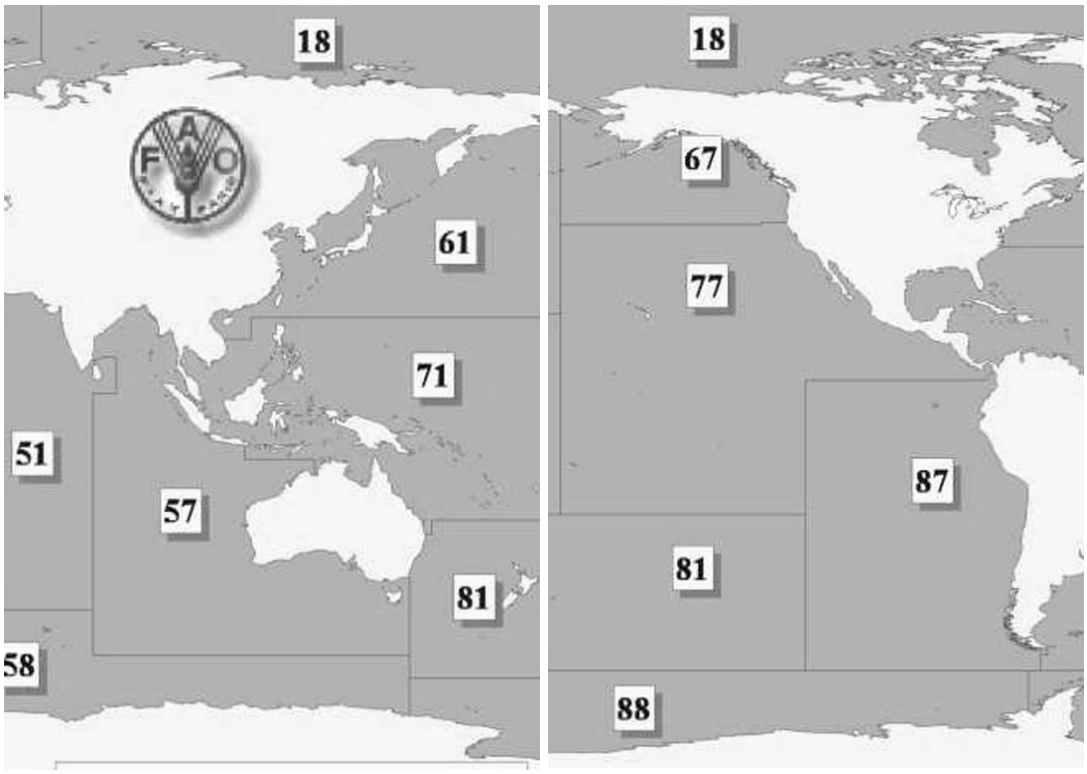
Few recent studies appear to have been made in this area. The recent revelation that a driftnet fishery has been operating off Tristan da Cunha for tuna, with concomitant incidental mortality of small whales and dolphins, suggests that there may also be considerable mortality to some as yet unidentified species. Incidental mortality to Heaviside's dolphin, which is restricted to the coastal zone of South Africa and Namibia, may also be an important interaction, but recent data on bycatch and population size are lacking.

Heaviside's dolphin is protected within the 200-mile Exclusive Fishery Zone of South Africa, where all delphinids are protected under the Sea Fisheries Act of 1973. Similar protection is provided in Namibia's 12-mile exclusive fishery zone (EFZ). The fisheries of concern are the inshore gillnet fishery and any coastal fisheries that may adversely affect Heaviside's dolphin. Neither the bycatch nor the abundance of this species is known, so there is a need for more thorough documentation. The St. Helena mullet and elephant fish fishery has caught only two dusky dolphins (*Lagenorhynchus obscurus*).

Pacific Areas and Populations Analyzed for Highest Risk

Nine FAO statistical areas make up the Pacific region, including the Indian Ocean, illustrated in Figures 3a and 3b. Where available, an assessment of the level of bycatch against estimated population is made. Many areas in the Pacific are characterized by lack of information about cetacean population size and incidental bycatch, making difficult an assessment of highest risk. Based on what is known about comparable fisheries and gear types elsewhere, it is likely that critical issues arise for a dozen species of marine and fresh water dolphins, three species of porpoise, and the false killer whale in the waters of 17 countries covering the entire Pacific Rim. Critical issues are summarized in the box below.

Developed nations such as the United States and Japan as well as developing countries such as Natal and Sri Lanka all have fisheries that interact with cetaceans. Challenges include gathering the most basic information on abundance and fishing effort to more providing complex technologic solutions and implementation of action plans. Critical issues that have been identified in the literature or by scientific and management organizations are summarized in the box below. Area specific recommendations also are drawn from the literature. High priority recommendations are included in Chapter 6.



Figures 3a & 3b: FAO Statistical Areas of the Western and Eastern Pacific

Critical Incidental Take Issues in the Pacific Ocean

- **Spinner dolphins in Sri Lanka, drift and set gillnets in combination with direct harpooning**
- **Risso's dolphins in Sri Lanka, drift and set gillnets in combination with direct harpooning**
- **Bottlenose dolphins off the coast of Natal, South Africa, anti-shark gillnets; south coast of Zanzibar (Tanzania), drift and bottom-set gillnets**
- **Indo-Pacific humpback dolphins in Natal (south Africa), anti-shark nets; south coast of Zanzibar (Tanzania), drift and bottom-set gillnets; Madagascar and East Africa, coastal gillnets**
- **Ganges river dolphins in India and Bangladesh, gillnets**
- **Irrawaddy dolphins in Chilka Lake (India), gillnets; Bay of Bengal, heavy-mesh drift gillnets for elasmobranches**
- **Dall's porpoise in direct harvests and salmon driftnets off Japan and Russia**
- **Finless porpoises in Korea and Japan, coastal nets and traps; in Inland Sea (Japan), gillnets; Yangtze River, gillnets and electrofishing; marine waters of China and SE Asia, coastal nets and traps**
- **Baijis in China, electrofishing and rolling hooks**
- **Spinner dolphins and Fraser's dolphins in the Phillippines, driftnets for large pelagics and flying fish, purse seines for small pelagics**
- **Irrawaddy dolphins (marine), Phillippines, *matang quarto* crab nets; (freshwater) Mekong River, Mahakam River, Songkhla Lake, and Ayeyarwady River, gillnets**
- **False killer whales, Hawaii, longlines**
- **Vaquitas, Gulf of California (Mexico), gillnets**
- **Hector's dolphins, North Island (New Zealand), coastal gillnets**
- **Dusky dolphins, Peru, drift gillnets**
- **Burmeister's porpoises, Peru, coastal gillnets**

Area 51 Western Indian Ocean

In the western Indian Ocean (See Figure 4), incidental catch appears to be of spinner (4,000), spotted (1,500), common (1,000) and Risso's (1,300) dolphins. Catches of pygmy sperm whales (2,700), dwarf sperm whales (2,700), and bottlenose (500–1,250) dolphins are particularly high in the Sri Lankan fisheries. From 4 to 9 percent of the populations of bottlenose and humpback dolphins, respectively, are caught in shark nets to protect bathers along the Natal coast; this amounts to an unsustainable incidental bycatch. Finless porpoises and Irrawaddy dolphins may also be heavily affected by gillnet fisheries in Sri Lanka, India, and Pakistan, but studies in this region are insufficient to make a quantitative assessment.

Large numbers of at least 14 species of cetaceans have been killed in directed hunts and by entanglement in fishing gear in Sri Lanka, with spinner dolphins caught most frequently.[53] Scientists estimate that, from 1984 through 1986, some 350,000 gillnets accounted for between 8,042 and 11,821 bycatch mortalities around the Sri Lankan coast.[54] Other authors estimate that the total annual catch for all cetaceans may be as high as 15,000 to 25,000 animals.[55] Additionally, many cetaceans are harpooned, and it appears that deliberate hunting may be increasing, possibly because of poor enforcement of legal protections for cetaceans enacted in Sri Lanka in 1993.[56] There is an immediate need to estimate population abundance for 14 cetacean species currently killed in Sri Lankan fisheries.

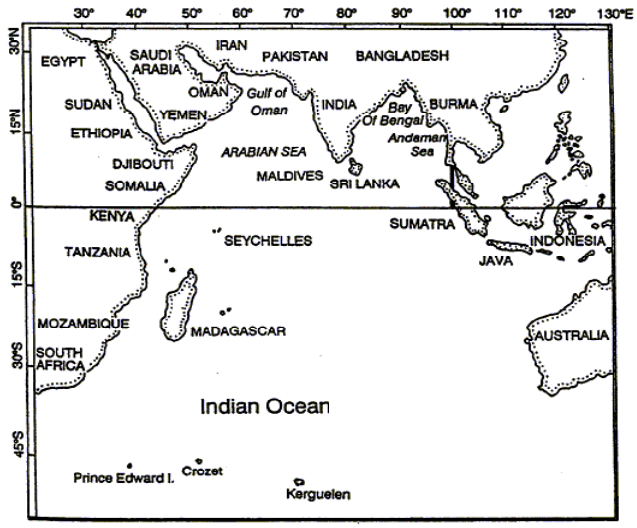


Figure 4: Indian Ocean

More than 2.5 million fishermen in the subcontinent of India deploy an estimated 1,216,000 passive gillnets annually, incidentally killing an estimated 1,000–1,500 cetaceans, 90 percent of which are killed along the southwest coast. Most of these animals are spinner or common dolphins, although coastal fisheries in India also take a toll on Indo-Pacific humpback dolphin populations.[43] Continued monitoring of the entanglement of dolphins along the Indian coast is very important because the expanding coastal gillnet fishery may adversely affect some coastal dolphins such as the humpback dolphin. Incidental mortality in fisheries is thought to be a significant conservation problem for cetaceans in numerous areas along the

[53] Leatherwood, S., and Reeves, R.R. (eds.). 1989. Marine mammal research and conservation in Sri Lanka 1985–1986. UNEP Marine Mammal Technical Report 1, Nairobi, Kenya.

[54] Leatherwood, S. 1994. Report of the workshop on mortality in passive fishing nets and traps. Annex D. Re-estimation of incidental cetacean catches in Sri Lanka. In: W.F. Perrin, Donovan, G.P., and Barlow, J. *(eds). Gill-nets and Cetaceans. Reports of the International Whaling Commission, Special Issue 15*, pp. 64–65. Cambridge, UK: International Whaling Commission.

[55] Dayaratne, P., and de Silva, J. 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2–6 July 1990 8 pp.

[56] Ilangakoon, A. 1997. Species composition, seasonal variation, sex ratio and body length of small cetaceans caught off west, southwest and south coast of Sri Lanka. *Journal of the Bombay Natural History Society* **94**, 298–306.

western shores of the Indian Ocean. Relatively few areas along the coast have been the focus of dedicated assessment efforts.

Additionally, the driftnet, shrimp trawl, gillnet, and seine fisheries in the waters of Pakistan, Iran, the Arabian Sea, the Arabian Gulf, and the Gulf of Oman have not been studied and may take cetaceans in numbers as large as in the Sri Lankan fishery.

Off the coast of East Africa there are several bycatch problems. First, dolphins *(Stenella* sp., *Steno bredanensis* and *Tursiops* sp.) are harpooned mainly for Use as bait in a longline fishery for tiger sharks in Zanzibar (Tanzania). Small populations of Indo-Pacific bottlenose dolphins *(Tursiops aduncus)* and humpback dolphins *(Sousa chinensis)* inhabit waters off the south coast of Zanzibar. Until 1996, these dolphins were hunted for bait and human consumption—an activity that likely reduced the local populations of these animals. The best current abundance estimates for the two species are 161 bottlenose and 71 humpback dolphins.[57] In 2000, scientists documented cetacean bycatch in fishing gear around Zanzibar. An estimated six species of dolphins are killed year-round in drift- and bottom-set gillnets predominantly; these killings were from two villages off the south coast of Zanzibar. In 2000–2004, observer programs estimated that the annual anthropogenic mortality was 8 percent and 5.6 percent of the estimated number of Indo-Pacific bottlenose dolphins and humpback dolphins in the area, respectively.[58]

Second, the Natal shark net fishery, although small, is also an important threat for local populations of bottlenose and humpback dolphins. Between 1980 and 1988 inclusive, 67 humpback dolphins died in shark nets to protect bathing beaches along the Natal coast, South Africa—or about 7–8 animals per year representing 3.5 to 4 percent of the population.[59] More recent estimates of both mortality and abundance are not available.

Urgent action is clearly needed to reduce the pressure on these East African populations that are likely already depleted. Bycatch mitigation is important to conserve both the dolphin populations and the long-term economies of the local communities for which dolphin-oriented tourism has become an important part of their livelihood.

Reliable and current data on cetacean populations and mortality rates are virtually non-existent, making it impossible to assess the magnitude of the problem and to establish clear priorities for conservation. What is needed is a comprehensive program to study cetacean populations and the impacts from hunting and fishing activities in the western Indian Ocean. Researchers from the various nations bordering the Indian Ocean need to be trained and equipped to conduct at-sea surveys; collect biological samples; estimate the species age, identify sex composition of landed cetaceans; and assess fishing effort by area and season.

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[57] Stensland, E. 2004. Behavioural ecology of Indo-Pacific bottlenose and humpback dolphins. Doctoral thesis, Stockholm University, Department of Zoology. ISBN: 91-7265-837-X. The hunt has since been replaced with dolphin-oriented tourism; in 2001, about 35 local boats were engaged in carrying passengers to watch dolphins. See: Amir, O.A., and Jiddawi, N.S., 2001. Dolphin tourism and community participation in Kizimkazi village, Zanzibar. Pp. 551–560 *in* M. Richmond and J. Francis (eds.), Marine science development in Tanzania and Eastern Africa. Proceedings of the 20th anniversary conference on advances in marine science in Tanzania, Zanzibar, Tanzania, IMS/ WIOMSA.

[58] Stensland, E. 2004. Behavioural ecology of Indo-Pacific bottlenose and humpback dolphins. Doctoral thesis, Stockholm University, Department of Zoology. ISBN: 91-7265-837-X.

[59] Jefferson, T.A., and Karczmarski, L. 2001. *Sousa chinensis*. *Mammalian Species* (American Society of Mammalogists) **655**, 9 pp. See also. Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. *South African Journal of Wildlife Research* **20(2)**, 44–51.

Finally, efforts are needed to assess populations, habitats, and bycatch in rivers or portions of rivers where the Ganges river dolphin occurs.

Area 57 Eastern Indian Ocean

Recent information on cetacean–fishery interactions in Area 57 is lacking. The following summary is based on what might be expected from previous studies and studies in other areas with comparable fisheries. A now-terminated Taiwanese shark and tuna gillnet fishery operated off Northern Australia and caught bottlenose dolphins, spinner dolphins, spotted dolphins, humpback dolphins and false killer whales, a proportion of which are in this area. The fishery was mainly located in Area 71 and is discussed under that section. Given the amount of gillnetting likely to occur in this region, accidental catches may adversely affect small coastal species such as the finless porpoise and Irrawaddy dolphin to some extent. The driftnet fisheries operating farther offshore—in the Bay of Bengal, for example—might be expected to catch spinner and spotted dolphins, at least, and perhaps other species. Driftnet fisheries in the southern Indian Ocean may catch a variety of species such as the spectacled porpoise, the southern right whale dolphin, and common dolphin. All of these fisheries require more detailed information on non-target catches.

Identified Needs

(Eastern & Western Indian Ocean)

Information: Reliable and current data on cetacean populations and mortality rates.

Monitoring: monitor entanglement in the Indian Ocean and establish bycatch estimates.

Mitigation: reduce mortality in drift- and bottom-set gillnets and shark nets.

Technology Transfer: train and equip scientists to conduct at-sea surveys; collect biological samples; estimate the species, age, and sex composition of landed marine mammals; and assess fishing effort by area and season.

Enforcement: enforce legal protections for cetacean in Sri Lanka.

Along the east coast of India, the expansion of marine fisheries results in large numbers of cetaceans dying in gillnets. Also, there is some indication that bottlenose dolphins (probably *T. aduncus)*, and possibly Indo-Pacific humpback dolphins, are also being deliberately killed along the coast of Andhra Pradesh, eastern India, because the fishermen perceive them as competitors for diminishing fish resources.[60] Deliberate and incidental killing of cetaceans may be especially frequent along the east coast of India near major population centers (e.g., Calcutta and Madras), where the demand is high for fish and fishing employment. This eastern coastline, at least as far south as Vishakhapatnam, includes the westernmost range of the Irrawaddy dolphin. The only other known freshwater population—in Chilka Lake, India—has not been adequately assessed but is known to be subject to bycatch in gillnets and drag nets and may number as few as 50 remaining individuals. Consequently, there is a need for a rigorous monitoring program to document cetacean mortality of Irrawaddy dolphins in Chilka Lake and all cetaceans along the east coast of India.

[60] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A., and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans.* IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp. at 62

Area 61 Northwest Pacific

The information in this section was derived from reports that Japan provided to the IWC on its directed hunts and incidental captures in Japanese fisheries, together with largely anecdotal accounts from Korean, Chinese, and Soviet fisheries. According to the FAO, Area 61 encompasses the most productive fishery waters in the world, and in 1999 accounted for 24.1 million tons of fish landings. China continues to report the largest landings of any fishing nation, most of which come from this area. As such, it is also an area of high levels of cetacean bycatch. Incidental catch in Vietnamese and Taiwanese fisheries would also be expected, but little information is available. Figures available for Japan might suggest some accuracy and reliability in estimating total bycatch, but the reported mortality is a minimum estimate and not corrected for total effort. Because of this enormous and unmonitored fishing effort, reported bycatch of cetaceans is likely to be grossly underestimated. Additionally, the IWC Scientific Committee has expressed concern that Japan (as well as other nations) may not be providing a complete reporting of all direct and incidental captures.

Identified Needs

Information: Stock structure information for Dall's porpoise, pilot whales and striped dolphins and systematic abundance survey throughout the range of the finless porpoise and better estimates of bycatch.

Monitoring: monitor bycatch in Chinese, Japanese, Vietnamese and Taiwanese fisheries.

Mitigation: eliminate electrofishing and rolling hooks and establish a protected area for finless porpoises in Dongting Lake or Poyang Lake .

In the 1980s, the estimated total bycatch for the Japanese, Taiwanese, and South Korean squid driftnet fishery was approximately 15,000–24,000 cetaceans per year. This mortality was particularly problematic for Pacific white-sided dolphins (6,100), Dall's porpoise (thousands or tens of thousands), and the northern right whale dolphin, which was reduced by 24 percent to 73 percent of its pre-exploitation size.[61] The Bering Sea population of Dall's porpoise is estimated to have been reduced to somewhere between 78 percent and 94 percent of its pre-exploitation size, and the Western Pacific population to between 66 percent and 91 percent of its original size.[62] In January 1993, a United Nations moratorium on high seas driftnet fisheries went into effect—virtually eliminating this source of mortality (See Chapter 4 for description of the moratorium). However, large numbers of Dall's porpoises continue to die in driftnets within national waters of Japan and Russia, where the UN ban on driftnets does not apply. The estimated bycatch in the Japanese salmon driftnet fishery operating in the Russian EEZ totaled close to 12,000 for the period of 1993 through 1999, ranging from 643 to 3,149 on an annual basis.[63]

More than 17,168 small cetaceans are caught by Japan each year in direct harvests. Dall's porpoise, Baird's beaked whale, pilot whales, and bottlenose and Risso's dolphins are all targets of directed fisheries. Catch levels for pilot whales and striped dolphins may be unsustainable if they are caught predominantly from one stock rather than several. While

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[61] Mangel, M. 1993. Effects of high seas driftnet fisheries on the northern right whale dolphin *Lissodelphis borealis*. Ecol App 3: 221–229

[62] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A., and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans.* IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp. at 62

[63] IWC. 2002c. Report of the standing sub-committee on small cetaceans. *Journal of Cetacean Research and Management* **4** (Supplement), 325–338.

available data indicate that, with the exception of the Dall's porpoise, the level of bycatch is less than 1 percent of each species, the absence of stock structure data and either absent or dated population estimates create significant uncertainty regarding whether these directed takes are adversely affecting these species. For nearly a decade the IWC Scientific Committee has expressed concern over the cumulative level of mortality of Dall's porpoise (14,992). Therefore, these catches highlight the need for an international agreement that regulates the direct harvests of small cetaceans.

The most severely affected species in this region is clearly the baiji, but fisheries may also threaten others such as the finless porpoise. For the baiji, there are many threats[64], but electrofishing is the greatest, and 5 of 12 documented deaths in the 1990s have been attributed to electrofishing.[65] Previously, the main cause of mortality was the use of a snagline fishing gear called "rolling hooks." While some types of rolling hooks are illegal, their Use continues within the limited remaining range of the baiji. Efforts are needed to end electrofishing and eliminate all forms of rolling hooks within the baiji's range. During an expedition in 2006, scientists failed to find any baiji in the Yangtze River. There are reports that scientists may now declare the baiji "functionally extinct," making it the first aquatic mammal species to become extinct since the 1950s.[66]

In the Yangtze, finless porpoises occur in the same areas as the critically endangered baiji and face similar threats. Although recent studies suggest a dramatic decline in abundance of finless porpoises, densities are said to remain relatively high in the mouths of Poyang and Dongting lakes. The Chinese government should consider establishing a protected area for finless porpoises in Dongting Lake or Poyang Lake and adjacent waters.

China's extensive fishing fleets Use gear (e.g., gill and trawl nets) known to kill cetaceans. Some scientists believe that the incidental catch of some small cetaceans, especially finless porpoises, is high.[67] From 1985 through 1992, 114 finless porpoises were found off the coast of

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[64] The Three Gorges Dam spans the Yangtze River at Sandouping, Yichang, Hubei province, China. Construction began in 1994. It will be the largest dam in the world, more than five times the size of the Hoover Dam. The reservoir began filling on June 1, 2003, and will occupy the present position of the scenic Three Gorges area, between the cities of Yichang, Hubei, and Fuling, Chongqing. Structural work was finished on May 20, 2006, nine months ahead of schedule. However, several generators still have to be installed, and the dam is not expected to become fully operational until 2009.

As with many dams, there is controversy over the costs and benefits of the Three Gorges Dam. Although there are economic benefits from flood control and hydroelectric power, there are also concerns about the future of more than 1.9 million people who will be displaced by the rising waters, the loss of many valuable archaeological and cultural sites, and the effects on the environment. It is believed that the dam is a contributing factor in the decline and possible "functional" extinction of the Chinese River Dolphin.

[65] Zhang, X., Wang Ding., Liu, R., Hua, Y., Wang, Y., Chen, Z., and Wang, L. 2001. Latest population of the baiji *(Lipotes vexillifer)* and its conservation in the Yangtze River, China. Pp. 41–53 in: [Proceedings of] Conference on Conservation of Cetaceans in China, March 2001, Shanghai. Published by Ministry of Agriculture, P.R. China.

[66] http://en.wikipedia.org/wiki/Chinese_River_Dolphin. Other scientists have noted, however, that conventional observation methods for sighting marine mammals may not be appropriate for the Yangtze, which not only is highly turbid, but also teeming with river traffic, making it nearly impossible to see any river dolphins even if any animals were present. Pers. Comm. David Cottingham, NOAA, March 2007.

[67] Parsons, E.C.M., and Wang, J.Y. 1998. A review of finless porpoises *(Neophocaena phocaenoides)* from the South China Sea. Pp. 287–306 *in:* The Marine Biology of the South China Sea. Proceedings of the Third International Conference on the Marine Biology of the South China Sea, Hong Kong, 28 October–1 November 1996 (ed. B. Morton). Hong Kong University Press.

western and northeastern KyU.S.hu, including part of the western inland sea of Japan: 84 were incidentally killed by fisheries—bottom gillnets killed 58; surface gillnets killed 17; trap nets killed 7; trawl nets killed 1, and drifting ghost nets killed 1.[68] Finless porpoises were also incidentally captured, most frequently in the coastal waters of China—totaling about 2,132 individuals in trawl, gillnet, and stow nets.[69] There is a tremendous need for a systematic abundance survey throughout the range of the finless porpoise and better estimates of bycatch for this species.

Numerically, the major fisheries that interact with cetaceans appear to be the smaller, salmon driftnet fisheries, but there are many other driftnet, gillnet, setnet, trap net, longline, and purse-seine fisheries in this area for which there is no information. Given the large and growing fisheries of Japan, China, Korea, and Taiwan, there is a need for systematic bycatch assessments in these diverse fisheries and for up-to-date abundance estimates.

Area 67 Northeast Pacific

Much of the Northeast Pacific Area 67 is made up of the U.S. EEZ off Alaska, Washington, and Oregon. It does, however, include areas off Canada and international waters outside the EEZs of Russia, Canada, and the United States. The United States and Canada account for 98 percent of all landings within the area.[70] This section will focus on international bycatch of shared cetacean stocks in the area, not on coastal stocks of cetaceans within the U.S. EEZ, which are managed under the MMPA and, as such, are not the subject of this report.

Many cetacean species interact with or are incidentally captured by commercial fisheries. Since the closure of the salmon and squid driftnet fisheries inside U.S. waters, the level of the mortality for cetacean species is less than 1 percent. Mortalities in fisheries in international waters in the area are poorly known. Fisheries include squid, pollock, salmon, halibut, cod, crab, and flatfish and Use a variety of gear, including pelagic and bottom trawls, longlines, gillnets, driftnets, purse seines, and troll lines.

The major fisheries that interact with cetaceans are the inshore salmon gillnet fisheries, the Alaska pollock fishery, longline fishery, and various pot fisheries. When considered in relation to other fisheries in the Pacific, the incidental mortality of cetaceans in Northeast Pacific fisheries is inconsequential.

Area 71 Western Central Pacific

Roughly 1,700 bottlenose dolphins and 1,000 spinner dolphins are incidentally caught in gillnet, driftnet, and purse-seine fisheries in the western central Pacific. Also at risk are Irrawaddy dolphins. This region's fisheries are diverse and poorly documented. Nevertheless, coastal gillnets, especially driftnets for tunas and mackerels, are widely Used. After a closure in Australian waters, the Taiwanese driftnet fishery relocated and continued fishing in Indonesian waters in the Arafura Sea. With no reduction in effort, high cetacean bycatch rates are probable.

Spinner and Fraser's dolphins experience substantial bycatch in Philippine fisheries. In the Philippines, scientists estimated that about 2,000 dolphins—primarily spinner, pan-tropical spotted, and Fraser's—were being killed each year by a fleet of five tuna purse seiners using fish-aggregating devices. The annual bycatch of small cetaceans in a single tuna driftnet fishery

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[68] Kasuy, T. 1999. Finless porpoise—*Neophocaena phocoenoides* (Cuvier, G. 1829). *in:* Handbook of Marine Mammals (Ridgway, S.H., Harrison, S.R., eds.) Vol. 6: The second book of dolphins and porpoises, pp 411–442.

[69] Yang G. Zhou K, Xu, X, and Leatherwood, S. 1999. A survey on the incidental catches of small cetaceans in coastal waters of China. Yingyong Shengtai Xuebao 10: 713–716.

[70] David and Lucille Packard Foundation. 2001. Mapping Global Fisheries and Seafood Sectors. 34.

in Negros Oriental was estimated at about 400.[71] Scientists estimate that even more cetaceans may be caught in round-haul nets. One estimate for the eastern Sulu Sea was 2,000–3,000 per year.[72] Directed fisheries for small cetaceans were also reported, with as many as 200–300 dolphins caught annually in San Francisco and smaller numbers caught for bait in shark and chambered nautilus *(Nautilus pompilius)* fisheries in Palawan.[73] Currently there are no total bycatch estimates for the Philippines. Preliminary analyses of cetacean abundance surveys indicate that current bycatch is not sustainable.[74]

There is still a need to continue efforts to assess incidental catch in the tuna purse seine and drift gillnet fisheries. The major need is for comprehensive monitoring and documentation of fishing effort and bycatch employing longitudinal monitoring of high-risk fleets with onboard observers and landing-site interviews. There should also be intensive surveys to assess cetacean abundance and threats in biodiversity hotspots such as the Tubbataha National Park and World Heritage Site and adjacent Cagayan Islands; there is also a need to conduct more extensive surveys under the auspices of the Convention on Migratory Species in the Sulu Sea and the Sulawesi Sea. Although the directed take of small cetaceans is believed to have declined as a result of protective legislation, monitoring has become more difficult because fishermen are secretive in disposing of their catch.[75]

Identified Needs

Information: Comprehensive cetacean abundance and bycatch surveys are needed for the Irrawaddy dolphin, Indo-Pacific humpback dolphin, Indo-Pacific bottlenose dolphin, finless porpoise, and spinner dolphin (and its dwarf form) in the Philippines, Indonesia, Thailand and throughout the region.

Monitoring: Incidental catch assessments in the tuna purse seine and drift gillnet fisheries; comprehensive monitoring and documentation of fishing effort and bycatch employing longitudinal monitoring of high-risk fleets with onboard observers and landing-site interviews.

Mitigation:, prohibit the intentional killing of dolphins and provide alternative gear or employment options for fishermen in Malampaya Sound and the Mahakam River.

Legal Framework: Use the Convention on Migratory Species to conduct abundance surveys.

Enforcement: enforce Indonesian and Philippine laws that prohibit killing and live-capture and direct harvests of cetaceans.

Incidental mortality in fisheries (e.g., gillnets, explosives) is likely the principal cause of depletion of Irrawaddy dolphin populations. The species has been seriously depleted in parts of Thailand.[76] Recent surveys indicate

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[71] Dolar, M.L.L. 1994. Incidental bycatch of small cetaceans in fisheries in Palawan, central Visayas and northern Mindanao in the Philippines. *Report of the International Whaling Commission* (Special Issue) **15**:355–363.

[72] *Id.*

[73] *Id.*

[74] Dolar, M.L.L. 1999. Abundance, distribution and feeding ecology of small cetaceans in the eastern Sulu Sea and Tañon Strait, Philippines. PhD. dissertation, University of California, San Diego. Xxv + 241 pp. See also Perrin, W.F. 2002. Problems of marine mammal conservation in Southeast Asia. Proceedings of International Symposium 70th Anniversary of the Japanese Society of Fisheries Science. Fisheries Science 68, Supplement 1:238–242.

[75] Dolar, *supra*, note 65.

[76] Andersen, M., and Kinze, C.C. 2000. Review and new records of the marine mammals and sea turtles of Indochinese waters. *Natural History Bulletin of the Siam Society* **48**, 177–184.

dramatic declines in range and abundance of the Mekong and Mahakam freshwater populations.[77]

Irrawaddy dolphins in the Mahakam River, Indonesia, number fewer than 50 individuals and are listed as Critically Endangered by the IUCN.[78] Between 1995 and 2001, at least 37 dolphins died, primarily from entanglement in gillnets but also from vessel collisions and illegal hunting.[79] From 1997 through 1999, an average of three dolphins died per year from gillnet entanglements, representing between 6 percent and 8.8 percent of the population.[80]

While Irrawaddy dolphins are protected from killing and live-capture according to Indonesian law, monitoring and enforcement are minimal. Further population monitoring is vitally important, as is a continued evaluation of the threats facing this population. But immediate action should be taken to eliminate fishery mortality by, at a minimum, prohibiting the intentional killing of dolphins and providing alternative gear or employment options for gillnet fishermen. Other options include establishing protected areas and deterrent measures, both of which should be examined.

Another small, geographically isolated group of animals living at the head of Malampaya Sound in Palawan, Philippines, numbers approximately 77 individuals (CV 27.4%) and is confined to a 133-square-kilometer area of the inner sound.[81] This population should also be classified as Critically Endangered simply by virtue of its low numbers. Between February and August 2001, researchers confirmed that two dolphins were accidentally killed in bottom-set nylon gillnets Used to catch crabs (called *matang quatro* nets locally). They also received reports from local fishermen that as many as three additional dolphins were killed in these nets during the same period.[82] These levels of bycatch are unsustainable and are threatening the existence of Irrawaddy dolphins in Malampaya Sound—the only known population of the species in the Philippines. The crab fishery provides substantial employment and income to the fishermen in Malampaya Sound, an economically depressed region. Despite a scientific recommendation that dolphin mortality in the crab fishery be eliminated or at least drastically reduced, promoting the conservation goal of reducing entanglement in *matang quatro* gillnets will require socio-economic alternatives to the crab fishery that ensure an equal or greater income to the fishermen. These efforts must be accompanied by long-term monitoring of dolphin abundance and mortality in Malampaya Sound.

Scientists believe that there may have been a dramatic decline in the abundance of Irrawaddy dolphins in the Mekong River, where the population is a high priority for Red List

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[77] IWC. 2001a. Report of the standing sub-committee on small cetaceans. *Journal of Cetacean Research and Management* **3** (Supplement), 263–291.

[78] Kreb, D. 2002. Density and abundance estimates of the Irrawaddy dolphin, *Orcaella brevirostris*, in the Mahakam River of East Kalimantan, Indonesia: a comparison of survey techniques. *Raffles Bulletin of Zoology*, Supplement, 85–95.

[79] *Id.*

[80] *Id.*

[81] Dolar, M.L.L., Perrin, W.F., Gaudiano, J.P., Yaptinchay, A.A.S.P., and Tan, J.M.L. 2002. Preliminary report on a small estuarine population of Irrawaddy dolphins *Orcaella brevirostris* in the Philippines. *Raffles Bulletin of Zoology,* Supplement, 155–160.

[82] *Id.*.

assessment.[83] In the Mekong River from 2001 through 2003, an average of four dolphin deaths per year were attributed to gillnet entanglement; this represents 5.8 percent of a population estimated to number only 69 individuals.[84] There is a need for a coordinated, comprehensive, and credible rangewide assessment of the Mekong River dolphin population. The assessment should include an abundance estimate, a determination of range limits during various water stages, and an evaluation of habitat quality.

In Thailand, the Irrawaddy dolphin, finless porpoise, and Indo-Pacific humpback dolphin are probably the most severely affected species because of their near-shore distribution and susceptibility to entanglement. Recent surveys revealed that Irrawaddy dolphins have almost entirely disappeared from Songkhla Lake, a large lagoon system connected to the Gulf of Thailand that may have harbored a substantial resident dolphin population in the past.[85] In Songkhla Lake from 1990 through 2003, scientists believe at least 15 Irrawaddy dolphins were killed incidentally in gillnets from a population that may number as few as 8–15 individuals.[86] A dwarf form of the spinner dolphin has been described from specimens caught by shrimp trawlers operating in the Gulf of Thailand. If these animals belong to a discrete breeding population, the impact of the shrimp fishery alone could put that population in jeopardy.[87] Now, there is a need for at-sea surveys to assess cetacean abundance, distribution, and fishery "hotspots" in the Gulf of Thailand and Andaman Sea.

Finally, this area needs further research. In the Philippines, Indonesia, Thailand, and elsewhere in the western central Pacific, where relatively little is known about abundance, distribution, and bycatch levels of cetaceans such as the Irrawaddy dolphin, Indo-Pacific humpback dolphin, Indo-Pacific bottlenose dolphin, finless porpoise, and spinner dolphin (and its dwarf form), comprehensive cetacean abundance and bycatch surveys are needed to develop effective mitigation strategies.

Area 77 Eastern Central Pacific

Although the Eastern Central Pacific includes cetaceans that occur within the U.S. EEZ, the description for this area will focus only on bycatch of shared cetacean stocks in international waters or the EEZs of other nations.

The species most frequently caught in this area are the dolphins incidentally captured in the purse-seine fishery for yellowfin tuna: eastern and white belly spinner dolphins; northeastern offshore and southern–western offshore spotted dolphins; coastal spotted dolphins, and the northern, central, and southern common dolphin.[88] In 1989, the U.S. and international fleets in the Eastern Tropical Pacific tuna purse-seine fishery incidentally caught approximately 100,000

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[83] Baird, I.G., and Mounsouphom, B. 1997. Distribution, mortality, diet and conservation of Irrawaddy dolphins *(Orcaella brevirostris Gray)* in Lao PDR. *Asian Marine Biology* **14**, 41–48.

[84] Beasley, I., Chooruk, S., and Piwpong, N. 2002. The status of the Irrawaddy dolphin, *Orcaella brevirostris*, in Songkhla Lake, southern Thailand, Raffles Bulletin of Zoology, Supplement 10: 75–83.

[85] *Id.*

[86] *Id.*

[87] *Id.*

[88] According to the National Marine Fisheries Service, although the number of coastal spotted dolphins reported caught by observers on class 6 purse seine vessels may be small, they may be caught more frequently by smaller purse seiners even though intentionally setting on dolphins with a vessel smaller than class 6 is technically prohibited. Personal communication with Brad Wiley, February 2007.

dolphins. In 2005, that mortality had declined significantly, to fewer then 1,200 dolphins. While the incidental mortality for each of these dolphin species still numbers in the low hundreds, the overall percentage of the population affected is less than 0.1 percent or the equivalent of the zero mortality rate goal in the U.S. MMPA. Nevertheless, within the Agreement on the International Dolphin Conservation Program (AIDCP) (see description in Chapter 3), the U.S. should advocate for updating the existing stock mortality limits to reflect the most recent and best available abundance estimates. Furthermore, the U.S. should continue to periodically conduct abundance surveys to investigate population trends and to support any modifications to the stock mortality limits that might be necessary.

Scientists are still concerned that despite the fact that reported dolphin mortality ahs been a very small fraction of population size, there is still no clear indication that either northeastern offshore spotted or eastern spinner dolphins are recovering. There are several hypotheses to explain this apparent failure to recover: cryptic effects of repeated chase and encirclement on survival or reproduction (internal injuries, stress, hyperthermia), separation of suckling calves from their mothers during the fishing process, unobserved or observed but unreported mortality, ecosystem or environmental changes, effects due to breakup of dolphin schools (increased predation, social disruption), ecological effects due to removing tuna from the tuna-dolphin association, and lags in recovery due to other inter-specific effects.[89]

Much of the research to date to evaluate the cryptic mortality and cow/calf separation hypotheses has been based on data mining and modeling from information collected from 1970 through the 1990s, and not on direct observation in the present-day fishery. Among the parties to the AIDCP, there has been significant debate about the model's assumptions resulting in a general unwillingness to accept the results or take any further action to account for cryptic mortality in the stock mortality limits. If the U.S. is to make any progress on this issue, it must partner with both the Inter-American Tropical Tuna Commission and the other parties to undertake direct observational research to further test these hypotheses. This will require a substantial commitment of resources to design and execute a series of at-sea experiments to better understand why these dolphin populations are not recovering at the expected rate.

The most significant incidental mortality in the eastern central Pacific region occurs with bycatch of the vaquita in coastal gillnet fisheries and false killer whales in longline fisheries. The vaquita, endemic to the upper Gulf of California, Mexico, is considered critically endangered by the IUCN. Vaquitas, numbering in the low to mid-hundreds, are threatened with extinction by gillnet fisheries. The populations may be declining as commercial and artisanal fisheries for sciaenids, scombrids, shrimp, and elasmobranchs in the upper Gulf kill 35 to 40 vaquitas per year—6 to 7 percent of the population. According to recent estimates by the Southwest Fisheries Science Center, the

Identified Needs

Information: estimate vaquita abundance and trends; undertake abundance and quantitative bycatch estimates in coastal fisheries in Central America

Monitoring: monitor fishing activities and bycatch throughout the vaquita's range

Mitigation: extend the southern boundary of the Biosphere Reserve to cover the entire range of the vaquita and phase out gillnets and trawlers in the entire Biosphere Reserve

Legal Framework: convene a take reduction team for false killer bycatch in longlines and export mitigation measures internationally.

[89] NOAA information available online at http://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=248&id=1408.

current estimate of annual mortality rate may be closer to 10 percent.[90]

In 1992, President Carlos Salinas of Mexico created the Technical Committee for the Preservation of the totoaba (an endangered sciaenid fish) and vaquita. On 10 June 1993, the Government of Mexico established the Biosphere Reserve of the Upper Gulf of California and Colorado River Delta, in large part to protect the habitat of vaquitas and totoabas. The management plan for this reserve called for a ban on commercial fishing in its "nuclear zone." In 1996, the Government of Mexico convened an international panel of experts to form a recovery team—the International Committee for the Recovery of the Vaquita. Regardless of which group, all of the various efforts have produced remarkably similar recommendations:

- To monitor fishing activities and bycatch throughout the vaquita's range
- To estimate vaquita abundance and trends
- To take immediate action to eliminate incidental catch of vaquitas

More recently, the International Committee recommended that the southern boundary of the Biosphere Reserve be expanded to incorporate the known range of the vaquita; gillnets and trawlers be phased out in the entire Biosphere Reserve; effective enforcement of fishing regulations begin immediately; acoustic surveys for vaquitas be initiated; research on alternative gear types be started; public outreach and education be developed; consideration be given to the compensation of fishermen for lost income; research be initiated on vaquita habitat; and international and nongovernmental cooperation be fostered.[91] Many scientists believe that banning gillnets in the entire range of the species is the single measure most likely to prevent extinction. This ban must be accompanied by socio-economic alternatives for the people whose incomes are adversely affected by any restrictions.

The impact of the longline fisheries off Hawaii is emerging as a potential problem for several species. National Marine Fisheries Service (NMFS) recognizes three stocks of false killer whales in the central Pacific: a Hawaiian stock within U.S. waters surrounding the Hawaiian archipelago, a Palmyra stock within U.S. waters surrounding Palmyra Atoll, and an undefined stock throughout international waters and the rest of the Pacific Islands Region. In recent years, mortality and serious injury from the Hawaiian and Palmyra stocks has exceeded sustainable levels (1.6 percent to 2.5 percent of the population).[92] To date, NMFS has not established a bycatch reduction team, as required by the MMPA, to develop measures to mitigate and reduce this bycatch. Additionally, the number of false killer whales caught by international fisheries has not been estimated for any of these three stocks, but scientists are concerned that bycatch may have a significant impact on them. NMFS must take the first step—convene a bycatch-reduction team—to develop effective mitigation measures that can then be exported to other international fleets that take false killer whales and enforced through international regional fisheries management organizations.

As stated, cooperative international management programs have dramatically reduced overall dolphin mortality in the yellowfin tuna purse-seine fishery in the eastern tropical Pacific during the last 15 years. Although much attention has been given to the bycatch problem associated with the yellowfin tuna purse-seine fishery, comparatively little notice has been given to incidental catch of cetaceans in coastal and artisanal gillnet fisheries in nations that border

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[90] Personal Communication, February 2007. Barbara Taylor, NOAA Southwest Fisheries Science Center.

[91] Rojas-Bracho, L., and Jaramillo-Legorreta, A.M. 2002. Vaquita *Phocoena sinus*. Pp 1,277–1,280 *in: Encyclopedia of Marine Mammals* (eds. W.F. Perrin, B. Würsig, and J.G.M. Thewissen). Academic Press, San Diego, California.

[92] The PBR for the Hawaiian stock is 1.0, and the estimated mortality is 4.4 animals.

the eastern tropical Pacific (eastern central Pacific). Although few quantitative data are available, the magnitude of the cetacean bycatch in coastal and artisanal gillnet fisheries of the eastern tropical Pacific is suspected to be high.[93] Because of the inshore nature of these fisheries, they tend to affect cetaceans that are already subject to other forms of exploitation and habitat degradation.

An exploratory study of artisanal gillnet fishery bycatch levels in relation to estimates of small cetacean abundance in the eastern tropical Pacific estimated overall annual mortality rates of 4.4 percent to 9.5 percent.[94] Even at the bottom end of this range, the mortality would be unsustainable—exceeding the recommended limit of 1 percent to 2 percent of the population abundance.[95] Scientists believe that mortality rates may be even higher for coastal subspecies (e.g., coastal spotted and Central American spinner dolphins (*S. a. graffmani* and *S. l. centroamericana*, respectively) because animals from these populations are likely over-represented, relative to their abundance, in the bycatch.[96] The report estimated that annual incidental mortality in artisanal gillnets was 16,596 in Costa Rica and 3,581 in Panama.[97] Nevertheless, information on bycatch in Guatemala, El Salvador, Honduras, and Nicaragua is still lacking.

These small cetacean species, which are not restricted to U.S. territorial waters, present a particular problem: no cooperative management agreements exist with Mexico to address the bycatch in widely dispersed, artisanal gillnet fisheries. These coastal fisheries involve many relatively small vessels and operate at subsistence or small-scale commercial levels. The same is true for the other Central American nations. The U.S. must work with Mexico, Costa Rica, Panama, Guatemala, El Salvador, Honduras, and Nicaragua, as well as local fishermen, scientists, and nongovernmental groups to jointly undertake abundance and quantitative bycatch estimates for these coastal fisheries. In particular, the U.S. must forge a cooperative management agreement with Mexico, because this is especially important for transboundary cetacean species, given the apparently dynamic nature of geographical stock boundaries. Until these goals are accomplished, the conservation and management actions that the U.S. is taking under the MMPA are at best hindered and at worst severely undermined.

Identified Needs

Information: Monitor abundance and distribution of Maui's and Hector's dolphins.

Monitoring: Observer program to estimate throughout the range of the dolphins.

Mitigation: Allow fishing only with gears and methods that do not catch Maui's dolphins; increase the size of the North Island sanctuary to include the harbors and bays and extend the offshore boundaries of both sanctuaries.

Area 81 Southwest Pacific

Hector's dolphin is endemic to New Zealand. The total size of all populations is

[93] Vidal O., Van Waerebeek K., and Findley L.T., 1994. Ceta[illegible] and the wider Caribbean: a preliminary review. Report of the International Whaling Commission (Special Issue) 15, 221–233.

[94] Palacios, D.M., and Gerrodette, T. 1996. Potential impact of artisanal gillnet fisheries on small cetacean populations in the Eastern Tropical Pacific. Southwest Fisheries Science Center Administrative Report LJ-96-11, La Jolla, California. 15 pp.

[95] Wade, P. 1998. Calculating limits to the allowable human-caused mortality of cetaceans and pinnipeds. Marine Mammal Sci 14: 1–37.

[96] Palacios, *supra*, note 86.

[97] *Id.*

estimated at approximately 7,400, with 7,270 (CV 16.2 percent) distributed around South Island[98] and some 100 individuals (called Maui's dolphins) off the west coast of North Island.[99] The IUCN lists the species as Endangered and the North Island population as Critically Endangered.

Hector's dolphins have been bycaught in gillnets throughout most of their range since gillnetting became widespread in New Zealand waters in the early 1970s. Scientists believe that gillnet mortality is causing continuing declines in all of the populations.[100] The Banks Peninsula Marine Mammal Sanctuary was created in 1988 to reduce bycatch off the Canterbury coastline on the east side of South Island. However, in 1997–1998, the estimated bycatch by commercial gillnetting vessels north and south of Banks Peninsula (fishing outside of the sanctuary area) was 16 Hector's dolphins (CV 39 percent).[101] In view of continued recreational and commercial bycatch north and south of the sanctuary, New Zealand introduced regulations to prohibit recreational gillnetting along the Canterbury coastline from 1 October through 31 March. Commercial fishermen have developed a voluntary code of practice (COP) for reducing bycatch in the Canterbury area as an interim measure while a management plan for the species is prepared. Acoustic deterrents (pingers), specially developed for Hector's dolphin based on field studies of this species, are being used by Canterbury gillnet fishermen as part of the COP.[102] Although there have been no reports of bycatch of Hector's dolphins in any of the nets using pingers, it is difficult to scientifically judge their effectiveness, and thus there is uncertainty about whether the pingers and COP are effective at reducing bycatch.

For Maui's dolphin, the situation is grave. Scientists have concluded that the population has been reduced to such low levels that in order for the North Island population to recover, human-induced mortality must be reduced to zero. In August 2001, the New Zealand Minister of Fisheries created a protected area that prohibits recreational and commercial gillnet fishing within four nautical miles of shore along a 400 km segment of the west coast of North Island. An observer program is also planned for trawlers and Danish seine vessels fishing in the area closed to gillnetting.

While there has been some progress, bycatch continues throughout most of the species range. Bycatch of Hector's and Maui's dolphins in gillnets must be reduced to sustainable levels. It is likely that additional measures will be necessary for Maui's dolphins such as allowing fishing only with gears and methods known not to catch Maui's dolphins (e.g., replace gillnetting or trawling with line fishing). Additionally, New Zealand should consider increasing the size of the existing protected areas—to include the harbors and bays in the North Island sanctuary and

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[98] Slooten, E., Dawson, S., and Rayment, W. 2002. Quantifying abundance of Hector's dolphins between Farewell Spit and Milford Sound. Published Client Report on Contract 3076, funded by Conservation Services Levy. Department of Conservation, Wellington, New Zealand. dsis35.pdf.

[99] Russell, K. 1999. "The North Island Hector's dolphin: a species in need of conservation". Unpublished M.Sc. thesis, University of Auckland.

[100] Martien, K.K., Taylor, B.L., Slooten, E., and Dawson, S. 1999. A sensitivity analysis to guide research and management for Hector's dolphin. *Biological Conservation* **90**, 183–191.

[101] Baird, S.J., and Bradford, E. 2000. Estimation of Hector's dolphin bycatch from inshore fisheries, 1997–1998 fishing year. Published Client Report on Contract 3024, Conservation Services Levy. Available: www.doc.govt.nz/cons/scires/csl.pdf.

[102] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A., and Notarbartolo di Sciara, Giuseppe (compilers). 2003. *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans.* IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139 pp. at 88

extend the offshore boundaries of both sanctuaries. Finally, New Zealand should implement a statistically robust observer program throughout the species range to verify whether and when bycatch has been reduced to sustainable levels, and it should continue to monitor abundance and distribution of Hector's and Maui's dolphins to assess exposure to threats and the effectiveness of management efforts.

Area 87 Southeast Pacific

The dusky dolphin, Burmeister's porpoise, the Chilean dolphin, and possibly southern right whale dolphins and Peale's and Commerson's dolphins are perhaps the most frequently captured species by a variety of fisheries in this area. Scientists have estimated that between 10,000 and 20,000 small cetaceans per year die in Peruvian fisheries, and most of these are dusky dolphins; the bycatch is large enough to cause serious concern for the continued existence of these species.[103] Changes in the catch composition suggest that the regional population of dusky dolphins is depleted.[104] In addition, a growing concern in Peru is the demand for dolphin meat and blubber to be used as shark bait.[105]

Identified Needs

Information: Abundance of Peale's, Chilean, and Commerson's dolphins off Chile and Dusky dolphins and Burmeister's porpoise off of Peru.

Monitoring: In Chile and Peru studies of fishery-related mortality of cetaceans, including the nature, species composition, and levels of bycatch. A coastal port survey for discarded remains and boat-based observers to document entanglement and evaluate current fishery-caused mortality.

Enforcement: In Peru, enforce existing laws; in Chile re-evaluate the extent to which cetaceans are still caught for bait.

Clearly the most important fisheries are the coastal gillnet fisheries, especially the driftnet fisheries that operate along the entire west coast of South America. With the exception of Pucusana in Peru, these fisheries and bycatches are virtually undocumented. Directed take of cetaceans for crab bait may also be an important source of mortality, but recent quantitative information on this is lacking.

In Ecuador, the estimated cetacean bycatch in 1993 for the fleets in Puerto Lopez, Santa Rosa, Manta, and Anconcito was between 2,500 and 5,000.[106] However, if the mortality levels are similar in other

[103] Van Waerebeek, K., Van Bressem, M.F., Alfaro-Shigueto, J., Sanino, G.P., Montes, D., and Ontón, K. 1999. A preliminary analysis of recent captures of small cetaceans in Peru and Chile. International Whaling Commission, Cambridge, UK. Document SC/51/SM17. See also: Van Waerebeek, K., Alfaro-Shigueto, J., Montes, D., Onton, K., Santillan, L., Van Bressem, M.-F., and Vega, D. 2002. Fisheries-related mortality of small cetaceans in neritic waters of Peru in 1999–2001. International Whaling Commission, Scientific Committee Document SC/54/SM10, Cambridge, UK.

[104] Van Waerebeek, K., Alfaro-Shigueto, J., Montes, D., Onton, K., Santillan, L., Van Bressem, M.-F., and Vega, D. 2002. Fisheries related mortality of small cetaceans in neritic waters of Peru in 1999–2001. International Whaling Commission, Scientific Committee Document SC/54/SM10, Cambridge, UK.

[105] Van Waerebeek, *supra*, note 95.

[106] Felix, F., and Samaniego, J. 1994. Incidental catches of small cetaceans in artisanal fisheries of Ecuador. Report of the International Whaling Commission (Special Issue) 15:475480.

artisanal ports in Ecuador, the total bycatch in 1993 may have been two to three times greater.[107] Other scientists place estimated mortality at 6,377 small cetaceans.[108] The most affected species are common dolphins, spotted dolphins, and pilot whales.

In Chile, the hunting of Peale's, Chilean, and Commerson's dolphins for crab bait in southern Chile and the harpooning and net entanglement of various species off central and northern Chile has been a concern. Point-sampling at fishing ports in central and northern Chile in 1998 indicated fishery-related killing—including illegal directed takes—in 80 percent of the specimens found of at least five small cetacean species (Burmeister's porpoise, pygmy sperm whale, long-beaked common dolphin, pygmy beaked whale, and long-finned pilot whale). This deliberate killing combined with bycatch mortality also has contributed to declines in abundance of Commerson's dolphins and Peale's dolphins.

Under an agreement between NMFS and the Fishery Subsecretary of Chile, the Chilean government agreed to take measures to decrease the impacts of crab fisheries on marine mammals.[109] These measures included programs to evaluate the scale of the problem, educate the fishing community concerning the ecological effects of the crab fisheries, and provide alternative sources of bait.[110] Some action has been taken on all of these aspects. Today a proportion of the bait consists of fish or fishery by-products, either obtained by the fishermen themselves or provided through government agencies within a legal framework.[111] The practice of using dolphins and other marine mammals as bait is reported to have declined in recent years, due in part to the fact that legal bait has been more readily available and in part to measures taken by government agencies; however, a certain amount of illegal fishing and baiting is believed to continue.

Nevertheless, there is a clear need for researchers in Chile to initiate or continue studies of fishery-related mortality of cetaceans, including the nature, species composition, and levels of bycatch in order to evaluate the likely implications for cetacean conservation. Researchers should also investigate the geographical distribution, scale, economics, and dynamics of the crab fisheries in southern South America and re-evaluate the extent to which cetaceans are still caught for bait. Field surveys to assess the status. of dolphin populations in the crab fishing areas are needed.

In Peru, cetaceans are still being caught incidentally in gillnets, in purse seines, and with harpoons.[112] Bycatch remains high, presumably unchanged from earlier levels because no bycatch reduction measures have been implemented.[113] Directed take was believed to be increasing from a low immediately after 1990, when a dolphin conservation law was implemented and the Peruvian government officially closed markets for dolphin meat.[114] In

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[107] *Id.*

[108] Palacios, D.M., and Gerrodette, T. 1996 Potential impact of artisanal gillnet fisheries on small cetacean populations in the Eastern Tropical Pacific. Southwest Fisheries Science Center Administrative Report LJ-96-11, La Jolla, California. 15 pp.

[109] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A., and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans.* IUCN/SSC.

[110] *Id.*

[111] *Id.*

[112] Van Waerebeek, *supra,* note 95.

[113] In the period 1990 through1993, the bycatch in Peruvian fisheries ranged from 15,000 to 20,000 small cetaceans.

[114] Van Waerebeek, K., and Reyes, J.C. 1994. Post-ban small cetacean bycatch off Peru: a review. Report of the International Whaling Commission (Special Issue) 15:503–520.

1994, a second, more stringent small cetacean conservation law was enacted that assigned joint responsibility for enforcement to district and provincial authorities. Today there may be an increasing use of cetacean meat as bait in the shark fishery. Dolphins are rarely landed openly on shore; they are instead hidden and sold clandestinely or transferred at sea to shark-fishing boats.[115]

The species of most concern continues to be the dusky dolphin, which is caught in the greatest numbers, and Burmeister's porpoise, a species endemic to coastal southern South America. In the 1990s, in Peru alone, annual directed take of Burmeister's porpoise and dusky dolphin each amounted to 500 to 2,000 animals, based on direct accounts of landings. The continuous decline of dusky dolphins as a proportion of the overall cetacean catch since 1985 (when recording began), with roughly constant fishing effort, is consistent with the hypothesis that abundance of this species has been decreasing off central Peru.[116]

Authorities in Peru remain unconvinced that any action beyond merely outlawing commerce is needed to reduce the mortality of cetaceans in fisheries. Consequently, in Peru there is still a need for reliable estimates of total fishing mortality for each species in Peruvian waters. Scientists need better information on stock structure and reliable estimates of abundance for the affected stocks. Total mortality caused by fisheries should be estimated using an on-board-observer-sampling scheme of some kind, in combination with information about total fishing effort. Reeves et al., recommend an independent observer scheme that consists of a three-part effort:

- A coastal port survey for discarded remains to evaluate current fishery-caused mortality relative to former levels, using the same criteria.
- Boat-based observers in areas where large numbers of porpoises were killed in the past to document entanglement dynamics (gear-related, temporal, and circumstantial factors).
- An estimate of current Burmeister's porpoise bycatch by extrapolation from the observed bycatch per unit of effort, which could be applied to data from the nationwide census of artisanal fisheries in September 2004.
- Compilation, analysis, and publication of substantial existing datasets that are relevant to this problem.

Finally, there is a need for aggressive enforcement of the existing measures. Peru is a disturbing case study for incidences where bycatch of small cetaceans becomes a market in cetacean meat and a gateway to direct harvests. If dusky dolphins and Burmeister's porpoises are to survive, mortality of these species must be drastically reduced and the existing laws fully enforced.

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[115] Van Waerebeek, *supra,* note 95. See also: Van Waerebeek, K., Alfaro-Shigueto, J., Montes, D., Onton, K., Santillan, L., Van Bressem, M.-F., and Vega, D. 2002. Fisheries-related mortality of small cetaceans in neritic waters of Peru in 1999–2001. International Whaling Commission, Scientific Committee Document SC/54/SM10, Cambridge, UK.

[116] *Id.*

CHAPTER 3. U.S. TOOLS FOR INTERNATIONAL CONSERVATION

The Marine Mammal Protection Act of 1972 provides some of the tools necessary to engage in activities to mitigate cetacean bycatch beyond the U.S. EEZ. From the inception of the MMPA, the Congress placed a strong injunction on the Department of State to develop "new arrangements for protection of these animals [marine mammals] and of ocean ecosystems that are significant to their welfare."[117] Congress also acknowledged that "unilateral action by the U.S." affecting any species or subspecies of marine mammals could be fruitless unless other nations involved in the taking of marine mammals work with the U.S. to preserve and protect these creatures."[118]

Marine Mammal Protection Act

Section 101 Embargo Provisions (non-tuna dolphin embargo provisions)

The MMPA requires a general prohibition of "taking" (harassment, hunting, capture, killing or attempt thereof) and importation into the U.S. of marine mammals, except where an exception is explicitly authorized. The act's stated goal is that the incidental kill or serious injury of marine mammals in the course of commercial fishing be reduced to insignificant levels approaching zero.[119] The MMPA is enforced by the National Marine Fisheries Service (NMFS) of the National Oceanic and Atmospheric Administration (NOAA) of the Department of Commerce. The U.S. Customs Service, within the Department of Homeland Security enforces the provisions regarding importation.

Section 101(a)(2) of the MMPA authorizes limited incidental taking of marine mammals by U.S. fishermen in the course of commercial fishing pursuant to a permit issued by NMFS, in conformity with and governed by certain statutory criteria in sections 103, 104, and 118 and implementing regulations. Section 101(a)(2) of the MMPA also states, "The Secretary of Treasury shall ban the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of U.S. standards". This prohibition is mandatory. Subparagraph (A) requires the Secretary to "insist on reasonable proof from the government of any nation from which fish or fish products will be exported to the U.S. of the effects on ocean mammals of the commercial fishing technology in use for such fish or fish products exported from such nation to the U.S."[120]

Outside the tuna-dolphin issue, these provisions have been only used once to bring about reductions in cetacean bycatch or direct harvests. Protecting marine mammals from direct takes, such as for crab bait as discussed in Chapter 2, was the primary focus of discussions during the initiation of a bilateral agreement between the U.S. and Chile in the 1990s. Since those initial meetings, the two sides have discussed conducting joint research on cetaceans and Chile has received information from the U.S. on whale watching regulations. The U.S. has requested information from Chile regarding its marine mammal data collection and research programs.

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[117] Report 92-707 House of Representatives, 92d Congress, 1st Session page 18

[118] Report 92-863 Senate 92d Congress 2d Session page 10

[119] 16 U.S.C 1372 (a)(2)

[120] 16 U.S.C 1372 (a)(2)(A)

Section 108 International Provisions

The MMPA requires the Secretary of Commerce, working through the Secretary of State, to initiate negotiations "as soon as possible" for the development of bilateral or multilateral agreements with other nations for the protection and conservation of all marine mammals covered by the MMPA.[121]

Many of the provisions in section 108 relate to bycatch reduction, calling on the Secretary of State to initiate negotiations with all foreign governments engaged in commercial fishing found to be unduly harmful to any species or population stock of marine mammal to develop bilateral and multilateral treaties with such countries to protect marine mammals.[122] Likewise, this subsection also calls upon the Secretary of State to enter into international arrangements (either through the Inter-American Tropical Tuna Commission or such other bilateral or multilateral institutions) for the conservation of marine mammals caught incidentally in the course of harvesting yellowfin tuna with purse seines.[123]

The final two provisions of section 108(a) call on the Secretary of State to seek to amend any existing international treaty to which the U.S. is a party for the protection and conservation of any species of marine mammal, to make such treaty consistent with the purposes and policies of the MMPA, and to seek an international ministerial meeting on marine mammals by July 1, 1973, to negotiate a binding international convention for the protection and conservation of all marine mammals.[124]

With the exception of the provisions related to the Inter-American Tropical Tuna Commission, these provisions have gone largely unused by either the Department of Commerce or Department of State. Congressional oversight has focused on the incidental capture of dolphins in tuna purse-seine nets and not on other forms of international bycatch. Therefore, with limited resources provided to both agencies, the priority has been action to reduce the bycatch of dolphins in the yellowfin tuna fishery and very little effort has been expended to initiate bilateral discussion, modify existing international treaties, or initiate a new international convention to address other forms of global bycatch.

Magnuson-Stevens Fishery Conservation and Management Act

In 2006 the Congress reauthorized provisions of the Magnuson-Stevens Fishery Conservation and Management Act (M-SFCMA),[125] the law governing how the U.S. manages fisheries within its EEZ. The reauthorization also directed substantial attention on fishing issues outside U.S. waters, particularly illegal, unregulated and unreported fishing (IUU) and bycatch. Although aimed primarily at strengthening U.S. leadership in international conservation and management of fisheries[126] for purposes of leveling the playing field between the U.S. fleet and

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[121] 16 U.S.C. § 1378(a)(1)

[122] 16 U.S.C. § 1378 (a)(2)(A)

[123] 16 U.S.C. § 1378 (a)(2)(B)

[124] 16 U.S.C. § 1378 (a)(4) and (5)

[125] 16 U.S.C. §§1801-1882 (1976), Pub. L. 94-265, as amended by H.R. 5946, Dec. 2006. Signed into law Jan 12, 2007.

[126] Report of the Committee on Commerce, Science & Transportation on S.2012, Magnuson-Stevens Fishery Conservation and Management Act Reauthorization Act of 2005. April 4, 2006. S. Rpt. 109-229. The Senate Report notes that restrictions placed on U.S. vessels to protect endangered or protected species "disadvantage U.S. fleets

those of other nations, the new provisions have strong bycatch language applicable to marine mammals.

The international title of the reauthorization creates a new section in the M-SFCMA, authorizing the Secretary to promote improved monitoring and compliance for high seas fisheries or fisheries governed by international or regional fishery management agreements.[127] Among other provisions, the section calls for improved communication and information exchange among law enforcement organizations, an international monitoring network, an international vessel registry, expansion of remote sensing technology, technical assistance to developing countries and support of a global vessel monitoring system for large vessels by the end of 2008.[128]

Section 403 of the reauthorization's international provisions amends the High Seas Driftnet Fisheries Enforcement Act by adding four new sections: a requirement for a biennial report on international compliance; action to strengthen regional fishery management organizations; identification and listing of nations whose vessels participate in IUU fishing; and identification and listing of nations that "fail to end or reduce bycatch of protected living marine resources by using regulatory measures that are comparable to those of the United States, taking into account different conditions."[129] The amendment defines "protected living marine resource" to mean non-target fish, sea turtles, or marine mammals that are protected under U.S. law or international agreement.[130]

The listing provisions are very comparable to certification under the Pelly and Packwood amendments (see below). The Secretary of Commerce determines whether a nation has taken appropriate corrective action in response to illegal fishing, gives the offending party notice and opportunity for comment, and then certifies to Congress whether it has provided documentary evidence of corrective action.[131] A similar procedure is required for bycatch of protected living marine resources in international waters or of a protected resource shared by the U.S. The certification must demonstrate that:

- the vessels have had bycatch in the prior year,
- the relevant organization has failed to implement measures to reduce such bycatch,
- the nation is not a party to a relevant organization, or
- the nation has not adopted a bycatch reduction program comparable to that of the U.S.[132]

After a notification and consultation process that gives the international community time to respond under relevant agreements, amend existing treaties or develop new instruments, the list of certified nations is provided to Congress and the sanctions of the Driftnet Enforcement Act

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and fail to address the problem" because the harmful fishing practices continue by other fleets in high seas fisheries. S.Rpt. at 43.

[127] Section 207(a)

[128] Section 207(b) (1) – (7).

[129] S.Rpt. 109-229 at 45, H.R. 5946, Sec. 610.

[130] H.R. 5946, Sec. 610(e)

[131] H.R. 5946, Sec. 609.

[132] H.R. 5946, Sec. 610(a)(1)-(3)

may be applied.[133] An alternative procedure allows for certification on a shipment-by-shipment or shipper-by-shipper basis of fish or fish products.

The measure calls for the Secretary of Commerce and Secretary of State to provide assistance to nations or organizations to help them develop gear and management plans that will reduce bycatch.[134]

International Dolphin Conservation Protection Act

The history of the dolphins dying in tuna purse-seine nets is a lengthy one and will not be repeated in this report. This issue was one of the driving forces behind the enactment of MMPA.[135] As stated earlier, the law created a ban upon "the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of U.S. standards." [136] In 1984 and 1988, Congress amended section 101(a)(2) of MMPA to require governments of nations that export yellowfin tuna harvested in the purse-seine fishery in the Eastern Tropical Pacific Ocean (ETP) to provide documentary evidence that the government has adopted a regulatory program governing the taking of marine mammals that is comparable to that of the U.S. and that the average rate of incidental taking of the harvesting nations is comparable to that of the U.S.

Subsequently, Mexico, an embargoed nation, and the EU, an embargoed intermediary nation, requested that a dispute-settlement panel be established pursuant to the General Agreement on Tariffs and Trade (GATT). The GATT panels issued decisions in favor of Mexico and the EU, but the GATT Council did not adopt either decision. This decision precipitated, in 1992, enactment of the International Dolphin Conservation Act of 1992 (IDCA).[137] The IDCA amended the MMPA to (1) impose a five-year moratorium on the harvesting of tuna with purse-seine nets deployed on or to encircle dolphins; and (2) lift the tuna embargo for those nations that made a declared commitment to implement the moratorium and take other steps to reduce dolphin mortality. No nation issued intent to honor the provisions of the IDCA.[138]

In October of 1995, the U.S. and eleven other nations signed the Panama Declaration. In this declaration these nations made commitments to strengthen the protection of dolphins and negotiate a new binding agreement to establish the IDCP, but only if the U.S. amended its laws to (1) lift the embargoes imposed under the MMPA; (2) permit the sale of both dolphin-safe and non-dolphin safe tuna in the U.S. market; and (3) change the definition of "dolphin safe tuna" to mean "tuna harvested without dolphin mortality."

In 1997, Congress enacted the IDCPA, [139] which revised the criteria for banning imports by amending the MMPA. Pursuant to this amendment, nations are permitted to export tuna to the U.S. if a nation provides documentary evidence that it (1) participates in the IDCP and is a member (or applicant member) of the Inter-American Tropical Tuna Commission; (2) is meeting

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[133] H.R. 5946, Sec. 610(c)(5)

[134] S.Rpt. 109-229 at 12.

[135] Pub. L. No. 92-522, 86 Stat. 1027

[136] 16 U.S.C.A. § 1371(a)(2)

[137] Pub. L. No. 102–523, 106 Stat. 3425 (1992).

[138] H.R. Rep. No. 105-74(I), at 14, 1997 U.S.C.C.A.N. at 1632.

[139] Pub. L. No. 105-42, 111 Stat. 1122 (1997).

its obligations under the IDCP and the Inter-American Tropical Tuna Commission; and (3) does not exceed certain dolphin mortality limits.[140]

As a result of amendments to the MMPA made by the IDCPA, the trade restrictions for intermediary countries were eliminated, and provisions were put in place to lift the embargoes on yellowfin tuna harvested by setting purse-seine nets on dolphins in the eastern Pacific Ocean. Since then, the embargoes were lifted for Ecuador, Mexico, and El Salvador. Spain also has been issued an affirmative finding and can export to the U.S. yellowfin tuna caught in the ETP using purse seines. To date the following nations remain embargoed: Belize, Bolivia, Colombia, Guatemala, Honduras, Nicaragua, Panama, Vanuatu, Venezuela, and Peru. Currently, there are no intermediary nations identified by NMFS subject to import prohibitions.[141]

Whaling Convention Act

The Whaling Convention Act of 1949[142] authorizes the Secretary of Commerce to enforce the provisions of the International Convention for the Regulation of Whaling and to issue regulations necessary for this purpose. Regulations can be found at 50 CFR Parts 230 and 351. The Secretary is authorized and directed to administer and enforce all provisions of the convention, this act, and regulations promulgated pursuant to this act. In conducting the duties prescribed under this act, the Secretary of Commerce cooperates with other agencies of the federal government, state governments, or other independent institutions. The Secretary may also cooperate with any agency from any other government of any party to the convention.

Under this act, it is illegal for any person under U.S. jurisdiction to engage in any act prohibited or not do any act required by the convention, this act, or any regulations promulgated by the Secretary of Commerce pursuant to this act. It is also illegal to ship, transport, purchase, sell, offer for sale, import, export, or have in possession any whale or whale products taken in violation of the convention, this act, or any regulation promulgated by the Secretary of Commerce pursuant to this act. The prohibitions of this act do not preclude the taking of whales for scientific investigation, with the approval of the Secretary.

To the extent that the convention applies to the U.S., the Secretary of Commerce issues regulations deemed necessary to further the goals of the convention.

As part of the international program anticipated under the act, Section 917(c) calls for appropriate bilateral agreements with Mexico and Canada for the protection and conservation of whales.[143] Even though no specific bilaterals have ever been negotiated, considerable cooperative research on marine mammals has taken place between the U.S. and Mexico in addition to work conducted under the tuna-dolphin program. Examples include population surveys for vaquita, gray whales, Gulf of Mexico bottlenose dolphins, and cooperative surveys of pinniped populations. Collaborative research has taken place on genetic studies for California sea lions, bottlenose dolphins, and sperm whales. The countries have also exchanged information on marine mammal bycatch from their respective longline observer programs and on coordinating responses to marine mammal strandings.

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[140] Id. at § 4, 111 Stat. at 1123-1124 (codified at 16 U.S.C.A. 1371(a)(2)(B)).

[141] http://swr.nmfs.noaa.gov/psd/embargo2.htm

[142] 16 USC 916-9161; Act of August 9, 1950, as amended

[143] 16 U.S.C. 917(c). However, this provision is generally thought to be superceded by the MMPA.

Endangered Species Act

The U.S. Endangered Species Act (ESA) was enacted in 1973 to provide for the conservation of species "which are in danger of extinction throughout all or a significant portion of their range."[144] The act operates through listings of species as either threatened or endangered, which then triggers action for protection of critical habitat and development of recovery plans. In addition to its provisions for protecting and recovering these species within U.S. jurisdiction, ESA reaches beyond U.S. borders to protect endangered species both through its own provisions and through U.S. implementation of the Convention on International Trade in Endangered Species (CITES). CITES operates primarily by controlling trade of listed species. Species are listed under various appendices, depending on their status. See Chapter 4 for a full discussion of the provisions of the treaty.

International Cooperation under the ESA

The U.S. president, with the foreign country's consent, may use foreign currencies to provide assistance for any listed endangered or threatened species, which may include acquisition of lands, waters or interests therein. These currencies must be used in preference to funds appropriated under §1542 of the Act.

Additionally, the Secretary of Commerce, through the Secretary of State, must encourage foreign countries to provide for the conservation of fish, wildlife and plants, including listed species; enter into bilateral or multilateral agreements for this purpose; encourage and assist foreign persons who take fish, wildlife and plants for import to the U.S. for commercial or other purposes to develop and carry out conservation procedures. Further, the Secretary of Commerce may provide personnel and financial assistance for the training of foreign personnel and for research and law enforcement, and may conduct law enforcement investigations and research abroad as necessary to carry out the Act.[145]

For purposes of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the Secretary of the Interior is designated as the management authority and the scientific authority, with the functions of the authorities to be carried out by the U.S. Fish and Wildlife Service. The Secretary of the Interior must give advice and make determinations under Article IV of CITES based on the best available biological information derived from professionally accepted wildlife management practices, but is not required to make population estimates. If the United States votes against including a species under CITES and does not enter a reservation pursuant to CITES, the Secretary of State must submit a report to the appropriate Senate and House committees.

The Secretary of Interior in cooperation with the Secretary of State and other secretaries, represents the U.S. regarding the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (the Western Convention). The Interior Secretary must take steps to implement the Western Convention, including developing personnel resources and programs, identifying species, habitats, and cooperative measures to ensure that species of migrating birds will not become threatened or endangered, and by identifying measures for the protection of wild plants.

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[144] 16 U.S.C. 1531-1543 (1976), Pub. L. 93-205, 87 Stat. 884, as amended.

[145] 16 U.S.C. 1537.

Agency Action

The MMPA places authority for protection of marine mammals in the Department of Commerce. Since 1972, the management authority has been delegated through NOAA to NMFS, Office of Protected Resources.

Many of the agency's ESA activities involve its duty to develop strategies for the conservation and survival of endangered and threatened species. In the area of marine mammals, the ESA and the MMPA offer similar management authority for endangered and threatened marine mammal species or stocks. Section 4(f) of the ESA requires the development and implementation of recovery conservation plans, while §115 of the MMPA mandates conservation plans modeled after the ESA for listed species. NMFS has recovery or conservation plans in place for North Pacific fur seals, Hawaiian monk seals, Steller sea lions, right whales, blue whales, and humpback whales. Consultations occur on an ongoing basis, under §7 of the ESA, with federal action agencies to avoid or mitigate the impacts of their activities on listed species. NMFS also reviews nonfederal activities that may affect listed species and issues §10 permits for incidental bycatch.

Pelly Amendment

In the years after the signing of the Convention for the Regulation of Whaling, it became clear the convention had no clear mandate for conservation.[146] The U.S. used instead the leverage it could apply through the MMPA, the Pelly Amendment and the Packwood Amendment to the Fishery Conservation and Management Act. Under these laws various official determinations about foreign government policies or production practices are deemed certifications under Pelly and are handled like any other certification. Some of these determinations involve international treaties and some do not.

The 1971 Pelly Amendment to the Fishermen's Protective Act[147] authorizes the U.S. president to prohibit the importation of products from countries that allow fishing operations that diminish the effectiveness of an international fishery conservation program or that engage in trade or taking that diminishes the effectiveness of an international program for endangered or threatened species. Specifically, the Secretary of Commerce, upon determination that foreign nationals are conducting fishing operations in a way that diminishes the effectiveness of international fishery conservation programs, is directed to certify such to the president. The secretary also has the responsibility to certify to the president when foreign nationals are engaging in trade or taking in a manner that diminishes the effectiveness of any international program for endangered or threatened species. Upon receipt of certification, the President may direct the Secretary of the Treasury to prohibit the importation into the U.S. of any products from the offending country for a period of time the President determines and to the extent prohibition is sanctioned by the General Agreement on Tariffs and Trade. The secretary also periodically reviews the activities of the offending nations to determine if the reasons for the certification still prevail. If the reasons no longer prevail, the secretary revokes the certification and publishes a notice thereof in the *Federal Register.*

While the Pelly Amendment is the most noteworthy section of the act for wildlife conservation purposes, the act also provides for federal reimbursement of money paid by owners to secure the release of fishing vessels improperly seized by foreign countries. In

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[146] Bean, M. 1983. *The Evolution of National Wildlife Law*. Praeger. New York. 448 pages, at 265.

[147] 22 U.S.C. 1978

addition, the act sets up a fund to compensate owners for damage to or destruction of their fishing vessel or gear.

Under Section 1821 of the Fishery Conservation and Management Act of 1976, also known as the Packwood-Magnuson Amendment, a certification by the Secretary of Commerce that foreign nationals are “engaging in trade or taking” that diminishes the effectiveness of the International Whaling Convention is deemed a Pelly certification. The only way this provision expands potential application of Pelly is by mandating certification for trade in whales even though they may not be endangered.

Under the MMPA amendments of 1988, the Secretary of Commerce must certify under Pelly any nation whose yellowfin tuna is embargoed whenever the embargo continues for more than six months.

If, under the Fishery Conservation Amendments of 1990, the Secretary of Commerce finds that a nation is engaging in trade in unlawfully taken anadromous. fish or fish products, that finding is deemed a Pelly certification.

History of Pelly Applications Related to Marine Mammals

This subsection provides a short case history of a few Pelly episodes related to marine mammals. For purposes of the following, the authors deem as successful those episodes where the Pelly threat led to a significant concurrent change in the target country’s policy in the direction sought by the U.S. government. Thus a commitment to greater adherence to international standards by a foreign government would be deemed successful.

1974—Japan and Soviet Union

In 1974, the Secretary of Commerce certified Japan and the Soviet Union for exceeding the International Whaling Commission’s (IWC) minke whale quota for 1973–1974. Both countries had objected to the IWC quota, however, and were therefore not legally bound by it. In announcing that he had decided against imposing sanctions, President Ford explained that both countries had voted for the 1974–1975 quotas, which incorporated conservation improvements. He also explained that imposing sanctions against Japan would result in higher prices for American consumers. These episodes are rated as successful because the two countries agreed to the IWC quota for the next year.

1986—Norway

In 1986, the Secretary of Commerce certified Norway for violating the IWC moratorium on commercial whaling. Norway had objected to the zero quotas and was therefore not bound by them. Less than a month after the Pelly certification, Norway announced that it would suspend commercial whaling after the 1987 season and would reduce its catch for that year. President Reagan then decided not to impose sanctions. This episode is rated as successful because Norway agreed to suspend commercial whaling after that season.

1990—Norway

In 1990, the Secretary of Commerce certified Norway for taking minke whales in violation of IWC research criteria. In announcing that he would not impose sanctions, President Bush stated that Norway was making progress in its “program and presentation” and noted current efforts to improve United States–Norwegian scientific consultations. This episode is rated as unsuccessful because Pelly did not affect Norway’s whale-hunting behavior.

1993—Norway

In August 1993, the Secretary of Commerce certified Norway for violating the IWC zero catch limit on minke whales by killing 157 whales. Norway argued that the minke whale was not endangered. The IWC, however, included this whale in its zero catch limit. Moreover, the minke whale is on CITES Appendix I. Norway also argued that it was not legally bound by the zero catch limit because it had entered a reservation under IWC procedures. In October 1993, President Clinton stated that, although "Norway's action is serious enough to justify sanctions," he would nevertheless not impose them. This episode is rated as unsuccessful because Pelly did not affect Norway's behavior.

1996—Canada

In December 1996, the Secretary of Commerce certified Canada for allowing its Inuit to take two bowhead whales from a highly endangered stock in the eastern Canadian arctic. Neither hunt was authorized by the IWC, which had expressed particular concern about whaling in the eastern Canadian arctic, where bowhead stocks are not known to be recovering. Canada was not a member of the IWC, withdrawing in 1982 and stating at the time that it no longer had any direct interest in the whaling industry or in the related activities of the IWC. This episode is rated as unsuccessful because Pelly did not affect Canada's behavior—it did not cease hunting nor did it return to the IWC.

2004—Iceland

In 2003, Iceland announced that it would begin a lethal, research whaling program and planned to take 250 minke, fin, and sei whales for research purposes. On June 16, 2004, the Secretary of Commerce certified Iceland for its lethal research whaling. The U.S. and a majority of the IWC nations questioned the scientific validity of Iceland's research whaling program. Iceland reduced its proposed take to 38 minke whales and actually killed 36 whales. President Bush did not impose trade sanctions on Icelandic products for the whaling activities, but directed U.S. delegations to seek ways to halt these whaling operations in its bilateral discussions with Iceland. This episode is deemed unsuccessful as Iceland announced its intention to resume commercial whaling.

CHAPTER 4. INTERNATIONAL AGREEMENTS RELATED TO BYCATCH

The previous chapter discussed U.S. law and policy that provide mechanisms for action to reduce bycatch of marine mammals in fishing operations. The U.S. is party to numerous international agreements related to marine mammal protection as well as to fishery agreements that have bycatch-reduction provisions. Another source of authority for action or diplomatic initiatives is the collection of regional agreements to which the U.S. is party. The increasing role of regional fishery management organizations in reaching out to both coastal states and fishing nations, whether they are contracting parties or not, may provide an additional venue for discussion of marine mammal bycatch in fisheries. Finally, the 2006 amendments to the Magnuson-Stevens Fishery Conservation and Management Act place a considerable burden on the U.S. to evaluate bycatch in international fisheries and take action to press fishing nations to reduce incidental catch of protected species such as cetaceans.

This report does not describe all of these instruments. The agreements discussed here and in Chapter 5 are included in Appendix B with lists of the parties to each instrument. In 1997, the U.S. Marine Mammal Commission published a *Compendium of Selected Treaties, International Agreements and Other Relevant Documents* related to marine mammal and wildlife conservation. This exhaustive resource provided the basis for much of the material covered. The following section concentrates on a few international tools and the relevant agreements that relate to the “hot spots,” or areas where the most significant incidental bycatch requires urgent action, based on the analysis presented in Chapter 5.

The global framework for conservation of living marine resources includes agreements that apply to all the seas, some that cover specific seas or regions, and some that govern ocean areas that are used by numerous coastal and flag nations. This chapter provides a compilation of agreements that relate directly to cetacean bycatch, or might be applied to actions to reduce cetacean bycatch. It presents global agreements for wildlife, fisheries and the marine environment first then discusses regional agreements for wildlife, fisheries and the environment. Finally, the chapter examines the emergence of an increased role for regional fishery management organizations in bycatch reduction, and the creation of several new regional fishery management organizations (RFMOs) that might be tasked with preventing bycatch of non-target species and protected species in the course of fishing.

Background

For centuries, customary international law and practice embraced the concept of *mare liberum*, freedom of the seas. Many assumptions that flowed from this principle continued until as recently as the 1980s and 1990s: anyone possessing the wherewithal to ply the seas and cast nets was free to fish; anyone wanting to impose restrictions on fishing bore the burden of proof to demonstrate the activity was harmful; fish, like wildlife, belonged to the state, which was the decision-maker on issues of access and other rights in the living resources of the sea. Even the inception of the International Whaling Commission in the 1940s was for the purpose of “regulating whaling,” an activity that was seen as just another kind of fishing.

It was not until the 1970s that international public opinion raised the notion that marine mammals were species of “special concern.” This era saw the beginning of a policy shift toward protecting marine mammals, rather than managing their exploitation.

In addition to agreements that are aimed specifically at protecting marine mammals, it is necessary to examine fishery management in an international context through several important agreements that changed the traditional freedom of seas approach to fisheries and led to the

emergence of the precautionary approach. These include the fishing provisions of the 1982 Convention on the Law of the Sea[148] (UNCLOS), the so-called U.N. Fish Stocks Agreement (UNFSA),[149] and the FAO Code of Conduct for Responsible Fisheries (Code of Conduct).[150] Sections briefly summarize a number of other important international and regional agreements that govern fisheries, including the Convention on the Conservation of Antarctic Marine Living Resources[151], the International Convention for the Conservation of Atlantic Tunas,[152] the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean,[153] and the North Atlantic Fisheries Organization.[154]

The role of regional fishery management organizations is explored as a tool for managing resources that cross jurisdictions and as a means to access decision-making bodies that may be able to influence fishing methods that pose harm to cetacean populations through bycatch. The emerging influence of trade, labeling, certification, product tracking, and similar regimes on international fishery management and their potential for reducing marine mammal bycatch are examined in Chapter 6.

International Tools for Reducing Bycatch

For most of human history people have seen the ocean as a frontier to be explored or a limitless and unchangeable source of fish. Hugo Grotius first expressed the philosophy of freedom of the seas in an anonymously published essay in November 1608 in defense of the rights of the Dutch East India Company to trade in waters claimed by Spain or Portugal.[155] Historically, fishing fleets took advantage of access to the richest fishing grounds—relatively shallow areas on the continental shelf—no matter where they were. It was not until after World War II that within their own waters, states exercised control over who fished and how much they caught. Beyond the territorial zone, access to fisheries continued to remain open and subject only to such regulations as their flag state imposed.[156] In the early nineteenth century, increased exploitation of fisheries led several coastal states to enter explicit bilateral and multilateral

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[148] The Third United Nations Convention on the Law of the Sea, Dec. 10, 1982, 21 I.L.M. 1245. (Entered into force 16 November 1994.)

[149] The Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, *Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conversation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks*. U.N. Doc. A/Conf./164/37.

[150] United Nations Food and Agriculture Organization. Code of Conduct for Responsible Fisheries. Rome. 1995.

[151] Convention on the Conservation of Antarctic Marine Living Resources, 20 May 1980. 33 U.S.T 3476.

[152] International Convention for the Conservation of Atlantic Tunas. Done at Rio de Janeiro, 14 May 1966. 20 U.S.T 2887.

[153] Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. Done at Honolulu, 5 September 2000. Available at http://www.wcpfc.int/. Last accessed 17 November 2006.

[154] The Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries. Done at Ottawa 24 October 1978. Senate Executive Treaty Series 96th Cong. 1st Sess. (Entered into force 1 January 1979.)

[155] Hugo Grotius, *Mare Liberum* or *The Freedom of the Seas or the Right Which Belongs to the Dutch to Take Part in the East Indian Trade*, Oxford University Press (New York 1916).

[156] Burke, The New International Law of Fisheries, 2-6 Clarendon Press (Oxford 1994).

agreements to conserve and manage fisheries.[157] However, even where a multilateral institution was created by such agreements, the fishing nations and the coastal states generally were not willing to confer on such institutions the authority needed to enforce the rules. Therefore, few of the world's fisheries were subjected to meaningful management.[158]

Over the past 40 years, the international law of fisheries has evolved from absolute freedom of the seas and unencumbered access to fishing, through assertion and extension of the rights of coastal states to protect their fisheries and fleets, to some limitations on fishing fleets operating in the zones of coastal states, to consensual limitations on vessels operating on the high seas, and finally to the current situation, where the right of freedom of fishing is restricted.

Attempts at widespread international agreement on fishery management were unsuccessful until the 1982 United Nations Conference on the Law of the Sea (UNCLOS III). With it came recognition of the extension of coastal state jurisdiction to 200 miles, and for the first time, the freedom of fishing on the high seas was circumscribed. In addition to reaffirming the right of coastal states to manage the living marine resources within their 200-mile zones, the convention placed qualifications on the rights of distant water fishing fleets fishing on the high seas.

UNCLOS III: Fishery Management Provisions of the Law of the Sea Treaty (Fisheries Articles 56, 61, 63, 64)

The 1982 UN Convention on the Law of the Sea is the overarching body of law covering every aspect of marine endeavor from transportation to pollution to military issues to scientific research. In its sections on protection of living marine resources, the Convention sets out the rights and responsibilities of coastal states and flag states with regard to fishing. While the Convention conferred economic rights over resources to coastal states, it preserved the traditional notion of freedom of fishing on the high seas. Although the Convention only entered into force in 1994, its provisions and policies have been recognized as customary international law since the late 1980s.[159]

Article 56 of the Convention gives coastal states sovereign rights over resources out to 200 miles.[160] This includes the authority to conserve and manage living resources.[161] The coastal nation must ensure, using best scientific information available and conservation and management measures, that the living resources of the EEZ are not threatened by overexploitation.[162] The Convention adopts MSY as the goal for maintaining or restoring exploited populations.[163] The costal state is to collect, contribute and exchange scientific

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[157] Louis B. Sohn & Kristen Gustafson, The Law of the Sea 115 (1984).

[158] William Burke, Remarks at University of Washington on Fisheries Law, at 3-1 (1992), cited in Iudicello and Lytle (1994).

[159] David Hunter, James Salzman and Durwood Zaelke, "International Environmental Law and Policy," Foundation Press (2002) at 659.

[160] UNCLOS, *supra* note 1 at Art. 56.

[161] *Id.* at Art. 61.

[162] *Id.* at Art. 61(2).

[163] *Id.* at Art. 61(3). "The concept of maximum sustainable yield recognizes that fisheries must be managed so that fish stocks can be sustainably caught year after year without causing the population of fish stocks to decline. 50 CFR

information, catch and effort statistics with other concerned states.[164] Access to the zone by foreign fleets is solely within coastal state discretion and subject to its laws and regulations, including requirements for licensing, observers and other conservation measures; compliance with conservation and management measures is required.[165] The convention directs states to seek coordinated measures necessary to conserve stocks that occur within the zones of two or more coastal states, or adjacent to their zones.[166] With regard to highly migratory species, UNCLOS calls for cooperation through international organizations, and where none exists, for the establishment of such organizations "with a view to ensuring conservation and promoting the objective of optimum utilization of such species throughout the region, both within and beyond the exclusive economic zone".[167] The 1982 conference even imposed new obligations on high seas fishing states. While freedom of fishing on the high seas continues in principle, the Convention can be read as imposing a dual responsibility on fishing nations: conservation and cooperation with coastal states.[168]

Even though the 1982 LOS Convention provided a new framework for better fisheries management, the extended jurisdiction of coastal states to 200 miles was insufficient to protect ocean fisheries.[169] As fleets, technology and the demand for fish and fishery products grew, it became clear by the late 1980s that the world's fish populations could not withstand continuing rapid and often uncontrolled exploitation and development. Reports of violence, confrontations between fishing nations, uncontrolled fishing on the high seas, and—for the first time in history—several consecutive years of declines in world catches led to a series of meetings and conferences where fishery experts called for action to control high seas fishing. In 1991, the Committee on Fisheries (COFI) called for the development of new concepts to foster responsible, sustained fisheries.[170] This was followed by an International Conference on

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602.11(d)(1)…. Scientists assume that population levels at 40% of unfished abundance (or biomass) are close to MSY, and that populations are overfished when levels fall below half the MSY level, roughly 20% of unfished abundance." However, MSY does not necessarily signify healthy fish populations, and should be viewed as a minimum target used in conjunction with precautionary and ecosystem management approaches. See Tim Eichenberg and Mitchell Shapson, "The Promise of Johannesburg: Fisheries and the World Summit on Sustainable Development, 34 Golden Gate University Law Review 587 at 624-626.

[164] UNCLOS, *supra* note 1, at Art. 61(5).

[165] *Id.* at Art. 62.

[166] *Id.* at Art. 63.

[167] *Id.* at Art. 64.

[168] Louis B. Sohn & Kristen Gustafson, The Law of the Sea 115 (1984). UNCLOS imposes duties on all states to take "such measures for their respective nationals as may be necessary for the conservation of the living resources of the high seas," Article 117; to cooperate "in the conservation and management of living resources" of the high seas, Article 118; and to "maintain or restore populations of harvested species at levels which can produce maximum sustainable yield," Article 119.

[169] FAO. The State of World Fisheries and Aquaculture 2004 at Preface. Available at http://www.fao.org/sof/sofia/index_en.htm. Last accessed 9 May 2006.

[170] "The Committee on Fisheries (COFI), a subsidiary body of the FAO Council, was established by the FAO Conference at its Thirteenth Session in 1965. The Committee presently constitutes the only global inter-governmental forum where major international fisheries and aquaculture problems and issues are examined and recommendations addressed to governments, regional fishery bodies, NGOs, fishworkers, FAO and international community, periodically on a world-wide basis. COFI has also been used as a forum in which global agreements and non-binding instruments were negotiated." Available at http://www.fao.org/fi/body/cofi/cofi.asp. Last accessed 3 May 2007.

Responsible Fishing in Cancun, Mexico in 1992, where participants adopted a Declaration stating that "States should cooperate...to establish, reinforce and implement effective means and mechanisms to ensure responsible fishing on the high seas."[171] These efforts culminated in the 1992 UN Conference on Environment and Development in Rio de Janeiro.[172] Ten years later, at the World Summit on Sustainable Development, 191 nations agreed to a series of targets and timetables to restore depleted fish stocks, manage fishing capacity prevent IUU fishing, and create marine protected areas.[173]

UNCED or the "Earth Summit," concluded in June with the adoption of a list of recommendations, including a chapter on the marine environment. Specifically, Chapter 17.C of Agenda 21 called for the UN to find ways to conserve fish populations and prevent international conflicts over fishing on the high seas, consistent with the provisions of the Law of the Sea.[174]

Code of Conduct for Responsible Fisheries

The FAO, recognizing these developments, "recommended the formulation of a global Code of Conduct for Responsible Fisheries which would...establish principles and standards applicable to the conservation, management and development of all fisheries."[175] The FAO Conference adopted the Code unanimously on October 31, 1995. In its 12 Articles, the Code covers both policy and technical matters including fisheries management, fishing operations, aquaculture, coastal area development, research and trade.

The Code is voluntary, and to be adopted by parties through national legislation, but some provisions are binding because of their relation to other legal instruments.[176] The Code is directed toward all persons concerned with conservation, management or development of fisheries, processing, marketing or any "users of the aquatic environment in relation to fisheries."[177] It provides principles and standards for every aspect of fisheries from aquaculture to capture, from research to fishing operations, processing to trade.[178]

For the first time, the Code attaches an obligation to the freedom to fish, and calls for users of living marine resources to use them "in a responsible manner so as to ensure effective conservation and management."[179] Inter-generational equity appears in the fishery context for the first time, as well, with the call for maintaining the diversity of fishery resources for "present and future generations" as well as for "food security, poverty alleviation and sustainable

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[171] International Conference on Responsible Fishing. Declaration of Cancun. Done at Canun, Mexico 8 May 1992.

[172] United Nations Conference on Environment and Development (1992) (hereinafter UNCED).

[173] See generally, www.johannesburgsummit.org, and "Report of the World Summit on Sustainable Development, available at http://ods-dds-ny.un.org/UNDOC/GEN/N02/636/93/PDF/No263693.prf. Although the WSSD set a number of ambitious fishery timetables, it generally fell short of expectations and mechanisms to ensure the timetables are met. See Eichenberg and Shapson, *supra* note 28 at 588 and 624-636.

[174] Agenda 21 (UN Doc. A/CONF.151/26 (Vol. I-III)).

[175] FAO Code of Conduct, *supra* note 141.

[176] *Id.* at Art. I,1.

[177] *Id.* at Art. II, 2.

[178] *Id.* at Art. I, 3.

[179] *Id.* at Art. VI,1.

development."[180] The Code urges effort controls, ecosystem management, the precautionary approach, selective fishing gear, habitat protection, and use of the best scientific information.[181] It calls for not only monitoring and control of flag state vessels, but also cooperation at all levels and among jurisdictions, and cooperation to prevent disputes.[182] In procedural recommendations, as well as substantive ones, the Code is far ahead of traditional fishery agreements. States are urged to conduct transparent decision making processes, education and training, provide safe and fair working conditions, and recognize and protect the rights of subsistence, small-scale and artisanal fishers.[183]

Articles 7 through 12 provide specific guidance to states and interested parties on operational and technical matters. These have been further elaborated by a series of technical guidelines from the FAO. Many of the provisions provide further detail on the principles by setting out how, for example, application of the precautionary approach would occur in fishery management measures.[184]

Management objectives include maintaining or restoring stocks to MSY, avoiding excess fishing capacity, protecting biodiversity and endangered species, assessing and mitigating adverse impacts from human activities, and minimizing pollution, waste, discards, ghost fishing, and bycatch. The Code recommends assessment of whole ecosystems and interrelationships, and directs states to consider the whole stock unit over its entire area of distribution.[185]

Straddling Stocks Agreement

The most significant outcome of the fishery management directives from Agenda 21 was the Straddling Stocks Agreement (UN Fish Stocks Agreement or UNFSA)[186]. This agreement has been called a "sea change" in international fishery management.[187] According to the UN, the agreement is considered to prescribe: "generally recommended international minimum standards" for conservation. As of August 2005, 52 states and the European community had become parties.[188]

Following a conference to address the problems of high seas fishing convened on April 19, 1993, delegates met six times in negotiating sessions over the next two years, concluding a

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[180] *Id.* at Art. VI, 2.

[181] *Id.* at Art. VI, 3-8.

[182] *Id.* at Arts. VI, 10-12; VI,15.

[183] *Id.* at Arts. VI, 13; VI, 16-18.

[184] *Id.* at Art. VI, 5.

[185] *Id.* at Arts II, VIII.

[186] Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982, Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (Status: entered into force December 2001)

[187] David Freestone. "International Fisheries Law: Who is Leading Whom?" The Magnuson Stevens Act: Sustainable Fisheries for the 21st Century? Tulane Law School Symposium, 7-9 Sept 1997. New Orleans, LA.

[188] UN, Chronological List of Ratifications. April 2007. Available at http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm. Last visited 3 May 2007.

document that was open for signing on 4 December 1995. The Agreement establishes detailed minimum international standards for the conservation and management of straddling fish stocks and highly migratory fish stocks. It calls for compatible measures and effective high seas compliance and enforcement. It was the first time an international fishing agreement shifted focus from producing maximum food for humans to sustainable fishing, ecosystem protection, conservation of biodiversity, and the precautionary approach to fishery management.[189] It also is the first agreement to produce an actual methodology for the precautionary approach, setting up reference points, targets, and limits.[190] Most significantly, it denies (for party nations) unqualified access to fish on the high seas.[191]

The guiding principle that governs the 1995 Agreement is the duty to cooperate. This core concept is given specific new meaning, and the coastal nations and distant-water fishing nations of each region are now required to share data and manage the straddling fisheries together. Article 7(2) requires that "[c]onservation and management measures established for the high seas and those adopted for areas under national jurisdiction shall be compatible in order to ensure conservation and management of the straddling fish stocks and highly migratory fish stocks in their entirety" (emphasis added). This duty gives the coastal state a leadership role in determining the allowable catch to be taken from a stock that is found both within and outside its exclusive economic zone, as evidenced by the requirement in Article 7(2)(a) that contracting parties "take into account" the conservation measures established by the coastal state under Article 61 of the Law of the Sea Convention for its EEZ "and ensure that measures established in respect of such stocks for the high seas do not undermine the effectiveness of such measures." This polite diplomatic language indicates clearly that catch rates outside a 200-nautical-mile exclusive economic zone cannot differ significantly from those within the EEZ.

The UN Agreement does all this without creating a new international structure, relying instead on existing regional agreements and organizations, and calling for mechanisms to strengthen them. Where such agreements or organizations do not exist, the Agreement directs states to create them.[192] The Agreement elaborates on the fundamental principle, established in the Convention, that States should cooperate to ensure conservation and promote the objective of the optimum utilization of fisheries resources both within and beyond the exclusive economic zone.[193]

The agreement provided for subsequent conferences to assess the adequacy of the provisions and propose ways to strengthen its implementation. These conferences have resulted in declaration of additional objectives such as considering the regional, subregional and

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[189] The approach includes these general features: identifying precautionary reference points for each stock, identifying in advance what measures will be adopted if reference points are exceeded, adopting cautious management for developing fisheries, monitoring impact on non-target species, and adopting emergency measures if continued fishing would increase the risk of depletion caused by a natural event. Freestone, *supra*, note 178.

[190] Fish Stocks Agreement, *supra* note 177 at Article 6, Annex II.

[191] *Id.* at Article XVIII.

[192] *Id.* at Art. VIII, 5.

[193]United Nations website. Available at http://www.un.org/Depts/los/convention_agreements/convention_overview_fish_stocks.htm. Last accessed 3 May 2007. Despite its many innovations, the Fish Stocks Agreement still suffers some of the limitations similar to other international fishery agreements such as the absence of major fishing nations and reliance on flag state enforcement. Eichenberg and Shapson, *supra* note 154 at 610.

global implementation of the Agreement. Informal consultations of states parties have met annually to continue review and oversight of the implementation of the agreement.[194]

The following is a summary of the provisions of the Straddling Stocks Agreement:

Management Goal: The management goal of the UN Agreement, expressed in Article 2, is "to ensure the long-term conservation and sustainable use" of straddling fish stocks and highly migratory fish stocks.

Precautionary Approach: Article 6 and Annex II describe the precautionary approach. The core of the precautionary approach is to act cautiously but expeditiously when information is "uncertain, unreliable, or inadequate," in the words of the UN Agreement. The UN Agreement describes a process for applying this approach that includes the following general features:

a) identifying precautionary reference points for each stock of fish;

b) identifying in advance management measures that will be adopted if reference points are exceeded;

c) adopting "cautious" management measures for developing fisheries, until information allows setting reference points;

d) monitoring the impact of fishing on non-target species and developing plans to conserve them;

e) adopting emergency measures if continued fishing would increase the risk of depletion caused by a natural event.

Compatibility of Measures: Article 7 requires compatibility between conservation measures on the high seas and those in the exclusive economic zones (EEZ) of coastal States. Among other considerations in determining compatibility, States are to take into account the biological unity of stocks and the distribution of the stocks, the fisheries, and the geography of the region. If compatible measures are not achieved, States are to use the procedures for dispute resolution identified in the UN Agreement.

Elements of Regional Agreements: According to Article 9, regional arrangements are to identify the stocks under management, the area of application, and the way in which a regional regime will obtain scientific advice.

Functions of Regional Regimes: Article 10 identifies 13 specific functions that may be summarized as follows:

- developing conservation measures in a timely manner;
- obtaining scientific advice;
- collecting, analyzing, and disseminating fisheries data;
- monitoring and enforcing conservation measures;
- insuring full cooperation of national agencies in implementation;
- identifying how new members will be accommodated; and
- promoting peaceful settlement of disputes.

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[194] See, e.g. resolutions, report of 2006 conference, ICSP5/UNFSA/REP/INF.1. 26 April 2006. Available at http://www.un.org/Depts/los/convention_agreements/fishstocksmeetings/icsp5report.pdf.

Transparency: Article 12 calls for transparency in decision making by regional regimes and for the participation of intergovernmental and nongovernmental organizations, subject to procedural rules that are not "unduly restrictive."

Membership: Article 17 calls upon State members of regional regimes to request that non-participating States join the regime and to take action to deter activities that undermine the effectiveness of regional conservation regimes.

Flag State Responsibilities: Article 18 enumerates eight obligations of flag States, including maintaining an accessible registry of vessels authorized to fish on the high seas, requirements for vessel and gear marking and for timely reporting of catch and other information, national inspection and observer schemes, and measures to insure transhipment at sea does not undermine conservation measures.

Enforcement: Article 19 enumerates five obligations of flag States in enforcing regional conservation measures. Articles 20-23 describe procedures by which Flag States and other States should collaborate in enforcing regional conservation measures, and provides authority for States to board fishing vessels of other States. Article 21 identifies eight specific activities that qualify as serious violations, including failing to maintain accurate records of catch, fishing in closed areas or seasons, or using prohibited fishing gear. Regional regimes may identify other serious violations.

Developing States: Articles 24-26 of the UN Agreement call for providing financial and technical assistance to developing States for management under the Agreement. Conservation measures are not to place an undue burden on developing States.

Dispute Resolution: Articles 27-32 call for States to settle disputes through peaceful means of their choice, and describe procedures for settling disputes.

Information Collection and Analysis: Article 14 describes five principal obligations of States for collecting and providing information and cooperating in scientific research. Annex I provides specific types of data that should be collected on fisheries and vessels, and describes obligations for frequent reporting by vessels, verification of data, and data exchange.

Other Obligations: Article 5 briefly describes 12 general tasks, some of which are described in greater detail elsewhere in the UN Agreement. Tasks that do not receive significant additional treatment in the UN Agreement include:

- Assess the impacts of fishing and other factors on target, associated, or dependent stocks;
- adopt measures to maintain or restore associated or dependent species above levels "at which their reproduction may become seriously threatened";
- minimize pollution, waste, discards, catch by lost or discarded gear, and bycatch;
- protect biodiversity;
- adopt measures to prevent or eliminate over-fishing and overcapitalization;
- consider the interests of artisanal and subsistence fishermen.

The U.N. Straddling Stocks Agreement has broken significant new ground in defining and refining what had heretofore been lip service to the “precautionary principle.” UNCLOS, the Code of Conduct and the U.N. Straddling Stocks Agreement all anticipate and recommend formation of regional organizations and agreements to carry out their provisions. Because the Code is voluntary, using existing regional regimes and organizations to promote conservation

measures is likely to be the most effective route. Some of the newer organizations created since the Straddling Stocks Agreement went into force go even beyond its groundbreaking provisions.

Finally, although each of the agreements calls for the "best available scientific evidence" as the basis for decision-making, in most cases the information is limited at best. Perhaps the first and most important task for promoting conservation would be to use the provisions of the agreements that promote data collection, information sharing, and scientific research.

The Straddling Stocks Agreement calls explicitly for work to assess the impacts of fishing and other factors on target, associated, or dependent stocks and for members to minimize bycatch and protect biodiversity. The Code of Conduct includes in its management objectives protecting biodiversity and endangered species and minimizing bycatch.

Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas

At the same time the FAO was developing the Code of Conduct for Responsible Fisheries, it was responding to growing concerns, highlighted during the Earth Summit, about incursions on coastal states' EEZs, confrontations between distant water fleets and coastal states, violations of fishing agreements, reflagging to avoid compliance with applicable rules, and general dissatisfaction with increasing fishing pressure on the high seas that was likely to affect stocks or fishing fleets in adjacent EEZs. In November 1993, the parties to the FAO Conference 27th Session adopted the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas.[195] They made clear that the provisions of the agreement were part of the Code, where the Compliance Agreement is referenced as one of the exceptions to the voluntary nature of the Code.[196]

The Compliance Agreement applies to all fishing vessels on the high seas, with a few exceptions for small vessels. Flag States are called upon to ensure that vessels flying their flag do not engage in activity that undermines the effectiveness of international conservation and management measures. The Agreement requires a party to authorize the use of its flag by fishing vessels, and parties may not authorize vessels unless they can exercise control over them, nor may they authorize vessels with previous compliance problems. Significantly, the authorization to fly the flag constitutes an authorization to fish on the high seas, and can be withdrawn: "Where a fishing vessel that has been authorized to be used for fishing on the high seas by a Party ceases to be entitled to fly the flag of that Party, the authorization to fish on the high seas shall be deemed to have been canceled."[197]

Parties are required to ensure that vessels are clearly marked, that they can be identified, and fulfill record keeping and information sharing obligations. Parties are required to take enforcement measures against vessels acting in contravention to the Agreement, and are urged to use serious sanctions, "of sufficient gravity as to be effective in securing compliance...and to deprive offenders of the benefits accruing from their illegal activities."[198]

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[195] Food and Agriculture Organization of the United Nations. Agreement To Promote Compliance with International Conservation and Management Measure by Fishing Vessels on the High Seas. 1993. (hereinafter Compliance Agreement)

[196] FAO Code of Conduct, *supra* note162 at Article I, 1.

[197] Compliance Agreement, *supra* note 54 at Art. III, 4.

[198] *Id.* at Art. III, 8.

Parties are directed to urge non-Parties to adopt consistent measures, and to exchange information about non-Parties whose activities undermine the effectiveness of international conservation and management measures.[199]

International Agreements Relating to Wildlife

The highly migratory nature of cetaceans and the need for multilateral cooperation to protect them was recognized as early as the 1940s. The treaties examined here include two that have provisions that may apply to cetaceans in addition to the International Convention for the Regulation of Whaling.

International Convention for the Regulation of Whaling (IWC)[200]

The International Whaling Commission (IWC) was established under the International Convention for the Regulation of Whaling of 1946. Currently, 71 nations including the United States are parties to the IWC. The purpose of the Convention is to provide for the proper conservation of whale stocks and the orderly development of the whaling industry. (Preamble)

The main duty of the IWC is to keep under review and revise as necessary the measures laid down in the Schedule to the Convention. These govern the whaling conduct of member nations throughout the world. These measures, among other things, provide for the complete protection of certain species; designate specified areas as whale sanctuaries; set limits on the numbers and size of whales which may be taken; prescribe open and closed seasons and areas for whaling; and prohibit the capture of suckling calves and female whales accompanied by calves. The compilation of catch reports and other statistical and biological records is also required.

In addition, the Commission encourages, co-ordinates and funds whale research, publishes the results of scientific research and promotes studies into related matters such as the humaneness of the killing operations.

The IWC currently operates a moratorium on commercial whaling, in force since 1986, although there are exceptions for aboriginal subsistence needs and scientific purposes and parties to the Convention may object to the operation of the moratorium (for example, Norway has entered such an objection and sets quotas for a commercial hunt of minke whales every year).

Small cetaceans occupy a precarious position within the IWC framework. The 1946 Convention does not define a 'whale', although a list of names in a number of languages of a dozen whales was annexed to the Final Act of the Convention. Some governments take the view that the IWC has the legal competence to regulate catches only of these named great whales. Others believe that all cetaceans, including the smaller dolphins and porpoises, also fall within IWC jurisdiction. It is agreed that the Scientific Committee can study and provide advice on the small cetaceans.

Consequently, to date there is no universal agreement on the competency of the IWC to regulate interactions with these animals. Nevertheless, the Scientific Committee has

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[199] *Id.* at Art. V, 1.

[200] International Convention for the Regulation of Whaling, Done at Washington, 2 November1946. 4 Bevans 248, TIAS 1849. For amendments to the schedule see Appendix B.

investigated many species and carried out major reviews of significant directed and incidental catches of small cetaceans, and the mortality of cetaceans in passive fishing nets and traps. The IWC does recognize the need for further international co-operation to conserve and rebuild depleted stocks of small cetaceans.

Each year the Scientific Committee, through its sub-committee on small cetaceans, identifies priority species/regions for consideration by a review. Topics considered include distribution, stock structure, abundance, seasonal movements, life history, ecology, and directed and incidental takes.

Since 1990 the IWC has adopted 17 resolutions directed at small cetaceans, specific small cetacean issues (e.g. baiji, vaquita, Dall's porpoise, striped dolphins and harbor porpoise), and small cetacean bycatch.[201]

Bonn Convention on Migratory Species of Wild Animals[202]

The Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention) seeks to conserve terrestrial, marine and avian migratory species throughout their range. It is an intergovernmental agreement concluded under the aegis of the United Nations Environment Program, concerned with the conservation of wildlife and habitats on a global scale. CMS acts as a framework Convention. Arrangements concluded under it may vary from legally binding treaties (called Agreements) to less formal instruments, such as Memoranda of Understanding, and can be adapted to the requirements of particular regions. The development of models tailored according to the conservation needs throughout the migratory range is a unique capacity of CMS.

The Convention was signed in Bonn on 23 June 1979, came into force on 1 November 1983, and since its membership has grown steadily to include 99 (as of 1December 2006) parties from Africa, Central and South America, Asia, Europe and Oceania (see Appendix B). The U.S. is not a signatory, but has signed a memorandum of understanding for Indian Ocean turtles, a less formal mechanism for meeting the goals of the agreement.

At the heart of the Convention lies the concept that wild animals constitute a common natural heritage for humankind, and should therefore be protected for the benefit of future generations. The CMS recognizes that "each generation of man holds the resources of the earth for future generations and has an obligation to ensure that this legacy is conserved and, where utilized, is used widely"(Preamble). Responsibility for this is vested in the individual States party, who are under an obligation to ensure that such species should be protected as they pass through their national jurisdictions (Article I).

To this end, Article II sets out the fundamental principles of the CMS, which are essentially two-fold:

Parties to the Convention must ensure that they take action specifically to protect those migratory species that are endangered, and those deemed to have an "unfavourable conservation status". This is not confined solely to guarding against the further depletion of the numbers of such species, but also to take individual or collective action to avoid the further degradation of their natural habitats.

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[201] http://www.iwcoffice.org/meetings/resolutions/resolutionmain.htm

[202] Convention on the Conservation of Migratory Species of Wild Animals. Done at Bonn 23 June 1979. 19 ILM 15 (1980).

Article II(2) creates a more general duty to take action to avoid ***any*** migratory species becoming endangered.

Under Article II(3), these aims are to be achieved by requiring the parties to promote, co-operate in and support research in relation to migratory species; endeavor to provide immediate protection for endangered migratory species; and endeavor to conclude agreements to allow for the conservation and management of migratory species classed as having an "unfavorable conservation status".

Migratory species threatened with extinction are listed on Appendix I of the Convention. CMS Parties strive towards strictly protecting these animals, conserving or restoring the places where they live, mitigating obstacles to migration, and controlling other factors that might endanger them. Besides establishing obligations for each State joining the Convention, CMS promotes concerted action among the Range States of many of these species. Additional protection is provided through Article III (5), which prohibits the taking of animals listed in Appendix I—this translates into an absolute ban on the hunting of any Appendix I species.[203]

There are currently six species of cetacean listed in Appendix I, namely the blue whale, humpback whale, bowhead whale, Northern right whale, Southern right whale and Franciscana.

Migratory species that need or would significantly benefit from international co-operation are listed in Appendix II of the Convention. For this reason, the Convention encourages the Range States to conclude global or regional Agreements to protect species listed in Appendix II of the Convention. There are thirty-three species of cetaceans currently listed in Appendix II.

With regard to cetaceans, Article V(4)(f) lays down specific requirements for Article IV(3) Agreements that have been concluded in respect of cetaceans. Under this provision, such agreements should: "at a minimum, prohibit, in relation to a migratory species of the Order Cetacea, any taking that is not permitted for that migratory species under any multilateral agreement and provide for accession to that Agreement by States that are not Range States of that migratory species".

The Agreements according to Article V(5) should include the review of the species' conservation status and coordinated conservation and management plans; research and the exchange of information; maintenance, restoration and protection of habitats; restriction of impediments to migration; co-operative action against illegal taking and emergency provisions to strengthen conservation measures. Although States party have concluded three Article IV(3) Agreements since the Bonn Convention came into force(17), none of these affect cetaceans.

Article IV(4) provides that States party "are encouraged to take action with a view to concluding agreements for any population or geographically separate part of the population of any species or lower taxon of wild animals, members of which periodically cross one or more national jurisdictional boundaries." Article IV(4) agreements are therefore wider and more general than Article IV(3) Agreements. Agreements formed under Article IV(4) are very different to the Agreements envisaged by Article IV(3). For instance, the scope of Article IV (4) Agreements encompasses a wide range of animals; Article IV(4) agreements do not apply to the restricted list of Appendix II species; and the definition of the type of animals subject to such an agreement is far wider than that of a "migratory species" for the purposes of the CMS.

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[203] Article III(5) is subject to exceptions, however, namely if the taking of such animals is for scientific purposes; to enhance the propagation or survival of the affected species (for example capture for breeding programs); to accommodate the needs of traditional subsistence users of such species; or if extraordinary circumstances so require.

To date eight Agreements have been concluded under Article IV(4) of the CMS, of which two are directly relevant to the issue of cetacean conservation. These are the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas, 1991 (ASCOBANS) and the Agreement on the Conservation of Cetaceans of the Mediterranean and Black Seas, 1996 (ACCOBAMS)(*See Sections 2.1.1 and 2.1.2*).

Convention on International Trade in Endangered Species

The Convention on International Trade in Endangered Species of Wild Fauna and Flora[204] (CITES) is a multilateral treaty regarding the export, import and transit of certain species of wild animals and plants. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. The goal of the convention is to prevent overexploitation of listed species whose survival is jeopardized. (Article II)

The convention on International Trade in Endangered Species entered into force July 1, 1975. As of December 2006, 169 nations, including the U.S., were parties. CITES is constructed to use Appendices that list species based on a set of criteria. Parties to CITES are not allowed to trade in species listed in the appendices of the Convention, except in accordance with the Convention. (Article II). Appendix I lists species threatened with extinction, (Article III) and Appendix II lists species that may become threatened with extinction unless trade is subject to regulation. (Article IV) Commercial trade is generally prohibited for Appendix I species, and requires both import and export permits. (Article III, 2) Commercial trade in Appendix II species requires an export permit verifying that trade will not be detrimental to the survival of the species. (Article IV, 2-6) "CITES allows the imposition of bans against the export of listed species to any signatory nation in order to diminish the economic incentives for continued taking" of the species.[205]

More than 20 cetaceans are listed on Appendix I of CITES, and Appendix II includes a zero annual export quota for live specimens from the Black Sea population of *Tursiops truncatus* removed from the wild and traded for primarily commercial purposes. Assessment of marine species has become a priority of the International Union for the Conservation of Nature (IUCN), which began a comprehensive regional assessment of marine species groups in 2006. The IUCN publishes the Red List of Threatened Species, which in 2006 included 65 cetaceans (both marine and freshwater).[206]

Other agreements on environment and wildlife that are not discussed here, but that may have relevance to protection of cetaceans, include the Convention on Biological Diversity, Agenda 21 Oceans Chapter, Convention on the Conservation of the Living Resources of the Southeast Atlantic,

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[204] Convention on International Trade in Endangered Species of Wild Fauna and Flora (Done at Washington 3 March 1973. Entered into force 1 July 1975. 27 UST 1087, TIAS 8249)

[205] Global Marine Biological Diversity: A strategy for Building Conservation into Diversity (Elliot A. Norse ed., 1993) at 209.

[206] IUCN http://www.iucn.org/themes/ssc/biodiversity_assessments/indexgmsa.htm. Last accessed 17 November 2006.

Regional Marine Mammal Agreements

Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS)[207]

As noted above, the thrust of the Convention on Migratory Species is to encourage member nations to conclude regional agreements under the umbrella convention that deal with specific problems. The First Meeting of the CMS Conference of the Parties held in 1985 initiated the development of ASCOBANS by passing a resolution urging CMS Parties to conclude an Agreement for two species of small cetaceans from the Baltic and North Sea: the bottlenosed dolphin (*Tursiops truncatus*) and the harbor porpoise (*Phocoena phocoena*). ASCOBANS was concluded on 13 September 1991 in Stockholm, Sweden, and entered into force on 29 March 1994. (The U.S. is neither a party to the agreement nor signatory to the MOU.)The Agreement applies to species initially considered, as well as all species, subspecies or populations of small cetaceans in the Baltic Sea and North Sea, with the exception of the Sperm whale (*Physeter macrocephalus*). The flagship species of the Agreement is the harbor porpoise.

The Agreement area covers the marine environment of 15 Range States, including the European Community, around the shores of the Baltic and North Seas. The Fourth Meeting of the Parties, held in Esbjerg, Denmark, in August 2003, agreed to extend the Agreement area farther west to cover parts of the North Atlantic and to incorporate waters adjacent to Ireland, Portugal and Spain. Once this amendment to the Agreement enters into force, the extension will close the gap for some species of small cetaceans between the Agreement areas of ASCOBANS and its sister agreement, the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS). (*See below*.)

The ASCOBANS includes a conservation and management plan that briefly describes the conservation, research and management measures that should be applied by the Parties. This plan foresees measures towards the mitigation of marine pollution and the reduction of bycatch, surveys and research about species ecology and population status and the establishment of an international database. Additionally, the plan further calls for Parties to adopt national laws to prohibit the intentional taking and killing of small cetaceans where such regulations are not already in force. General guidelines on public awareness and participation are also included in the plan.

The first major study of small cetaceans in this area took place in 1994, after ASCOBANS came into force, when scientists from the Sea Mammal Research Unit at St. Andrews University launched the SCANS project.[208] SCANS identified nine species of small cetaceans resident within the Convention area[209] (along with four species of whales), and identified three main threats to their survival: bycatch, pollution and environmental change.

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[207] Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas ASCOBANS entered into force in 1994.

[208] Hammond PS, Benke H, Berggren P, Borchers DL, Buckland ST, Collet A, Heide-Jørgensen M-P, Heimlich-Boran S, Hiby AR, Leopold MP, Øien N, 1995a. Distribution and abundance of harbour porpoises and other small cetaceans in the North Sea and adjacent waters. Life, LIFE 92-2/UK/027, European Community LIFE Programme; 242 pp. See also Hammond PS, Heimlich-Boran S, Benke H, Berggren P, Collet A, Heide-Jørgensen MP, Leopold MP, 1995b. The distribution and abundance of harbour porpoises and other small cetaceans in the North Sea and adjacent waters. (SC/47/SM30). (unpublished); 21.

[209] Namely the Harbour porpoise, Bottlenose dolphin, White-beaked dolphin, Atlantic white-sided dolphin, Common dolphin, Striped dolphin, Long-finned pilot whale, Risso's dolphin and Killer whale.

ASCOBANS conservation and management plan prescribes, in general terms, the measures that parties are to introduce. The conservation and management plan is in five parts and States must:

- Introduce conservation and management measures that strive to: prevent the release of substances that constitute a potential threat to small cetaceans, modify fishing gear to reduce bycatch, and prevent fishing apparatus from becoming a hazard to cetaceans, regulate activities affecting food sources and preventing other types of disturbance – especially of an acoustic nature.
- Cooperate in research activities to assess the status and movements of populations, locate areas of special importance to their survival and to identify present and potential threats to small cetaceans.
- Endeavor to establish an effective reporting system for bycatch and strandings.
- Endeavor to establish under national law a prohibition on taking and killing small cetaceans, supported by an obligation to immediately release any animals that have been caught.
- Provide information to the general public to encourage the reporting of sightings and strandings, and to encourage fishermen to report any bycatch of small cetaceans.

The conservation and management plan is implemented through a series of specific Resolutions passed during the Meetings of the Parties. The following resolutions contain measures to reduce bycatch.

- ***The Resolution on the Implementation of the Conservation and Management Plan*** called for Parties to establish an independent observer scheme to assess bycatch, conduct research into feeding habits, and set up a sightings survey for the harbor porpoise population in the Baltic Sea.
- ***The Resolution on the Incidental Take of Small Cetaceans*** set as the immediate short-term objective of the Agreement, to restore or maintain stocks to 80 percent of the carrying capacity, with a view to eventually preventing *all* anthropogenic removals. In the interim, it established a maximum allowable bycatch level at 2 percent of the population abundance estimate, with the possibility that this would be reduced if the population were severely depleted.
- ***Resolution on the Incidental Take of Small Cetaceans 2000*** reduced the bycatch limit for the harbor porpoise to 1.7 percent, with a view towards a further reduction. It also stated that the ultimate goal of ASCOBANS is the reduction of bycatch to less than 1 percent of the best population estimate, in line with the IWC guidelines.
- ***The Jastarnia Plan***, a recovery plan for the depleted harbor porpoise stocks within the convention area establishes guidelines to assist in the recovery of harbor porpoise.

Agreement on the Conservation of Cetaceans of the Black Sea, and the Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)[210]

CMS adopted a regional approach for cetacean conservation in the Mediterranean and Black Seas.[211] ACCOBAMS, concluded in 1996 and entered into force on 1 June 2001, binds the countries of two sub-regions to work together on an environmental problem of common concern. ACCOBAMS covers an area that includes the Black Sea, Mediterranean Sea and the Atlantic coasts of North Morocco and South Portugal. The Agreement area includes 28 Range States. ACCOBAMS covers large and small cetaceans and applies to all cetaceans that have a range that lies entirely or partly within the Agreement area or that accidentally or occasionally frequent the Agreement area.[212] Species covered include the harbor porpoise, striped dolphin, short-beaked common dolphin, false killer whale, killer whale, long-finned pilot whale, Blainville's beaked whale, Cuvier's beaked whale, sperm whale, dwarf sperm whale, Northern right whale, minke whale, sei whale, fin whale and humpback whale.[213]

The Agreement aims to reduce threats to all cetaceans in these waters and to promote closer cooperation amongst Parties with a view to conserving all cetacean species present in the area. ACCOBAMS calls also on its members to enforce legislation to prevent the deliberate taking of cetaceans in fisheries by vessels under their flag or within their jurisdiction, and to minimize incidental catches.

ACCOBAMS' objectives, set out in Article II, state: "Parties shall take coordinated measures to achieve and maintain a favorable conservation status for cetaceans. To this end, Parties shall prohibit and take all necessary measures to eliminate…any deliberate taking of cetaceans and shall co-operate to create and maintain a network of specially protected areas to conserve cetaceans."[214]

Additionally, annexed to the Agreement is a comprehensive conservation plan in Article II (3) that covers six substantive areas:

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[210] Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area. ACCOBAMS entered into force in 2001

[211] The Action Plan for the Conservation of Cetaceans in the Mediterranean Sea was developed, within the framework of the Mediterranean Action Plan, following concerns about the status of cetaceans in the region. The Action Plan was adopted at the seventh Ordinary Meeting of the Parties of the Barcelona Convention, in Cairo, in October 1991. The main objectives of the Action Plan were the protection and conservation of cetacean habitats, including feeding, breeding and calving grounds; and the protection, conservation and recovery of cetacean populations in the Mediterranean Sea Area. Within these two broad objectives, a number of general priorities were recommended, including: prohibition of deliberate taking; prevention and elimination of pollution; elimination of incidental catches in fishing gear; prevention of over-exploitation of fishery resources; protection of feeding, breeding and calving grounds; monitoring, research and data collection and dissemination with regard to biology, behavior, range and habitats of cetaceans; and educational activities aimed at the public at large and fishermen. Although the Action Plan remains an instrument of reference for the Mediterranean coastal States, it is of limited relevance now and has in any case effectively been superseded by the 1996 ACCOBAMS Agreement.

[212] Article I(2).

[213] Defined as "animals, including individuals, of those species, subspecies or populations of Odontoceti and Mysticeti".

[214] Article II(1).

1. *The adoption and enforcement of national legislation.* Parties are to develop and implement measures to minimize the effects of fisheries activities on cetaceans, with a specific ban on the use of driftnets more than 2.5km in length; to introduce regulations to prevent discarded fishing gear becoming a hazard; to conduct impact assessment on activities affecting cetaceans and cetacean-watching; to regulate the discharge of pollutants and to endeavor to strengthen or create institutions to further implement the Agreement.
2. *Assessment and management of human-cetacean interactions.* Parties are required to co-operate in the collection of data and research into activities like fishing, tourism, industry and pollution.
3. *Habitat protection.* Parties must "endeavor to establish and manage specifically protected areas" relating to cetacean feeding grounds and habitats, which should be designated as protected under the framework of the Convention for the Protection of the Mediterranean Sea Against Pollution 1976.
4. *Research and monitoring.* Parties are to take coordinated action to monitor the status and trends in cetacean populations, especially for those species for which there is little scientific data currently available; determine migration routes, feeding and hunting areas to identify localities in which human activities may need to be restricted; evaluate the feeding requirements of cetaceans and adapt fishing activities accordingly; develop research programs for sick and wounded animals and develop passive acoustic techniques to monitor cetacean populations.
5. *Capacity building, collection and dissemination of information, training and education.*. Parties are to co-operate in order to, *inter alia*, develop data collection schemes; prepare lists of national bodies with expertise in cetaceans; list the current and potential protected areas; compile a directory of applicable national and international laws; develop information-sharing initiatives on a sub-regional level; improve public awareness of cetacean issues and develop training programs for cetacean management.
6. *Responses to emergency situations.* Parties are to co-operate whenever possible and necessary to develop and implement emergency measures "when exceptionally unfavorable or endangering conditions occur". In particular they must prepare for an unexpected danger to cetaceans in the area, such as a major pollution incident; evaluate their capacity to rescue sick and wounded animals and prepare codes of practice. The parties may also receive advice from their relevant Co-ordination unit to develop mechanisms to give rapid protection to especially vulnerable cetacean populations should an emergency situation arise.

ACCOBAMS has committed to investigating competitive interactions between dolphins and fisheries; creating a by-catch database; developing pilot conservation and management actions for areas containing critical habitats for cetaceans; developing methods for evaluating habitat degradation; developing conservation plans for cetaceans of the Black Sea and for certain species in the Mediterranean Sea; conducting a survey of sperm whale populations in the Mediterranean; identifying sites of conservation importance for whales in the Mediterranean; and developing training and education schemes.

The International Sanctuary for Mediterranean Mammals

The Sanctuary was created by a tripartite agreement between the Governments of France, Italy and Monaco to mitigate the threats to cetaceans from bycatch (especially from the

increased use of driftnets), maritime traffic or urbanization and industrialization of coastal areas. The Agreement was signed on 25 November 1999 in Rome and entered into force in February 2002.

The agreement forming the Sanctuary coordinates the concerted actions taken by the three countries within the ACCOBAMS Agreement area. To ensure that all Mediterranean countries respect its objectives, the Sanctuary has been designated a Specially Protected Area of Mediterranean Importance under a protocol of the Barcelona Convention. The Sanctuary covers the Tyrrheneo-Corsican-Provencal part of the Mediterranean Sea and includes both littoral and pelagic waters.

Agreement on the International Dolphin Conservation Program (AIDCP)

The Agreement on the International Dolphin Conservation Program was signed in Washington on 15 May 1998 and entered into force on 15 February 1999, following ratification by four States, as required: Ecuador, Mexico, Panama, and the United States. To a large extent the agreement is simply a formalization of two earlier voluntary agreements (the La Jolla Agreement and the Panama Declaration). However, the 1998 agreement developed, extended and formalized the earlier agreements.

The purpose of the AIDCP is to ensure the long-term sustainability of tuna stocks in the eastern Pacific Ocean, as well as living marine resources related to the tuna fisheries; to seek ecologically sound means of capturing large yellowfin tunas not in association with dolphin; progressively reduce the incidental dolphin mortalities in the tuna fishery of the eastern Pacific Ocean to levels approaching zero; and to avoid, reduce and minimize the incidental catch and the discard of juvenile tuna and the incidental catch of non-target species, taking into consideration the interrelationship among species in the ecosystem. [Preamble, Article II].

The Agreement applies to typical dolphins (family *Delphinidae*) associated with the yellowfin tuna fishery in the Agreement Area. [Article I(1) and (2)] In practice, the principal species concerned are spotted and, to a lesser extent, common and spinner dolphins, although other species, including striped and bottlenose dolphins, are also relevant. The convention area included The Eastern Pacific Ocean, specifically as bounded by the coastline of North, Central, and South America and by the following lines: (a) The 40°N parallel from the coast of North America to its intersection with the 150°W meridian; (b) the 150°W meridian to its intersection with the 40°S parallel; and (c) the 40°S parallel to its intersection with the coast of South America. [Article III, Annex I].

A system of dolphin mortality limits (DMLs) is the principal means by which dolphin mortality is reduced under the agreement. These work by setting a basic objective of limiting total incidental dolphin mortality in the purse seine tuna fishery to no more than 5,000 individuals annually and using the basic approach of allocating DMLs to vessels. The Agreement establishes per-stock per-year dolphin mortality caps with the objective of achieving a limit of 0.1 percent of the minimum estimated abundance of stocks (Nmin) from the year 2001 onwards (an objective which was achieved). The Agreement contains various provisions which require parties to manage their DMLs in a responsible manner and provides for the reallocation of DMLs that have either not been used or have been forfeited during a particular year because of irresponsible use.

In addition to the DML system, the Agreement includes provisions for the establishment of a system that provides incentives to vessel captains to continue to reduce incidental dolphin mortality, with the goal of eliminating mortality; the establishment and implementation of a system for the tracking and verification of tuna harvested with and without mortality or serious

injury of dolphins; the exchange of scientific research data collected by the parties pursuant to the Agreement on a full and timely basis; and the conduct of research for the purpose of seeking ecologically sound means of capturing large yellowfin tuna not in association with dolphins.

The Protocol Concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (SPAW)

The SPAW Protocol's purpose is to protect the marine environment of the Gulf of Mexico and Caribbean Sea, including the areas surrounding the U.S. mainland off the coast of Florida and the Gulf States and territories in the Caribbean region. This Protocol is an outgrowth of the Cartagena Convention, and is one of three Protocols called for by and developed under the Cartagena Convention. The Convention establishes general legal obligations for the protection and preservation of the marine environment of the Caribbean region. Geographically, it covers the marine environment of the Gulf of Mexico, the Caribbean Sea and areas primarily within 200 nautical miles of the Atlantic coasts of 20 countries and island territories. Twenty-eight countries of the Wider Caribbean Region are eligible to become Parties to the Cartagena Convention and its Protocols. Currently, 12 countries are Parties to the SPAW Protocol, while five others are non-Party Signatories.

The SPAW Protocol also encompasses internal waters extending up to the fresh water limit, and any related terrestrial areas (including watersheds) that a party may wish to designate. It requires parties to establish protected areas and to take specified protection and management measures therein, as necessary and appropriate to carry out the provisions of the Protocol, and in conformity with national laws and regulations and international law.

The United States ratified the SPAW Protocol on April 16, 2003, with two reservations and an understanding along with ratification. One of the reservations is needed to ensure that our application of Article 11 of the Protocol is consistent with provisions of the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA) that allow for the limited taking of species listed in Annex I and II for the purpose of public display, scientific research, rescue and rehabilitation, or as incidental catch related to fishing operations. The second reservation is to Article 13, which could be interpreted to require environmental assessments for non-Federal activities not covered by the National Environmental Policy Act of 1969, as amended (NEPA). The Understanding would state that the provisions of the Protocol do not apply to non-native species. There are three Annexes that contain the lists of 481 endangered and threatened species of flora and fauna covered by Article 11 of the Protocol. The United States notified the depositary that the Protocol will not apply to six species of fauna and flora that do not require the protection provided by the Protocol in U.S. territory. It is envisioned that the Annexes will be treated separately as an Executive Agreement.[215]

Discussion of Regional Marine Mammal Agreements

The regional agreements relating to cetacean conservation are still very much in their infancy, but it is clear that ACCOBAMS is the superior instrument, in terms of both its scope and its potential for establishing strong and workable conservation measures in relation to cetaceans. Similarly, the U.N. Straddling Stocks Agreement and the conventions and RFMOs that have been created in its model provide the most precautionary, transparent, mandatory

[215] http://www.state.gov/g/oes/rls/rm/2002/9991pf.htm

frameworks. These agreements even provide mechanisms for coastal states to enforce regulations against fishing nations, a tool that gets around the historic weakness of consensual international agreements that have depended on flag state enforcement against its own vessels.

To date, the various ASCOBANS initiatives have proved largely ineffective, with few parties willing to adopt specific national measures to enforce these principles. One possible reason for ASCOBANS weaknesses may be that it was the first agreement of its type to deal with issues of cetacean management. As such, it may be experimental, and its limitations may act to guide the development of future agreements. Nevertheless, imperfect as it is, ASCOBANS should be commended for introducing a new tier of protection for small cetaceans, whose status under international law is vulnerable given the controversy surrounding the IWC's competence to regulate small cetaceans.

ACCOBAMS uses more prescriptive terms, imposes strong obligations on states to conserve *all* cetaceans in this area, requires the use of the precautionary principle, and works to acquire necessary scientific data about cetaceans in these waters. The initial implementation of the ACCOBAMS conservation plan shows a clear determination to introduce effective conservation measures within the convention area. In particular it has established clear and workable targets for bycatch reduction. ACCOBAMS will need to develop effective sanctions to deter noncompliance, especially with regard to fishing regulations where a number of range states have an alarming track record of noncompliance.[216]

As for the future of regional cooperation in relation to the conservation and management of cetaceans, there is cause for tentative optimism. There have been some initial moves toward creation of a similar agreement for small cetaceans in West Africa, although this is a long way from becoming a reality. While the agreements do have the potential to prescribe far-reaching measures, much will depend upon the enthusiasm of the other range states that have yet to join; the current climate of indifference, however, does not auger well for this. Likewise, the expansion of the regional agreements into contiguous areas also looks unlikely, given the current attitudes of Iceland, Greenland, and the Faroe Islands in relation to the exploitation of cetaceans.

One eventual goal for the agreements is that they will form an interlocking series of regional initiatives to protect species of cetaceans around the planet. While there are undoubtedly localities in which the conditions for future expansion are favorable, such as Australasia and parts of South America, real questions remain about whether such Agreements may be concluded in the areas where they are most needed. There are currently moves under the auspices of the Bonn Convention to conclude an agreement for small cetaceans and sirenians in central and West Africa[217] and also for small cetaceans and dugongs of Southeast Asia.[218] At present, regional action would appear to be most needed in Asia where river dolphins are critically endangered, although the range states remain lukewarm to the idea of implementing conservatory measures for small cetaceans in particular. With populations of these animals now feared to have fallen to the low hundreds, the formation of a tessellating system of global minimum standards is arguably now more pressing than ever.

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[216] "Sustaining Small Cetaceans: A Preliminary Evaluation of the ASCOBANS and ACCOBAMS Agreements" in Alan Boyle and David Freestone (eds.) *International Law and Sustainable Development*, (Oxford University Press, 1999) at 233, cited in, The conservation and management of small cetaceans in Europe: an analysis of the ASCOBANS and ACCOBAMS Agreements. Available online at **h**ttp://www.derechomaritimo.info/pagina.

[217] Recommendation 7.3 adopted by the Conference of the Parties at its Seventh Meeting in September 2002.

[218] Recommendation 7.4, adopted at the same meeting.

International Agreements Related to the Marine Environment

UN Resolution Prohibiting Large-Scale Pelagic Driftnet Fishing[219]

Large scale, high seas driftnets were recognized in the 1980's as a significant cause of incidental take of marine mammals, birds, turtles, and non-target fish species. This gear was banned internationally by United Nations resolutions in 1989, 1990 and 1991.[220]

Until they were outlawed, driftnets were used in the North Pacific and on the high seas where single vessels were capable of deploying driftnets ranging from up to 40 miles in length. In the North Pacific in the years from 1976 to 1989, 2 million miles (3.2 million km) of net were set per season.[221] With more than enough netting to encircle the earth set each night, not only were target fish caught (squid, tuna, and billfish) but approximately 100,000 dolphins and porpoises, hundreds of thousands of seabirds, sharks, sea turtles and salmon were also caught. (The Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean significantly reduced pelagic driftnet fishing and is discussed below in the section on regional fishery agreements.)

Although the driftnet fleet operated under requirements set by a multi-national agreement relating to salmon fishing, that agreement did not address incidental take of birds and marine mammals.[222] Additionally, the fleets were frequently found by U.S. enforcement to be catching salmon and steelhead in violation of the provisions of the governing treaty. In 1987, due to continued compliance problems with the Japanese, Koreans and Taiwanese, the U.S. Congress passed the Driftnet Impact Monitoring, Assessment, and Control Act, (Driftnet Act) calling for negotiations with the nations driftnetting in the North Pacific to establish monitoring and enforcement agreements by June 29, 1989.[223] If these nations refused to come to the bargaining table, they risked trade sanctions. The Driftnet Act required further research into the nature and extent of driftnet fishing to facilitate the development of effective solutions to the problem.[224]

The Driftnet Act also addressed the control of driftnet debris. Congress assigned the Secretary of Commerce with three responsibilities: establishment of controls for marking, registry, and identification of foreign driftnets so that the original vessel can be identified if their gear is lost, abandoned, or discarded; development of alternative materials for making driftnets "for the purpose of increasing the rate of decomposition," and the implementation of a bounty

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[219] United Nations General Assembly Resolution 45/197 on Large Scale Pelagic Driftnet Fishing and Its Impact on the Living Marine Resources of the World's Oceans and Seas, New York, 1990. 21 December 1990. Took effect in 1992. Report: A/46/645/ADD.6.

[220] UN Resolution A/RES/45/197, 21 December 1990. See also, UN Resolution A/RES/44/225, 22 December 1989.

[221] Simon P. Northridge with the United Nations Environment Programme. "Driftnet fisheries and their impacts on non-target species; a worldwide review." FAO 1991.

[222] Pacific Salmon Treaty, March 18, 1985, U.S.-Can., 99 Stat. 7.

[223] 16 U.S.C.A. § 1822.

[224] 16 U.S.C.A. § 1826 (f) relating to 22 U.S.C.A. § 1978 authorizing, *inter alia*, the banning of the import of fish products from offending nations.

system, so that people who find, retrieve, and return to the Secretary of Commerce lost, abandoned, or discarded driftnets and other plastic fishing materials may receive payment.[225]

Driftnetting had also become a major concern in the South Pacific. After several nations had banned driftnet fishing in their waters, 20 nations in the South Pacific negotiated and signed the Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific (the Wellington Convention).[226] This Convention endorsed a ban on driftnets as of May 1991, prevented the violators from crossing their waters, and denied access to food, fuel and facilities of the signing nations. The Wellington Convention set the stage for international efforts to end driftnetting.

On December 22, 1989, the United Nations General Assembly passed Resolution 44/225, promoted by the U.S. and New Zealand, calling for an end to driftnetting by June 30, 1992, and an end in the South Pacific by 1991.[227]

Although Resolution 44/225 is non-binding under international law, its strength lies in the fact that it demonstrates a global consensus on the issue. However, it does not carry any sanctions or mechanisms for monitoring driftnet operations.

Throughout early 1990 conflicts continued between driftnet fishing nations and nations opposed to the practice. Reports surfaced of the introduction of driftnets into new areas such as the Caribbean. In December of that year the United Nations passed Resolution 45/197 restating concern about the practice of driftnetting and calling for a report on driftnetting.[228]

In June 1991, the observer data from two previous years of driftnetting were compiled and experts met in British Columbia to discuss the results. The numbers confirmed fears of massive numbers of marine mammals, sea birds, and non-target fish being killed by the driftnet fishery. Armed with the new data, the United States submitted a report to the UN condemning the use of large-scale pelagic driftnets, and soon thereafter introduced a resolution mandating a ban on their use by June 1992. Japan introduced a resolution to study the problem further, again suggesting that there may be 'effective management measures' available to continue the fishery. December 20, 1991 the UN General Assembly passed Resolution 46/215, which stated, without exceptions, that large-scale high seas driftnetting end by 1992.[229] The December 31, 1992 deadline affects the high seas of the world's oceans and seas, including enclosed seas and semi enclosed seas. It should be noted, though, that much driftnetting continues, within EEZs, in many nations including the U.S.

The UN reaffirmed its stance on driftnets in 1995, particularly in the context of unauthorized fishing in national zones, the effects of driftnets on bycatch mortality, and the adoption of the Code of Responsible Fishing, as the General Assembly again passed a driftnet resolution. The resolution reaffirms the global moratorium on high seas driftnet fishing, urges nations to take greater enforcement responsibility and to impose sanctions, refers to the Compliance

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[225] 16 U.S.C.A. § 1822 note, PL 100-220, 1987 HR 3674 Sec 4007 (b), (c).

[226] The Wellington Convention done at Wellington, New Zealand. 17 May 1991. Available at http://www.oceanlaw.net/texts/summaries/wellington.htm. Last visited 3 May 2007.

[227] UN Resolution A/RES/44/225, 22 December 1989.

[228] UN Resolution A/RES/45/197, 21 December 1990.

[229] UN Resolution A/RES/46/215, 31 December 1992

Agreement and states' responsibilities under that convention, and makes a high priority of improvement of monitoring and enforcement.[230]

Convention on the Conservation of Antarctic Marine Living Resources

The principal instrument for management of fisheries in the Southern Ocean is the 1980 Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR).[231] By the time it came into force, CCAMLR had inherited significantly damaged fish stocks—12 of 13 assessed fish stocks were considered depleted.[232] The convention was established mainly in response to concerns that an increase in krill catches in the Southern Ocean could have a serious effect on populations of krill and other marine life; particularly on birds, seals, whales, and fish, which mainly depend on krill for food.

Current members of the Commission are Argentina, Australia, Belgium, Brazil, Chile, the European Union, France, Germany, India, Italy, Japan, Namibia, Republic of Korea, Norway, New Zealand, Poland, Russian Federation, South Africa, Spain, Sweden, Ukraine, United Kingdom, United States, and Uruguay. Bulgaria, Canada, Cook Islands, Finland, Greece, Mauritius, Netherlands, Peru, and Vanuatu have acceded to the convention, so are parties, but not members of the commission.

The purpose of CCAMLR is to ensure conservation of Antarctic marine living resources in the high seas within the area south of 60° S latitude and the Antarctic Convergence.[233] Unlike most other conventions on fisheries, in Article II CCAMLR defines rational use to mean use in accordance with these conservation principles:

- Prevention of decreases in the size of any harvested population to levels below those which ensure stable recruitment;
- Maintenance of ecological relationships among harvested, dependent, and related populations of Antarctic marine living resources and the restoration of depleted populations;
- Prevention of changes or minimization of the risk of changes in the marine ecosystems that are not potentially reversible over two to three decades.[234]

A Commission coordinates research, gathers and analyzes catch and effort statistics, identifies and evaluates conservation measures, adopts conservation measures based on the best scientific evidence, and implements observer and inspection programs.[235] The Commission, not states parties, places observers on fishing vessels. Commission membership is open to the original participants in the negotiations, and countries who have acceded to the

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[230] UN Resolution A/RES/50/25, 4 Jan 1996.

[231] CCAMLR, *supra note* 142.

[232] Kwame Mfodwo, Summaries and evaluations of selected regional fisheries management regimes. Prepared for the Pew Charitable Trusts. Unpublished manuscript. February 1998 (transcript available with the author).

[233] CCAMLR, *supra* note 142 at Article I, II.

[234] *Id.* at Article II (3).

[235] *Id.* at Article X.

convention, upon approval of an application and indication of its willingness to abide by conservation measures that are in force under the convention.[236]

The Commission may designate open and closed seasons, quotas, and regulate gear.[237] Decisions on matters of substance require a consensus. Observers from non-member countries and non-governmental organizations may attend most meetings with few restrictions, and may submit reports and views.

The Antarctic Scientific Committee includes representatives from countries that are members of the Commission. The Committee regularly assesses the status and trends of Antarctic marine living resources, the effectiveness of conservation measures, and has established programs such as developing precautionary measures for krill exploitation, ecosystem monitoring, and acquiring catch and effort data.[238]

In design, CCAMLR is considered one of the most advanced of fisheries conservation regimes in the world.[239] The treaty is consistent in many respects with the UN Agreement on Straddling Stocks. Besides a conservation-based management goal, the treaty also includes significant elements of the precautionary approach, including conservation controls over exploratory and new fisheries.[240] CCAMLR's observer and inspection programs are considered among the most developed in international fisheries management organizations. For example, members may board vessels of other members for the purposes of inspection; if a breach of CCAMLR rules is detected, the flag state must inform CCAMLR of the action it has taken against the offender.[241] CCAMLR also requires flag states to maintain an accessible registry of vessels, to insure that vessels are properly marked, and to report catch and other information in a timely fashion.[242]

CCAMLR has focused significant effort on the assessment and avoidance of incidental mortality of Antarctic marine mammals in commercial fisheries. However, the priority has been the reduction of seabird bycatch in longline fisheries, through establishment of the Ad hoc Working Group on Incidental Mortality Associated with Fishing.[243] As part of its continued efforts to minimize seabird mortality in longline fisheries, in 1996 CCAMLR published an educational book for fishers that promotes practical ways in which longline fishers can reduce incidental catches of seabirds in bottom longline operations.[244] The publication includes the CCAMLR conservation measures that establish seabird bycatch mitigation measures for longline fisheries. To date CCAMLR has not adopted bycatch mitigation strategies for small cetaceans.

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[236] CCAMLR. Website at http://www.ccamlr.org. Last updated May 2006. Accessed 3 May 2007.

[237] *Id.* at Article IX(2).

[238] *Id.* at Articles XIV, XV.

[239] Mfodwo, *supra* note 222.

[240] CCAMLR, s*upra* note 142 at Article IX.

[241] *Id.* at Article XXIV.

[242] *Id.* at Article XX.

[243] CCAMLR. Website at WG-IMAF. Accessed 15 March 2007.

[244]CCAMLR. Website at Fish the Sea, Not the Sky. Accessed 15 March 2007.

Regional Agreements Related to the Marine Environment

South Pacific Regional Environment Program (SPREP) Agreement

SPREP, a regional organization established by the governments and administrations of the Pacific region, has existed for more than twenty years to protect and improve the South Pacific environment and to ensure sustainable development in that region. It has grown from a small program attached to the South Pacific Commission (SPC) in the 1980s into the Pacific region's major intergovernmental organization charged with protecting and managing the environment and natural resources. The U.S. territories of American Samoa, Guam and the Commonwealth of the Northern Mariana Islands, are located within the SPREP region. The State of Hawaii is also closely linked to the Pacific basin by geography, history, economics and politics. SPREP provides for increased cooperation among the United States, Australia, New Zealand, France and twenty-one island States and territories of the South Pacific region in addressing issues affecting the environment and development in the region.

SPREP's mandate is to promote cooperation in the Pacific islands region and to provide assistance in order to protect and improve the environment and to ensure sustainable development for present and future generations. SPREP's focus is on sustaining Pacific islands ecosystems.

In the Solomon Islands, locals hunt dolphins long-snouted oceanic forms, including spinner, pan-tropical spotted, striped, common and rough-toothed dolphins, along with false killer whales and other small cetaceans. The animals are herded into confined bays where they are killed, with the primary objective of obtaining their teeth and meat. Dolphin teeth have long served as currency throughout Malaita and Makira. They are also woven into collars or headbands used in blood bounties. Dolphins are also harvested for the aquarium trade. Dolphins are also captured in the Solomons for traditional shell money and there is the issue of by catch in fishing fleets. At the moment SPREP has no specific requirements for bycatch reduction.

Regional Fishery Management Organizations

Commission for the Conservation of Antarctic Marine Living Resources
Commission for the Conservation of Southern Bluefin Tuna
Commission for Inland Fisheries of Latin America (FAO)
Fishery Committee for the Eastern Central Atlantic
Forum Fisheries Agency
General Fisheries Commission for the Mediterranean
Indian Ocean Tuna Commission
Inter-American Tropical Tuna Commission
International Baltic Sea Fishery Commission
International Commission for the Conservation of Atlantic Tunas
International Pacific Halibut Commission
North Atlantic Salmon Conservation Organization
Northeast Atlantic Fisheries Commission
Northwest Atlantic Fisheries Organization
North Atlantic Salmon Conservation Organization
North East Atlantic Fisheries Commission
North Pacific Anadromous Fish Commission
Pacific Salmon Commission
Latin American Fisheries Development Organization
South Pacific Permanent Commission
Southeast Asian Fisheries Development Center
Southeast Atlantic Fisheries Organization
Southwest Indian Ocean Fisheries Commission
Secretariat of the Pacific Community
Western Central Atlantic Fishery Commission
Western and Central Pacific Fisheries Convention

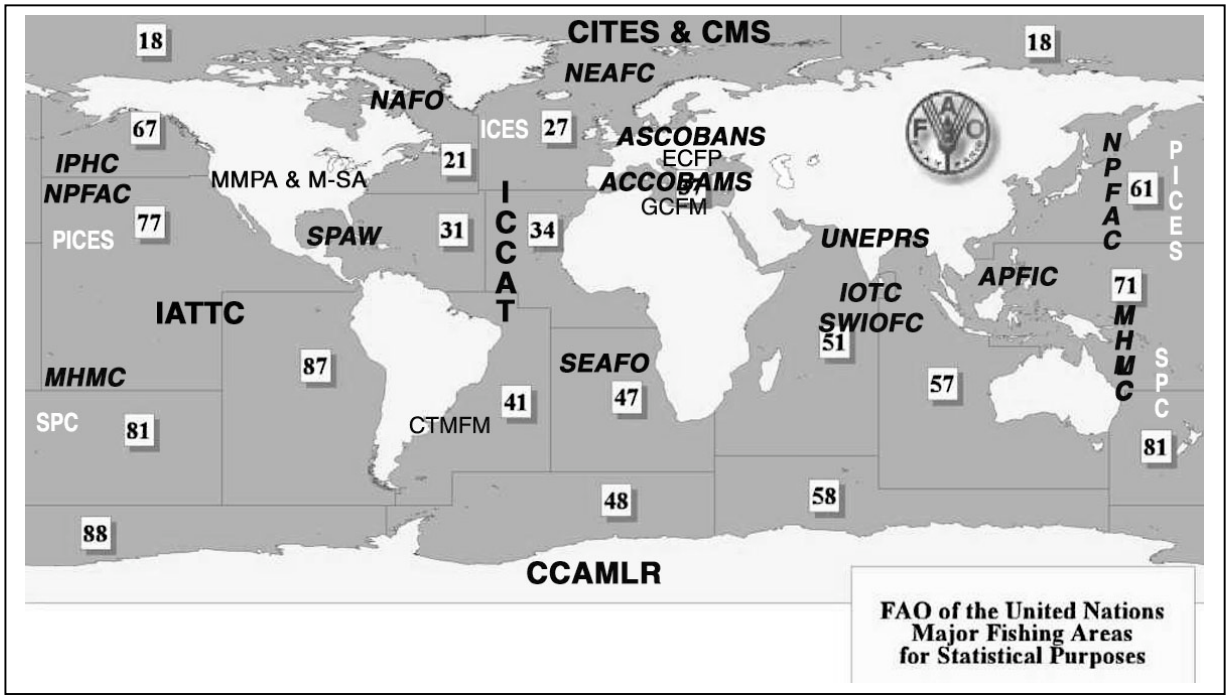
Regional Fisheries Agreements Having Potential to Address Bycatch

Although regional fishery management organizations have existed since the 1940s and earlier, their importance has increased significantly with the adoption of treaties such as the Straddling Fish Stocks Agreement, which call for creation of such bodies. In its Oceans Atlas, FAO editors point out that "under existing international law, and within the current paradigm for the governance of high seas fisheries to regulate straddling, highly migratory and high seas fish

stocks, [Regional Fishery Management Organizations] provide the only realistic mechanism for the enhanced international cooperation in their conservation and management."[245] Specific regional agreements that may have potential to address cetacean bycatch are discussed in Chapter 5. The box lists regional fishery management organizations recognized by the FAO.

As of late 2006, there were 44 regional fishery bodies including RFMOs, advisory bodies and scientific bodies. These organizations have, among other responsibilities, collecting and distributing fishery statistics, stock assessment, setting catch quotas, limiting vessels allowed in the fishery, regulating gear, allocation, research oversight, monitoring and enforcement.[246] Figure 5 shows areas where RFMOs operate.

Figure 5. Map of RFMO Areas of Operation



Although the implementation of many of the regional agreements hinges upon the effectiveness of the relevant RFMO, the success of these organizations has been the exception rather than the rule. The RFMOs are only as strong as the members make them, and rely on flag state enforcement of their provisions. Criticisms and shortcomings of these bodies include inconsistent authority, failure by key fishing interests to join the RFMO or abide by its rules, illegal, unreported and unregulated fishing, lack of equity and disparate interests between developed states and developing states, conflicts of interest among parties, lack of funding and lack of political will.[247]

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[245] Regional Fishery Organizations, Oceans Atlas USES: Fisheries and Aquaculture. http://www.oceansatlas.com/servlet/CDSServlet?status=ND0yOTQ, updated 25 Aug. 2000, accessed 8 May 2006).

[246] Devaney, P.L. Regional Fisheries Management Organizations: Bringing Order to Disorder, in, Papers on International Environmental Negotiation Vol. XIV, L.E. Susskind and W.R. Moomaw, eds. Harvard, 2005. Available at www.pon.org/downloads/ien14_Devaney.pdf. Last accessed 12 November 2006. See also, FAO Oceans Atlas, Regional Fishery Organizations. http://www.oceansatlas.com/servlet/CDSServlet?status=ND0yOTQ. Last accessed 8 May 2007.

[247] *Id.*

Devaney concludes that RFMOs could be made more effective through audits, performance review and improvements through neutral bodies such as the FAO. She recommends a stronger role for port states in enforcement, the use of technology such as vessel monitoring systems to track fishing, and modifying incentives for membership to ensure participation by all interested parties.[248]

The following section describes one or two major regional fishery agreements or organizations in each of the North Atlantic, South Atlantic, North Pacific, South Pacific, Indian and Southern Ocean regions. The discussion is not exhaustive, but is provided as illustrative of agreements that may have potential to address cetacean bycatch. Additional agreements in the ocean regions are listed in boxes.

The Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries

The convention established the Northwest Atlantic Fisheries Organization (NAFO).[249] Although the convention applies to the whole of the northwest Atlantic, the regulatory powers of NAFO include only the high seas beyond the Exclusive Economic Zones of its members.[250] This regulatory area is divided into six sub-areas. NAFO's members are Bulgaria, Canada, Cuba, Denmark, Europe Union (EU), France (in respect of St. Pierre et Miquelon) Iceland, Japan, Korea, Norway, Russia, and the United States.[251]

Atlantic Ocean Agreements and Organizations

Convention for Fisheries & Conservation of Living Resources of the Black Sea

Convention on Conduct of Fishing Operations in the North Atlantic

Convention on Future Multilateral Cooperation in the Northeast Atlantic Fisheries

EU Fisheries Agreement (Common Fisheries Policy)

General Fisheries Council for the Mediterranean

International Convention for the Conservation of Atlantic Tunas

International Convention for the Northwest Atlantic Fisheries

International Council for the Exploration of the Sea

North Atlantic Salmon Conservation Organization

Regional Convention on Fisheries Cooperation Among

A general council oversees the organization and coordinates the legal, financial, and administrative affairs of NAFO.[252] A scientific council serves as a forum for analysis and consultation among scientists from the member states.[253] The Fisheries Commission decides on management and conservation measures, with the purpose of ensuring consistency in the EEZs of member states.[254]

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[248] *Id.*

[249] *Supra*, note 145.

[250] *Id.* at Article I.

[251] Estonia, Latvia, Lithuania, Poland, Portugal, Spain and Germany were contracting parties, but acceded to the European Union. Romania withdrew from the convention. NAFO website at http://www.nafo.int/about/frames/about.html. Last accessed 17 November 2006.

[252] *Supra* note 145 at Article II (a).

[253] *Id* at Article II (b), VI.

NAFO has jurisdiction over all fishes in the Regulatory Area with the exception of salmon, tunas, marlin, and the sedentary species of the continental shelf.[255] NAFO currently provides for the conservation and management of stocks of American plaice, yellowtail flounder, cod, witch flounder, redfish, Greenland halibut, capelin, and squid. Stocks that straddle the Regulatory Area and Canada's EEZ, such as cod, American plaice, redfish, flounder, and Greenland halibut, are regular objects of diplomatic tension.[256] Conflicts also have arisen with the vessels of non-parties, including Chile, Malta, Mauritania, Mexico, Panama, St. Vincent and the Grenadines, and Venezuela. Some of these vessels have reflagged from member states of NAFO to non-member states.[257]

In addition to these regional agreements, there are management regimes for highly migratory species in the Atlantic Ocean, such as salmon and tuna, which cross national boundaries, and for which management requires international cooperation.[258]

International Convention for the Conservation of Atlantic Tunas

The International Convention for the Conservation of Atlantic Tunas (ICCAT), entered into force 21 March 1969.[259] ICCAT was established to provide an effective program of international cooperation in research and conservation in recognition of the unique problems related to the highly migratory nature of tuna and tuna-like species. The Convention area is defined as all waters of the Atlantic Ocean, including the adjacent seas.

The treaty established a Commission to carry out the objectives of the Convention. The Commission is responsible for providing internationally coordinated research on populations of tuna and tuna-like species and such other species of fishes exploited in tuna fishing in the Convention area as are not under investigation by another international fishery organization.[260] Unlike Inter-American Tropical Tuna Commission, ICCAT does not have its own scientific staff.[261] Instead, ICCAT, through its rules of procedure, established a scientific body, the Standing Committee on Research and Statistics, to advise the Commission on research needs, conduct stock assessments, and provide management advice. The SCRS is composed of scientists from the ICCAT membership. Although the Convention provides that the Commission

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[254] *Id.* at Article I (4).

[255] *Id.* at Article I (4).

[256] Mfodwo, *supra* note 222.

[257] *Id.*

[258] In general, highly migratory species (HMS) have a "wide geographic distribution, both inside and outside the 200-mile zone, and … undertake migrations on significant but variable distances across oceans for feeding or reproduction. They are pelagic species (do not live on the sea floor)…" UNCLOS Annex I "includes 11 tuna, 12 billfish species, pomfrets, 4 species of sauries, dolphinfish (Coryphaena spp.), oceanic sharks and cetaceans (both small and large)." FAO, Fisheries and Aquaculture Department. Highly Migratory Species Fact Sheet. Available at http://www.fao.org/fi/website/FIRetrieveAction.do?dom=topic&fid=13686. Last visited 3 May 2007. See also UNCLOS, *supra* note 139 at Annex 1 and Art. 64.

[259] ICCAT, *supra* note 143.

[260] *Id.* At Article IV(1).

[261] Michael L. Weber and Frances Spivy-Weber. "Proposed Elements for International Regimes to Conserve Living Marine Resources. Report in fulfillment of Marine Mammal Commission Contract no. T30916119. NTIS, Springfield, VA, October 1995.

may obtain technical and scientific information or services from any public or private individual or group, the Commission only rarely seeks scientific advice from other sources.[262]

With regard to conservation and management, the Commission may, on the basis of scientific evidence, make regulatory recommendations (Article VIII). With the decline in some large pelagic populations in the Atlantic Ocean, discussion and decisions within the Commission on stock management have become highly politicized.[263]

Promoting the conservation of large pelagics in the Atlantic Ocean under ICCAT can raise practical problems. For example, under the Atlantic Tunas Convention Act, the U.S. legislation that implements the Convention domestically, the U.S. government cannot alter a U.S. quota allocation adopted by ICCAT—even if the quota level agreed by ICCAT has been set at an unsustainable level.[264] The U.S. can adopt more stringent measures, such as higher minimum sizes, larger closed areas, etc., however U.S. fishermen must be allowed the opportunity to catch their ICCAT quota.[265] Although in its earlier years, ICCAT could not take action against non-members,[266] in 2003, ICCAT adopted a comprehensive trade measures resolution that covers both members and non-members.[267] Since the late 1990s, ICCAT has had quota compliance rules on the books that allow for the imposition of penalties, including trade sanctions, against members for quota overharvests in the swordfish and bluefin tuna fisheries.[268] Sanctions have been applied to a member under the quota compliance rules once. The trade measures resolution has not yet been applied against an ICCAT member although several non-members have had sanctions placed against them under the 2003 measure and its predecessors.[269]

Convention on the Conservation and Management of Fishery Resources in the Southeast Atlantic Ocean

Until the late 1990s, there were no regional management regimes for fisheries in the Southeast Atlantic. Angola, Namibia, and South Africa had formed the Southern Africa Development Community (SADC), which includes a Marine Fisheries Policy and Strategy. These three coastal states of the southeast Atlantic negotiated access agreements with distant water fleets. In the late 1990s, Namibia, South Africa, and the United Kingdom began talks on

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[262] *Id.*

[263] Carl Safina. 1997. North Atlantic Fishery Resources at Risk. Prepared for the Pew Charitable Trusts. Unpublished manuscript. December 1997. 54 pages. See also, Carl Safina, Song for the Blue Ocean, Henry Holt and Co. (1997) at 92-99, which describes the difficulties of getting ICCAT members, especially Japan and Canada, to reduce quotas for bluefin tuna in 1992 despite scientific information showing a consistent 15-year decline.

[264] The exact ATCA wording is "…no regulation promulgated under this section may have the effect of increasing or decreasing any allocation or quota of fish or fishing mortality level to the United States agreed to pursuant to a recommendation of the Commission." 16 U.S.C.A. 971(d)(c)(3).

[265] *Id*.

[266] Safina, *supra* note 253.

[267] Resolution 94-9 by ICCAT on Compliance with the ICCAT Conservation and Management Measures (including Addendum). (Transmitted to Contracting Parties: January 23 1995).

[268] Resolution 03-15 by ICCAT Concerning Trade Measures. (Transmitted to Contracting Parties: December 19, 2003).

[269] Personal communication with Mark Wildman, NOAA Office of International Affairs, March 2007.

the formation of a new fisheries organization, called the Southeast Atlantic Fisheries Organization, for the conservation and management of deepwater straddling stocks. Eventually Angola, the European Community, Iceland, Namibia, Norway, Republic of Korea, South Africa, United Kingdom (on behalf of St. Helena and its dependencies of Tristan da Cunha and Ascension Islands) and the United States signed the agreement.[270] States that have participated in the negotiations but have not signed the Convention are Japan, Russian Federation and Ukraine.

The Convention is one of the first regional fisheries agreements negotiated since the adoption of the UN Fish Stocks Agreement, and closely follows that model.[271] The convention seeks to ensure the conservation and sustainable management of the fishery resources of the Southeast Atlantic, and establishes the South-East Atlantic Fisheries Organization as the RFMO to implement the convention.[272]

The convention sets long-term conservation and sustainable use as a goal. Articles 2, 3, and 7 set out principles such as the precautionary approach, ecosystem management, protection of biological diversity, and protection of the marine ecosystem. Recognition of the special position of developing states is taken in Articles 12 and 21. Species covered are all but sedentary species within the coastal states' jurisdiction (Article 1). The geographic coverage of the convention is roughly FAO Statistical Area 47. The convention defines fishing more broadly than earlier instruments, taking in such activities as support operations, mother ships, transshipment and similar activities.[273] The responsibilities of the Commission include setting quotas, allocating fishing rights, determining participants in the fishery and other management duties. The convention also creates a Scientific Committee and a Compliance Committee.[274]

Flag states are responsible for authorizing their vessels to fish in the convention area, for keeping a record of such authorizations, for reporting catches and monitoring compliance. In addition, port states are authorized to develop control measures, conduct inspections and deploy observers.

Other Atlantic Regional Regimes

There is some regional management structure in the southwest Atlantic, but not much. The Joint Technical Commission for the Argentina/Uruguay Maritime Front has regulatory authority to set quotas in the common fishing zone. The South Atlantic Fisheries Commission is a bilateral agreement between Argentina and the United Kingdom that manages fisheries through cooperative unilateral measures.

As in the southeast Atlantic, the principal managing organizations in the southwest Atlantic are national governments. Their programs may be summarized as follows:

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[270] Convention on the Conservation and Management of Fishery Resources in the Southeast Atlantic Ocean. DoneatWindhoek. 20 2001 April. Entered into force April 2003 (hereinafter the Southeast Atlantic Convention). Available at http://www.seafo.org

[271] Hedley, C. The South-East Atlantic Fisheries Organization (SEAFO) Convention: an initial review. OceanLaw On-Line Paper No. 2, April 2001. Internet guide to International Fisheries Law. Available at http://www.intfish.net/ops/2.htm. Last accessed 17 November 2006.

[272] Southeast Atlantic Convention, *supra* note 260 at Art. 5.

[273] *Id.* at Art. 1(h).

[274] *Id* at Article 14.

The United Kingdom manages the fisheries around the Falkland Islands, principally the squid fishery. Management is based upon scientific advice and is carried out through limitations on fishing effort, including area restrictions and bidding for access rights. Fishing effort on the high seas is restrained by linking access to squid within the fishery zone to voluntary restraints on the high seas.

Fisheries in Argentina are managed by the Secretary of Agriculture, Fisheries, and Nutrition. Annual quotas are set based on advice of the National Institute of Fisheries Research and Development. Fisheries in Uruguay are the responsibility of the National Institute of Fisheries. The principal management concern is hake. The Agriculture Ministry in Brazil is responsible for fisheries, although management of fisheries is delegated to the states and municipalities in principle. Although legislation and regulations exist, they have little practical effect on fisheries.

North Pacific Anadromous Fisheries Commission (NPAFC)

Canada, Japan, the Russian Federation, and the United States are the primary states of origin for anadromous stocks in the North Pacific Ocean. Stocks from Asia and North America mix on the high seas, making discrimination among stocks very difficult. Generally, states of origin have claimed salmon from their streams as their property and have insisted that other states must receive their permission to catch these salmon. States whose fisheries within their own EEZ intercept salmon from another State's streams claim they have rights to any fish in their EEZs.

The North Pacific Anadromous Fisheries Convention, which came into force in 1993, replaced the International Convention for the High Seas Fisheries of the North Pacific Ocean, to which the United States, Japan, and Canada belonged.[275] Within the older convention, Japanese fishing for salmon on the high seas was increasingly restricted in order to reduce the capture of salmon from North American streams. [276]In 1989, the Soviet Union announced that, effective in 1992, it was withdrawing permission to fish for salmon in its EEZ that it had granted to Japan since the 17th century.

The Soviets also provided the United States with a draft international agreement to establish a new organization for conserving North Pacific anadromous stocks.[277] This led to a series of negotiations that produced the North Pacific Anadromous Fisheries Convention, which came into force in February 1993. The Convention established the North Pacific Anadromous Fish Commission (NPAFC), whose purpose is to promote the conservation of anadromous stocks of fish throughout their migratory range in the high seas area of the North Pacific Ocean and adjacent seas. The Convention also proposes the conservation of ecologically related species that interact with anadromous fish, including various marine mammals, seabirds, and non-anadromous fish species.

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[275] Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean. Done at Moscow 11 February 1992. Entered into force 16 February 1993. Senate Treaty Document 102-30, 102nd Cong. 2nd Sess. Hereinafter North Pacific Anadramous Fisheries Convention.

[276] Mfodwo, *supra* note 222.

[277] *Id.*

Among other improvements, the new Convention increases at-sea enforcement powers, authorizes strict enforcement at the point of sale, includes all countries of origin and fishing countries under one organization, and incorporates Russian scientific expertise and knowledge of Japanese fishing patterns.[278] The founding members are Canada, Japan, the Russian Federation, and the United States. Non-member parties may join at the invitation of existing member states.

Besides prohibiting fishing for anadromous stocks on the high seas, the Convention also requires minimizing incidental taking of anadromous fish. The member states individually or collectively may take appropriate measures to prevent trafficking in illegally harvested Pacific salmon. The member states also are to intervene with non-parties whose fishing activities may adversely affect North Pacific anadromous fish. Article IV calls for the member states to prevent the reflagging of their fishing vessels.

Pacific Ocean Agreements and Organizations

- Asia Pacific Fishery Commission
- Asia-Pacific Economic Cooperation
- Convention for a North Pacific Marine Science Organization
- Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean
- Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific Ocean
- Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean
- Eastern Pacific Ocean Tuna Fishing Agreement
- Inter-American Tropical Tuna Commission
- International Convention for the High Seas Fisheries of the North Pacific Ocean
- International Pacific Halibut Commission
- Latin American Organization for Fisheries Development
- North Pacific Anadromous Fisheries Convention
- Pacific Salmon Treaty
- Permanent South Pacific Commission
- South Pacific Commission
- South Pacific Forum Fisheries Agency Convention
- Southeast Asian Fisheries Development Center

Impacts on other species, restoration of other species, minimization of pollution, discards, and bycatch, and biodiversity protection all are reflected at least partially. The Convention authorizes timely conservation and the language on enforcement is among the strongest and most advanced in the world. Member states may board the vessels of another member state on the high seas and seize the vessel if it is found in violation of the Convention. Besides providing authority to sanction non-parties that violate conservation measures, the Convention authorizes consultation with non-members.

[278] *Id.*

Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea

The need for the Convention arose out of intensive fishing for pollock in an area of the Bering Sea that is outside the EEZs of the United States and the Russian Federation.[279] Concerns about the impact of this fishing on pollock stocks within the EEZs of the United States and the Russian Federation led to a series of negotiations that began in 1991 and concluded in February 1994 among China, South Korea, Poland, the Russian Federation, and the United States.[280] The convention's objectives are conservation, management, and optimum utilization of Bering Sea pollock, restoration of pollock to levels that will produce maximum sustainable yield, and cooperation in data gathering.

Rather than establishing a separate Secretariat, the Convention calls for annual meetings of the member states, between which the governments of the member states are to perform many of the functions of a Secretariat.[281] The only "internationalized" administrative structure is the Scientific and Technical Committee (STC), which is composed of at least one representative from each member state.[282] The STC is to provide the annual meeting of the member states with the assessments of Aleutian Basin pollock that are the basis for the harvest levels.

Principal functions of the annual meeting include setting the allowable harvest level for pollock in the area covered by the Convention and allocating this quota among the member states. The annual meeting also is to adopt other conservation and management measures, to establish terms and conditions for any trial fishing operations, to discuss cooperative enforcement measures, to review an observer program established by the member states, and to discuss scientific research in the region.[283]

All decisions of substance must be taken by consensus. If a member state considers a matter to be of substance, then it is to be voted upon in that way. Other decisions are taken by simple majority vote.

South Pacific Permanent Commission

The South Pacific Permanent Commission (CPPS) was established by the August 1952 Agreement of the Conference on the Use and Conservation of the Marine Resources of the South Pacific.[284] The Agreement does not define a specific area of jurisdiction. The Agreement does state that the parties to the agreement—Ecuador, Peru and Chile—proclaim that each possesses sole sovereignty over the area of the sea and sea floor within 200 miles of its shores. A 1984 Declaration states that each state has responsibility for conservation and protection of living resources within their jurisdictions and beyond. The agreement applies to all living marine resources.

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[279] Suzanne Iudicello, Background Paper: Major Fisheries at Risk in the North Pacific Ocean. Prepared for the Pew Charitable Trusts. Unpublished manuscript. December 1997. Transcript available with author.

[280] Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea. Done at Washington, D.C. 16 June 1995. Entered into force 8 December 1995. U.S. Treaty Document 103-27.

[281] Mfodwo, *supra* note 222.

[282] *Id.*

[283] Iudicello, *supra* note 269.

[284] 1952 Agreements on the Exploitation and Conservation of the Maritime Resources of the South Pacific. Done at Santiago, Chile, 18 August 1952. Available at http://www.intfish.net/orgs/fisheries/cpps.htm. Accessed June 30, 2007.

CPPS collaborates with FAO in collecting fisheries data for FAO Statistical Area 87. In 1985, CPPS signed an agreement with FAO to collaborate in research on living marine resources, staff training, dissemination of information, and scientific and technical meetings. Subsequent meetings of the parties resulted in an additional protocol, proposals for fishery regulation on the high seas adjacent to member countries, and a call for projects examining both artisanal and industrial fisheries.[285]

Forum Fisheries Agency

The Forum Fisheries Agency (FFA) was established by convention that went into force in July 1979. Members of the South Pacific Forum, as well as other states and territories on the recommendation of the Fisheries Committee, may join FFA.

According to the 1979 convention, the FFA was formed "to secure the maximum benefits from the living marine resources of the region for their peoples and for the region as a whole and in particular the developing countries," and "to facilitate the collection, analysis, evaluation and dissemination of relevant statistical scientific and economic information about the living marine resources of the region, and in particular the highly migratory species."[286] FFA promotes harmonization of fisheries management in the region, cooperation regarding distant water fishing nations, cooperation in enforcement and surveillance, cooperation in marketing and in granting access to exclusive economic zones.

The sphere of influence of the FFA covers about 30 million square kilometers from the Republic of the Marshall Islands to New Zealand, and corresponds roughly to FAO statistical areas 74 and 81. The FFA addresses all living marine resources, but particularly highly migratory species.

In June 1988, the Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States came into force. This agreement had been concluded in 1987 at Port Moresby, Papua New Guinea, and was renewed for ten years in 1993.[287] Under the agreement, fishing vessels from the United States are permitted into the fisheries jurisdictions of the 16 FFA member countries that are party to this treaty. Fees paid for this access are divided among the parties. The treaty was innovative in requiring U.S. vessels to comply with the same reporting and enforcement provisions on the high seas as applied within the exclusive economic zones of the member countries.[288]

Upon discovering large-scale driftnetting operations in the area, a 1989 meeting of the FFA in Kiribati issued the Tarawa Declaration calling for the end of such driftnetting. This led later to the Convention for the Prohibition of Fishing With Long Driftnets in South Pacific, which was concluded at Wellington, New Zealand, in November 1989 and came into force in May 1991.

In July 1992, members of the FFA concluded the Niue Treaty on Cooperation in Fisheries Surveillance in the South Pacific Region, which entered into force in May 1993. The principal purpose of the Niue agreement is to overcome the difficulties of enforcement in so large an area of ocean by, among other things, permitting reciprocal and joint enforcement and surveillance of

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[285] *See*, Galapagos Agreement. Available at http://www.intfish.net/orgs/fisheries/cpps.htm. Accessed June 30, 2007.

[286] Basic convention documents and agreements are available at FFA Website. http://www.ffa.int/node/266 Last accessed June 30, 2007.

[287] Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America. Done at Port Moresby, 2 April 1987. Entered into force 15 June 1988. TIAS 11100.

[288] *Id.* Articles 3-4.

measures adopted by individual countries. Subsequent agreements, annexes and projects have addressed tuna fishing, longline gear, surveillance and monitoring.

Asia Pacific Fishery Commission

The Asia Pacific Fishery Commission is an outgrowth of an agreement to establish the Indo-Pacific Fisheries Council in 1948 under the FAO. The commission, created in 1994, is to "promote the full and proper utilization of living aquatic resources by the development and management of fishing and culture operations."[289] The APFIC's jurisdiction includes a large part of the area, the Asia-Pacific (FAO Statistical Area 71). Members include Australia, Bangladesh, Cambodia, China, France, India, Indonesia, Japan, Korea, Malaysia, Myanmar, Nepal, New Zealand, Pakistan, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America, and Vietnam. Membership in the APFIC is widely open.

APFIC acts as consultative forum that works in partnership with other regional organizations and arrangements and members. It provides advice, coordinates activities and acts as an information broker to increase knowledge of fisheries and aquaculture in the Asia Pacific region to underpin decision-making. Among its functions, the commission is to review the state of fishery resources and to recommend measures and carry out programs to increase the efficiency of the fishing and aquaculture industries. The Commission also is to conserve and manage resources and protect them from pollution.

The Asia Pacific Fishery Commission has yet to make the transition from fishery development and promotion to stock conservation and rebuilding. It has not amended its charter to undertake management or conservation actions, but relies on the governments of member countries to do so. In the area under the commission's purview, there is no management structure for adjacent, or straddling stocks of fish.

Convention for the Conservation of Southern Bluefin Tuna

The Commission for the Conservation of Southern Bluefin Tuna[290] arose from annual trilateral meetings among Australia, Japan and New Zealand (Weber 1998). The three countries had operated under a voluntary management agreement, but negotiated the formal convention in response to continued heavy fishing that had resulted in significant declines of mature fish throughout the 1980s.[291]

Indian Ocean Agreements & Organizations

- Indian Ocean Fishery Commission
- Indian Ocean Tuna Commission
- Southwest Indian Ocean Fisheries Commission
- Western Indian Ocean Tuna Organization

Concerned that activity of non-party nations in the fishery was reducing the effectiveness of members' conservation and management measures, the parties in 1996 asked Taiwan, South Korea and Indonesia to become parties. On 17 October 2001 the Republic

[289] APFIC Website at http://www.apfic.org/

[290] Convention for the Conservation of Southern Bluefin Tuna. Done at Canberra, May 1993. Entered into force 20 May 1994 (hereinafter CCSBT).

[291] Commission for the Conservation of Bluefin Tuna. Website available at www.ccbt.org/docs/about.html. Last accessed 17 November 2006.

of Korea joined the Commission. The Fishing Entity of Taiwan's membership of the Extended Commission became effective on 30 August 2002.[292]

In 2003, the commission created membership status for countries with an interest in the fishery to participate in its activities as formal cooperating non-members. These parties must comply with the management and conservation objectives and agreed catch limits of the convention and may participate in discussions, but cannot vote. The Philippines was accepted as a formal cooperating non-member in 2004, and parties continue discussions with Indonesia and South Africa.[293]

The convention goal is conservation and optimum utilization of bluefin tuna.[294] Though the scope of the agreement limits its attention to bluefin tuna, definitions include consideration of all "ecologically related species."[295] By definition, the convention covers not just fishing activity, but support operations as well. States parties are required to enforce the provisions of the agreement, provide information including scientific and catch statistics and effort data, exchange scientific and fishing information, and report fishing by non-parties. Member countries are legally bound by decisions on total allowable catch and other conservation and management measures. Enforcement is by the parties on their flag vessels. Significantly, the treaty requires parties to take action to prevent vessels from transferring registration to avoid compliance with Commission decisions[296] Member countries also must act to deter non-parties from activities that undermine the objectives of the treaty. The measures adopted by the CCSBT are not limited to the high seas, but apply to the EEZs of all member countries.

The commission's duties include gathering and disseminating scientific information, statistical data, and legal information. It adopts regulations, sets catch limits, allocates catch, and operates a monitoring system.[297] All decisions are by unanimous vote.[298] The convention created a Scientific Committee, and allows both non-party and NGO observers at meetings.

The Convention for the Establishment of an Inter-American Tropical Tuna Commission

The IATTC convention[299] defines its area of competence as the Eastern Pacific Ocean, but does not further define the area, although conservation and management measures contain their areas of application, generally out to 150°W. The IATTC focuses on skipjack tuna, yellowfin tuna, and fish used as bait, although staff has studied bigeye tuna, black skipjack, bluefin tuna, albacore tuna and billfishes, as well as dolphins, turtles and sharks. Members are Costa Rica, Ecuador, El Salvador, France, Guatemala, Japan, Mexico, Nicaragua, Panama, Peru, Republic of Korea, United States, Vanuatu and Venezuela. Belize, Canada, China, Cook

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[292] CCSBT *supra* note 280.

[293] *Id.*

[294] *Id.* at Article III.

[295] *Id.* at Article II.

[296] Mfodwo *supra* note 222.

[297] CCSBT *supra* note 280 at Article VIII.

[298] *Id.* at Article VII.

[299] The Convention for the Establishment of an Inter-American Tropical Tuna Commission. Done at Washington, 31 May 1949. Entered into force 3 March 1950. 1 UST 230, TIAS 2044. (hereinafter IATTC).

Islands, the European Union, Honduras and Chinese Taipei are Cooperating Non Parties or Cooperating Fishing Entities.[300]

The IATTC is authorized to make recommendations to its members regarding measures that will maintain the fishes covered by the convention at levels that will permit maximum sustained catch. The Convention also calls for the IATTC to collect, analyze, and disseminate information regarding the catches and operations of vessels in the fishery. Unlike other tuna management regimes, the IATTC maintains an independent scientific staff that collects catch and other information and prepares recommendations for the member governments. IATTC has also carried out a program to estimate bycatch of non-target fishes and dolphins in the fishery.

At a September 1990 meeting in Costa Rica, representatives of Chile, Colombia, Costa Rica, Ecuador, El Salvador, France, Honduras, Japan, Mexico, Nicaragua, Panama, Spain, the United States, Vanuatu, and Venezuela agreed that the IATTC was the appropriate body to coordinate technical aspects of the program to reduce the incidental capture and mortality of dolphins in their exclusive economic zones and the adjacent high seas during purse seine operations. At a 1995 meeting, the member countries of the IATTC adopted a Declaration on Strengthening the Objectives and Operation of the IATTC, which called for implementing the UN agreement on straddling fish stocks and highly migratory fish stocks.

For comparison, see the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean.[301] One of the first treaties developed after the UN Fish Stocks Agreement, it was the culmination of complex negotiations among 25 nations including small island nations and developed countries with active distant water fleets.[302] As of November 2004, Australia, China, Cook Islands, Federated States of Micronesia, Fiji Islands, Korea, Kiribati, Marshall Islands, Nauru, New Zealand, Niue, Papua New Guinea, Samoa, Solomon Islands, Tonga and Tuvalu had ratified or acceded to the Convention.[303]

Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean

The Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean creates the kind of regional organization foreseen in the Straddling Stocks Agreement.[304] The 2000 Honolulu Convention covers much of the Pacific Ocean and governing territorial seas and exclusive economic zones as well as high seas areas. It creates a commission with authority to set catch limits and allocate catch quotas to fishing nations both within and outside the exclusive economic zones of coastal and island nations. Most significantly in relation to incidental capture of marine mammals, this fairly new treaty requires fishing of migratory species in the high seas to be compatible with the regulations that apply within adjacent exclusive economic zones. It relies on the precautionary approach as its basic foundation throughout. It is one of the new instruments that enables both flag-state and

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[300] IATTC website at http://www.iattc.org/HomeENG.htm. Accessed 17 November 2006.

[301] *Supra* note 144.

[302] *See generally* Violanda Botet, *Filling in one of the Last Pieces of the Ocean: Regulating Tuna in the Western and Central Pacific Ocean,* 41 VIRGINIA JOURNAL OF INTERNATIONAL LAW 787-813 (2001).

[303] WCPF Convention*, supra* note 144.

[304] Mfodwo *supra* note 222.

port-state enforcement, boarding and inspection rights, obligatory transponders on all high-seas fisheries, and regional observers on the vessels. President Bush requested advice and consent to ratification in May 2005,[305] and the Senate Foreign Relations Committee held a hearing on it on September 29, 2005.[306] Pending ratification, the U.S. has attended meetings in recent months as a "cooperating nonmember."

The objective of the Convention is to ensure, through effective management, the long-term conservation and sustainable use of highly migratory fish stocks in the western and central Pacific Ocean, in accordance with the 1982 LOS Convention and the 1995 UN Fish Stocks Agreement. The Convention applies to the Western and Central Pacific Ocean.

The Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean was opened for signature in September 2000, and entered into force on 19 June 2004. The Convention applies to all species of highly migratory fish stocks (as defined as in Annex I of the Law of the Sea Convention) or otherwise decided by the Commission.

The Convention provides a list of general principles that are closely modeled on the general principles contained in the Fish Stocks Agreement. These principles, inter alia, are: adopt measures to ensure long-term sustainability of highly migratory fish stocks and promote their optimum utilization; maintain or restore stocks at levels capable of producing maximum sustainable yield, taking into account fishing patterns, the interdependence of stocks; apply the precautionary approach; assess the impacts of fishing, other human activities and environmental factors on target stocks, non-target species, and species belonging to the same ecosystem or dependent upon or associated with the target stocks; adopt measures to minimize waste, discards, catch by lost or abandoned gear, pollution originating from fishing vessels, catch of non-target species, both fish and non-fish species, in particular endangered species and promote the development and use of selective, environmentally safe and cost-effective fishing gear and techniques; protect biodiversity in the marine environment; and take measures to prevent or eliminate over-fishing and excess fishing capacity. The general principles are to be applied by coastal States within areas under national jurisdiction in the Convention Area in the exercise of their sovereign rights for the purpose of exploring and exploiting, conserving and managing highly migratory fish stocks.

The Commission is also required to develop a regional observer program to collect verified catch data and other information, which is to consist of independent and impartial observers authorized by the Secretariat. All vessels which fish in the Convention Area, other than those which operate exclusively within waters under the national jurisdiction of the flag State, must be prepared to accept an observer from the regional observer program, if required by the Commission.

The Commission on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific has taken action to reduce the bycatch of non-target fish, seabirds and sea turtles, but has taken no action to reduce any small cetacean bycatch.

The U.S. was heavily involved in the negotiation of this convention, and in December 2006 received Senate advice and consent to ratification and secured implementing legislation through Congress.

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[305] Press Release, George W. Bush, Message to the U.S. Senate Regarding WCPF Convention (May 16, 2005), available at <http://www.whitehouse.gov/news/releases/2005/05/20050516-7.html> (visited Sept. 4, 2005).

[306] 151 Cong. Rec. S D990 (daily ed. Sept. 29, 2005)

Regional Scientific Organizations

ICES

The International Council for the Exploration of the Sea (ICES) was established in 1902, and provides scientific advice to member states in the North Atlantic in both European and North American regions. The organization annually analyzes about 70 stocks of commercially exploited fishes (Marashi 1996). ICES is considered the premier international organization researching marine living resources through its Advisory Committee on Fishery Management (ACFM). ICES also conducts research on pollution through its Advisory Committee on Marine Pollution.

Current members are Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Netherlands, Norway, Poland, Portugal, Spain, Sweden, United Kingdom, the United States, Russian Federation, Latvia, Lithuania, and Estonia.

ICES depends upon its members for much of the information that it collects, although there is no legal obligation on member states to provide information (Mfodwo 1998). It regularly conducts assessments of the state of the most important fish and shellfish stocks in the effective ICES area, the northeast Atlantic, including the Baltic but excluding the Mediterranean.

The principal decisionmaking body of ICES is the Council to which each member state may send two representatives. Member states provide most of ICES funding based on annual budgets approved by a majority vote. A Secretariat manages the day-to-day business of the commission and serves as a data center. ICES databases include a wide range of information on fisheries, including catch and effort data, discards, independent surveys, tagging data, and other matters.

ICES generally is viewed as a well-functioning organization with the capability of providing significant input into fisheries management where an appropriate political framework exists (Mfodwo 1998). It also has a highly developed ability to integrate environmental considerations into its fishery stock assessments, as through the recently established Working Group on the Ecosystem Effects of Fishing Activities. ICES also has begun evaluating the impacts of gear on the seabed of the northeast Atlantic and on marine mammals, seabirds, and benthic organisms.

PICES

After more than a decade of stop-and-start discussions, the Convention for a North Pacific Marine Science Organization (PICES) was established in December 1990. PICES's area of concern is the temperate and sub-Arctic region of the North Pacific Ocean northward of 30°N latitude. The purposes of PICES are:

- to promote and coordinate research on living resources in the North Pacific, including intereactions with land and atmosphere, climate change, ecosystems, and the impacts of human activities;
- to promote collection and exchange of information.

Founding members are Canada, China, Japan, the Russian Federation, and the United States. Each member state appoints two delegates to the Governing Council, whose roles are as follows:

- to identify research priorities and problems as well as methods for the resolution of problems;
- to recommend coordinated research programs undertaken by the member states;
- to promote the exchange of scientific data, information, and personnel; and

- to consider requests to develop scientific advice.

The Governing Council may invite other states, organizations, and experts to attend scientific meetings as it wishes. Decisions are to be by consensus--considered as the absence of a formal objection--and where consensus is not possible, by a three-quarters majority vote. Constraints on the effectiveness of PICES include the non-binding nature of their recommendations and conflicts among the agendas of different member states.

SPC

The South Pacific Commission was established by an agreement signed at Canberra, Australia in 1947. The agreement came into force in 1948, was amended in 1952, 1954, and 1964, and was supplemented by protocols of understanding in 1974 and 1976. In November 1986, a Convention for the Protection of the Natural Resources of the South Pacific Region was adopted. In August 1995, the Convention came into force after Niue became the tenth party to ratify the agreement.

The Canberra agreement defined the area of competence as all those areas in the Pacific administered by the participating governments that lie wholly or in part south of the Equator, east from and including the Australian territory of Papua and the Trust Territory of New Guinea (now Papua New Guinea and Irian Jaya), and Guam and the Trust Territory of the Pacific Islands.

The Convention for the Protection of the Natural Resources of the South Pacific Region will apply to the 200-mile zone of 23 self-governing island nations and island territories, as well as those areas of high seas that are enclosed from all sides by these 200-mile zones.

The basic principle of the SPC has been "development relevant to need." Although the SPC addresses a wide range of issues, including agriculture and plant protection, rural development, education, health information and cultural exchanges, fisheries is its largest single activity. The SPC does not make management recommendations, although it does provide scientific advice to its members. It also provides a regional forum for discussion. Two Commission programs deal exclusively with tunas and billfishes, while five others deal with coastal fisheries. Many of these programs such as the observer program are carried out in cooperation with other entities.

The SPC has collected and analyzed catch statistics, and conducted research on tuna and billfish. The program includes observer activities, port sampling, collecting catch and effort data, and population assessment. The commission monitors catches of tuna and performs biological analysis of these data. It maintains a regional oceanic fisheries data base, and assesses interaction among regional oceanic fisheries, studies the population dynamics of ocean species, monitors the level of exploitation of tunas and billfishes and baitfishes, and assists countries in building expertise. TBAP also provides observers for foreign flag vessels.

CHAPTER 5. RISK ASSESSMENT ANALYSIS OF INTERNATIONAL SMALL CETACEAN BYCATCH AND TOOLS TO REDUCE BYCATCH

In this chapter, we attempt to further classify and rank problems and potential action mechanisms according to a set of criteria and to provide a clear rationale for each problem assigned high priority for funding and intervention. The problems are presented by region, as surfaced by the review of each of the FAO statistical areas evaluated in Chapter 2 and Appendix A. The tools also are presented by region and are drawn from the domestic tools presented in Chapter 3 and agreements evaluated in Chapter 4. Table 5.1 summarizes the analysis by showing species at risk in each statistical area. Species at risk are those species where the bycatch represents between one and two percent of the population estimate. The narrative in Chapter 5 focuses on those species where the bycatch is unsustainable—where the bycatch exceeds two percent of the population estimate. Table 5.1 also summarizes gaps in abundance and bycatch information, gaps in management frameworks and gaps in implementation or enforcement of existing measures. The following species are at risk:

- Northwest Atlantic—harbor porpoise, northern right whale
- Northeast Atlantic—harbor porpoise, common and striped dolphins
- Western Central Atlantic—tucuxi
- Eastern Central Atlantic—humpback dolphin
- Mediterranean and Black Sea—striped and common dolphins, sperm whale, and harbor porpoise
- Southwest Atlantic—tucuxi, dusky and Commerson's dolphins, Franciscana
- Western Indian Ocean— Indian humpback dolphin, bottlenose dolphin, spinner dolphin, Risso's dolphin
- Eastern Indian Ocean—Ganges river dolphin and Irrawaddy dolphin
- North Pacific—Dall's porpoise and finless porpoise
- Sea of Japan—finless porpoise
- East and South China Seas and inland waters of Yangtze River—finless porpoise
- Yangtze River—baijis
- Western Central Pacific—bottlenose and spinner dolphins, Fraser's dolphin, Indopacific humpback dolphins and Irrawaddy dolphin
- Mekong River, Mahakam River, Songkhla Lake, and Ayeyarwady River—Irrawaddy dolphins
- Eastern Central Pacific—False killer whale and Vaquita
- Southwest Pacific—Hector's dolphin and Maui's dolphin
- Southeastern Pacific—Dusky dolphin and Burmeister's porpoise

Analytical Approach

In our criteria we considered the following: (1) the level of risk—whether a species' or population's survival is unsustainable, approaching an unsustainable level, or at risk from bycatch; (2) available legal mechanisms for action—whether the problem is being addressed effectively through national legislation, bilateral agreements, or international conventions; (3)

feasibility of intervention, based on institutional capacity within the country or region to effectively implement bycatch mitigation strategies and quantitative assessments to verify the risk; and (4) fisheries in which a currently available solution (technical, socio-economic, or a combination) appears feasible. Also, in this chapter, we have noted where the U.S. has capacity to participate or where it is not a party nation to applicable agreements and may need to find alternative approaches such as training and technical assistance, scientific support, grants, or economic incentive approaches.

As we undertook our analysis, a number of issues and problems emerged that apply to several regions. First, in areas where developing nations have instituted legislation making bycatch illegal, monitoring becomes increasingly difficult because fishermen dispose of bycaught cetacean carcasses clandestinely rather than bringing them to shore. Furthermore, in many regions, bycaught cetaceans have acquired a market value and are therefore brought ashore and sold for human consumption or bait, blurring the distinction between bycatch and direct harvests. This may occur despite prohibitions against the sale of cetacean products.[307]

Except for North America, western Europe, Australia, and New Zealand, very few nations have observer programs designed to monitor cetacean bycatch; consequently, the evidence for or estimates of bycatch tends to be anecdotal or non-quantitative, consisting of stranding reports, interviews, port monitoring, self-reporting by countries, and opportunistic observations by scientists and fishery observers.[308] Such information can result in underestimates of bycatch. Innovative, rigorous analyses are necessary in all regions to secure credible estimates of bycatch levels and trends. Finally, in areas where there is intensive fishing effort, but little or no basic information on presence of cetacean species or their population abundance, bycatch may pose a serious conservation threat, yet the lack of quantitative observations makes it difficult to assess risk. Moreover, the fisheries in such areas are often small-scale and decentralized, making it difficult to evaluate fishing effort or to estimate or monitor cetacean bycatch rigorously.[309] Adding to the intractability of this problem is the fact that where fisheries are coastal, local, or artisanal, international or even bi- or multi-lateral agreements do not provide mechanisms for action because these activities are solely within the purview of the coastal states.

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[307] Van Waerebeek, K., and Reyes, J.C. 1994. Post-ban small cetacean bycatch off Peru: a review. Report of the International Whaling Commission (Special Issue) 15:503–19. See also Van Waerebeek, K., Van Bressem, M.-F., Félix, F., Alfaro-Shigueto, J., García-Godoes, A., Chávez-Lisambart, L., Ontón, K., Montes, D., and Bello, R. 1997. Mortality of dolphins and porpoises in coastal fisheries off Peru and southern Ecuador in 1994. Biological Conservation 81:43–49. Leatherwood, S., and Reeves, R.R., 1989. Marine mammal research and conservation in Sri Lanka 1985–1986. United Nations Environment Programme, Nairobi, Marine Mammal Technical Report 1, 138 pp. Dolar, M.L.L., Leatherwood, S.J., Wood, C.J., Alava, M.N.R., Hill, C.L., and Aragones, L.V. 1994. Directed fisheries for cetaceans in the Philippines. Report of the International Whaling Commission 44:439–449.

[308] Leatherwood, S., and Reeves, R.R. 1989. Marine mammal research and conservation in Sri Lanka 1985–1986. United Nations Environment Programme, Nairobi, Marine Mammal Technical Report 1, 138 pp. See also Zerbini, A.N., and Kotas, J.E. 1998. A note on cetacean bycatch in pelagic driftnetting off southern Brazil. Report of the International Whaling Commission 48:519–24. Bordino, P., and Albareda, D. 2004. Incidental morality of franciscana dolphin *Pontoporia blainvillei* in coastal gillnet fisheries in northern Buenos Aires, Argentina. International Whaling Commission, Cambridge, UK. Scientific Committee Document SC/56/SM11.

[309] Donovan, G.P., 1994. Developments on issues relating to the incidental catches of cetaceans since 1992 and the UNCED conference. Report of the International Whaling Commission (Special Issue) 15:609–613.

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS[310] IUCN	CITES	CMS	AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES[311] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
ATLANTIC OCEAN, MEDITERRANEAN & BLACK SEAS										
AREA 21-NORTHWEST ATLANTIC										
PHOCOENA PHOCOENA - HARBOR PORPOISE										
Gulf of Maine/Bay of Fundy	89,700		55/year (2000-2004)		NE (VU-over all)		II	BILATERAL	US-Canada	Pingers
EUBALAENA GLACIALIS NORTHERN RIGHT WHALE										
	300		1.2/year		E	I &II	I&II	BILATERAL	US-Canada	
AREA 27-NORTHEAST ATLANTIC										
PHOCOENA PHOCOENA - HARBOR PORPOISE										
Northern and Central North Sea	61,335		2,700/4.1%		VU		II	Regional	CS/FS/PS	
Kattegat and Oeresund	36,046 (20,276-64,083)		83/0.2%		VU		II	Regional	CS/FS/PS	
Skagerrak	4,738		114/2.4%		VU		II	Regional	CS/FS/PS	Pingers
Kattegat	4,009		50/1.2%		VU		II	Regional	CS/FS/PS	
Kiel & Mecklenburg Bight	588 (240-1,430)				VU		II	Regional	CS/FS/PS	
Southwestern Baltic proper	599 (200-3,300)		13/2.1%		VU		II	Regional	CS/FS/PS	
Northern North Sea	98,564 (66,679-145,697)		5,000/5%		VU		II	Regional	CS/FS/PS	Pingers (DMK) gillnet fishery

[310] For IUCN Red List, Categories are: LC, Least Concern; LR, Lower Risk, NT Near Threatened; NE, Not Evaluated; DD, Data Deficient; VU, Vulnerable; EN, Endangered; CR, Critically Endangered. LR/cd, Conservation Dependent (cd). Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years. If listed on CITES, the Appendix is indicated as I, II or both. For the Convention on Migratory Species, Appendix II listings are shown.

[311] The parties to the international, regional and bi-lateral agreements discussed in Chapters 4 and 5 and summarized in this table are listed in Appendix B.

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS[310] IUCN	CITES	CMS	AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES[311] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
										Aug - Oct
Southern & Central North Sea	169,888 (124,121-232,530)		7,493/4.3%		VU		II	Regional	CS/FS/PS	
Celtic Sea	36,280 (12, 828-102,604)		2,200/6.2%		VU		II	Regional	CS/FS/PS	
North Sea	268,800		3,410/1.3%		VU		II	Regional	CS/FS/PS	
DELPHINUS DELPHIS-COMMON DOLPHINS										
Celtic Sea	75,449 (22,900 - 284,900)				LC	nl	II	Regional	CS/FS/PS	
Bay of Biscay	61,888 (35,461 - 108,010)		410-419 /0.67%		LC	nl	II	Regional	CS/FS/PS	Driftnet fishery banned
Celtic Sea & Western Waters	101,205 (55,125 – 185,802)		356-835312 61313-200314/ 0.6-1.1%		LC	nl	II	Regional	CS/FS/PS	
STENELLA COERULEOALBA-STRIPED DOLPHINS										
Bay of Biscay	73,843		1193-152315 /1.6-1.56%		LR/cd	nl	II	Regional	CS/FS/PS	
Celtic Sea & Western Waters	66,825		136-528316 44317/ 0.27-0.79%		LR/cd	nl	II	Regional	CS/FS/PS	
AREA 31-WESTERN CENTRAL ATLANTIC										
SOTALIA FLUVIATILIS TUCUXI										
Cananeia estuary	156-380				DD	I&II	II	Regional	CS (US)	Marine Mammal

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS[310] IUCN	CITES	CMS	AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES[311] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
	No estimate for rest of range									Action Plan under SPAW Protocol
AREA 34-EASTERN CENTRAL ATLANTIC										
SOUSA TEUSZII-ATLANTIC HUMPBACK DOLPHIN										
Dakhla Bay	Considered small				DD	I&II	II	Int'l/Regional	CS	
Parc National du Banc d' Arguin in Mauritania.	Considered small				DD	I&II	II	Int'l/Regional	CS	
Saloum delta, Senegal	100				DD	I&II	II	Int'l/Regional	CS	
Canal do Geba-Bijagos	< 1,000 animals				DD	I&II	II	Int'l/Regional	CS	
South Guinea					DD	I&II	II	Int'l/Regional	CS	
Cameroon					DD	I&II	II	Int'l/Regional	CS	
Gaboon Estuaries					DD	I&II	II	Int'l/Regional	CS	
Angola	Considered small				DD	I&II	II	Int'l/Regional	CS	
AREA 37-MEDITERRANEAN AND BLACK SEA										
STENELLA COERULEOALBA – STRIPED DOLPHINS										
Alboran Sea	14,736 (6,923 – 31,366)		145-201/1.2%		LR/cd	nl	II	Int'l/Regional	CS/FS/PS	Swordfish driftnet fishery banned
Corsican/Ligurian Sea	25,614 (15,377 – 42,685)		51-326 (+/-146) 0.19 – 1.3%		LR/cd	nl	II	Int'l/Regional	CS/PS	Swordfish driftnet fishery banned
Western Mediterranean	117, 880 (68,379-214,800)		14-15/0.006%		LR/cd	nl	II	Int'l/Regional	CS/FS/PS	
DELPHINUS DELPHIS -COMMON DOLPHINS										
Alboran Sea	14,736 (6,923 – 31,366)		145-201/1.2%		LC	nl	II	Regional	CS/FS/PS	Swordfish driftnet fishery banned
PHYETER MACROCEPHALUS—SPERM WHALE										
Mediterranean			7-14/year		VU	I	II	Regional	CS/FS/PS	Swordfish driftnet

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS[310] IUCN	CITES	CMS	AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES[311] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
										fishery banned
PHOCOENA PHOCOENA – HARBOR PORPOISE										
Azov Sea in total	2,922 (1,333–6,403I)				DD		II	Regional	CS/FS/PS	
Kerch Strait	54 (12–245)				DD		II	Regional	CS/FS/PS	
NW, N and NE Black Sea within Ukrainian and Russian territorial waters	1,215 (492–3,002)				VU		II	Regional & National (EC Directive)	CS/FS/PS	
SE Black Sea < Georgian terr waters	3,565 (2,071–6,137)				VU		II	Regional	CS/FS/PS	
Central Black Sea> waters Ukraine/Turkey	8,240 (1,714–39,605)				VU		II	Regional	CS/FS/PS	
AREA 41-SOUTHWEST ATLANTIC										
SOTALIA FLUVIATILIS-TUCUXI										
Cananéia estuaryBrazil	156-380				DD	I&II	II			
Southwest Atlantic			141		DD	I&II	II			
LAGENORHYNCHUS OBSCURUS – DUSKY DOLPHIN										
Patagonian coast	7,252		70-200/ .96%-2.7%		DD	nl	II			
Punta Ninfas and Cabo Blanco, Argentina	6,628				DD	nl	II			
CEPHALORHYNCHUS COMMERSONII – COMMERSON'S DOLPHIN										
Southwest Atlantic	21,000		141-212/		DD	nl	I			

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS[310] IUCN	CITES	CMS	AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES[311] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
			.67%-1.0% 25-170/ .1%-.8%							
Tierra del Fuego	14,000		5-30/.03%-.2%		DD	nl	I			
PONTOPORIA BLAINVILLEI FRANCISCANA										
FMA I			110		DD	nl	I&II			
FMA II			375		DD	nl	I&II			
FMA III	42,078 (33,047 – 53,542)		1,374 (694-2,215) 3.2%		DD	nl	I&II			
FMA IV	34,131 (16,360-74,397)		651 (398-1097) 1.9%		DD	nl	I&II			

PACIFIC AND INDIAN OCEANS										
AREA 51 – WESTERN INDIAN OCEAN										
SOUSA CHINENSIS – INDIAN HUMPBACK DOLPHIN										
Natal coast	200		7.5/3.75%		DD	I&II	II	Regional	CS/FS	
Zanzibar (Tanzaniza)	71		5.6%		DD	I&II	II	Regional	CS/FS	
TURSIOPS TRUNCATES – BOTTLENOSE DOLPHINS										
Indian Ocean coast south of Natal SAfrica	250		20-23/8-9%		DD		II	Regional	CS/FS	
Indian Ocean coast north of Natal S Africa	1,000		11-14/1-1.4%		DD		II	Regional	CS/FS	
TURSIOPS ADUNCUS – BOTTLENOSE DOLPHINS										
Zanzibar (Tanzania)	161		8%				II	Regional	CS/FS	

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS[310] IUCN	CITES	CMS	AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES[311] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
GRAMPUS GRISEUS – RISSO'S DOLPHIN										
Western Indian Ocean	5,500 to 13,000		1,300/24% - 10%		DD		II	Regional	CS/FS	
AREA 57 – EASTERN INDIAN OCEAN										
ORCAELLA BREVIROSTRIS – IRRAWADDY RIVER DOLPHIN										
Chilka Lake, India	20-30				DD		II	Regional	CS/FS	
PLATANISTA GANGETICA GANGES RIVER DOLPHIN.										
Ganges River	600-700				EN	I&II	I&II	Regional	CS/FS	
AREA 61 – NORTHWEST PACIFIC										
PHOCOENOIDES DALLI – DALL'S PORPOISE										
Western N Pacific	141,800		643-4,187/0.4-3.0%		LR		II	Regional	CS/FS	
NEOPHOCAENA PHOCAENOIDES – FINLESS PORPOISE										
Inland Sea Japan	4,900		84/1.7%		DD EN	I&II	II	Regional	CS/FS	
LIPOTES VEXILLIFER - BAIJI										
Yangtze	100-300		5/1.6-5.0%		CR	I&II				
AREA 71 – WESTERN CENTRAL PACIFIC										
TURSIOPS ADUNCUS – BOTTLENOSE DOLPHINS										
Northern Australia	700-1000		1700		nl	nl	II	Int'l/Regional	CS/FS/PS	
STENELLA LONGIROSTRIS – SPINNER DOLPHINS										
Northern Australia			1000		LR	nl	II	Int'l/Regional	CS/FS/PS	
Sulu Sea	30,000		1,500-3,000/5-10%		LR	nl	II	Int'l/Regional	CS/FS/PS	
LAGENODELPHIS HOSEI—FRASER'S DOLPHIN										
Eastern Sulu Sea	8,700				DD	nl	II	Int'l/Regional	CS/FS/PS	
SOUSA CHINENSIS—INDO-PACIFIC HUMPBACK DOLPHIN										
Northern Australian—Central Section Great Barrier Reef	200		11-100/5.5-50%		DD	I&II	I	Int'l/Regional	CS/FS/PS	

AREA/SPECIES	ABUNDANCE ESTIMATE	Updated Recently	BYCATCH ESTIMATE/% POPULATION AFFECTED	Bycatch Mortality exceeds 2%	STATUS[310] IUCN	CITES	CMS	AGREEMENTS IN PLACE? International/ Regional/Bilateral	PARTIES[311] Coastal State/Flag State/ Port State/(US)	MEASURES IMPLEMENTED? Monitoring Mitigation Observers Enforcement
ORCAELLA BREVIOSTRIS – IRRAWADDY (SNUBFIN) DOLPHIN										
Mahakam River, Indonesia	34-50		3/6-8%		CR		II			
Malampaya Sound, Palawan Philippines	77		2-5/2.5-6.5%		CR		II			
Mekong River	69		4/5.8		CR		II			
AREA 77 – EASTERN CENTRAL PACIFIC										
PSEUDORCA CRASSIDENS – FALSE KILLER WHALES										
Hawaiian stock	236		4-6/1.6-2.5%					Reg'l/Nat'l legisl	FS (US)	
PHOCOENA SINUS – VAQUITA										
	567		35-39/6.2-6.9%		CR	I&II		Bilateral US/Mex	CS/FS(US)	Biosphere reserve
AREA 81 – SOUTHWEST PACIFIC										
CEPHALORHYNCHUS HECTORI – HECTOR'S DOLPHIN										
South Island east	1,900		16/.8%		EN			National legis.	CS	Sanctuary regs, voluntary pingers
South Island west	5,400							National legis	CS	Regs, pingers
CEPHALORHYNCHUS HECTORI MAUI – MAUI'S DOLPHIN										
North Island	100-150		3/3-2%		CR			National legis.	CS	Protected area
AREA 87 – SOUTHEAST PACIFIC										
LAGENORHYNCHUS OBSCURUS – DUSKY DOLPHIN										
			500-1,800		DD		II	Nat'l leg/Regional	CS/FS	
PHOCOENA SPINIPINNIS – BURMEISTER'S PORPOISE										
			450-200		DD		II	National legisl.	CS/FS	

Atlantic Ocean

Major (in the top 20 for global, wild-capture landings) fisheries in the Atlantic include Atlantic herring, skipjack tuna, chub mackerel, Atlantic cod, Argentine shortfin squid, European pilchard, Gulf menhaden, European sprat, Atlantic mackerel, and European anchovy. Major fishing nations in the Atlantic are the U.S., Norway, Iceland, Denmark, Spain, and Canada. In the Atlantic Ocean, the major bycaught species and gear types in which this bycatch occurs are north Atlantic right whales off eastern North America, trap lines and gillnets; harbor porpoises in the North Sea, Celtic Sea, and Baltic Sea, gillnets; tucuxis in Caribbean coastal waters, gillnets; humpback dolphins in West Africa, coastal gillnets; sperm whales, striped dolphins, and short-beaked common dolphins in the Mediterranean, pelagic driftnets and gillnets; harbor porpoises in Black Sea, coastal gillnets; tucuxis in eastern South American coastal waters, gillnets; dusky and Commerson's dolphins in Argentina, coastal gillnets and midwater trawls and franciscanas in coastal gillnets.

Northwest Atlantic

In the Northwest Atlantic, the focal species for action is the North Atlantic right whale. The U.S. and Canada have developed a recovery plan for the species and have implementation teams; nevertheless, there is still a need for the U.S. to engage in bilateral discussions with Canada to achieve greater protection for the species. In addition, competent fishery bodies in the region that could play a role include the North Atlantic Fisheries Organization (NAFO) and the International Convention for the Conservation of Atlantic Tunas. Canada and the U.S., as well as fishing nations who operate in the area and might encounter right whales, are party to both those agreements[318] in the event of documentation of incidental catch outside the EEZs of U.S. and Canada. NAFO recently passed a resolution related to documentation of marine turtle bycatch in the region's fisheries[319] and might perform a similar function for additional documentation of cetacean bycatch.

Northeast Atlantic

In the Northeast Atlantic, harbor porpoise bycatch in bottom-set gillnets is estimated at nearly 15,000 animals per year. Of particular concern are harbor porpoise mortality levels in the Celtic Sea, where more than 6 percent of the minimum population estimates are killed annually as bycatch; in the Northern and central North Sea, Northern North Sea, and Southern and central North Sea where bycatch is at unsustainable levels amounting to 4.1, 5.0, and 4.3 percent, respectively, of the population estimates for those areas.

In this area, ASCOBANS provides a regional management framework for cetaceans. After its scientific documentation of bycatch problems, members of the agreement took a variety of actions to regulate fishing operations. Under the authority of the European Community Common Fisheries Policy, the EU imposed numerous bycatch reduction measures. In EU waters, closure of the albacore *(Thunnus alalunga)* driftnet fishery in the Bay of Biscay, Celtic Sea, and west of Ireland; prohibition of driftnets from 1 January 2004 (except in the Baltic Sea); and prohibition of

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[318] U.S., Japan, Canada, France, Russia, United Kingdom, European Community, Iceland, Norway, Nicaragua, Guatemala, Senegal, Belize, Syria, St. Vincent, and the Grenadines.

[319] http://www.nafo.int/publications/frames/general.html

tuna purse-seine fishing on dolphins represent important measures to reduce bycatch.[320] Denmark implemented a mandatory pinger program in certain North Sea bottom-set gillnet fisheries after undertaking rigorous studies of harbor porpoise *(Phocoena phocoena)* bycatch levels and conducting pinger trials.[321] In March 2004, the European Commission introduced a new regulation (Council Regulation [EC] No. 812/2004) aimed at reducing the bycatch of harbor porpoises in bottom-set gillnets and entangling nets. Beginning in the summer of 2005, pinger use was to become mandatory on bottom-set gillnets or entangling nets in the North Sea and the Skaggerak and Kattegat region of the Baltic deployed from vessels greater than 12 m in length. Similar rules were to apply to the western English Channel and South Western Approaches from January 2006, and to the east English Channel from January 2007. This regulation also made provision for the monitoring of dolphin bycatch in trawl fisheries from January 2005 in the English Channel, Irish Sea and off western Britain and Ireland, and from January 2006 in the North Sea and west Scotland.

However, within its framework for cooperation and research, ASCOBANS does not provide authority for actual regulation of fishing operations, even though it has documented how those operations affect cetacean bycatch. Action is up to individual parties of ASCOBANS for measures within their EEZs. Region-wide policy must come from the European Commission. Outside the EEZs of European countries, the North East Atlantic Fisheries Commission (NEAFC) and ICCAT govern fishery operations in international waters of the region. But these management regimes do not reach into coastal areas with documented bycatch. ICES, the International Commission for Exploration of the Seas, is the scientific arm for various management agencies in the Northeast Atlantic region; it assesses living marine species and monitors the health of the regional marine environment.

In order to address bycatch under a legally binding, Europe-wide management framework, either the EC or the members of ASCOBANS would have to establish legally accepted bycatch limits and enforcement strategies. Scientists generally agree that a PBR-type approach, incorporating the ASCOBANS management goal of maintaining stocks at 80 percent of the carrying capacity, is a useful means to determine critical bycatch mortality limits.[322] However, this would require the development of species-specific critical mortality limits for species other than harbor porpoises. More research investigating stock structure and maximum population growth rates is crucial to achieve this objective.

Scientists agree that it is necessary to carry out comprehensive surveys to estimate cetacean abundance, stock structure, and population growth rates in ASCOBANS waters at regular intervals.[323] Additionally, monitoring cetacean entanglement is urgently needed for all bottom-set gillnet, single and pair pelagic trawling operations in British, French, Dutch, Danish, Norwegian, and German fisheries. Scientists within ASCOBANS recommend observer coverage

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[320] Kaschner, K. 2003. Review of small cetacean bycatch in the ASCOBANS area and adjacent waters – current status and future actions. Submitted to the Fourth Meeting of the Parties to ASCOBANS, Esbjerg, Denmark, 19–22 August 2003. Document MOP4/Doc.21 (S). Unpublished.

[321] Vinther, M. 1999. Bycatches of harbour porpoises (*Phocoena phocoena* L.) in Danish set-net fisheries. *Journal of Cetacean Research and Management* **1**, 123–135. See also Larsen, F., and Rye Hansen, J. 2000. On the potential effects of widespread pinger use for the Danish North Sea gillnet fishery. IWC paper SC/52/SM27.

[322] CEC, 2002. Incidental catches of small cetaceans. Report of the second meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC (2002) 1134, Brussels, BL, Commission of the European Communities; 63.

[323] *Id.*

of 5–10 percent of total fishing effort for all bycatch monitoring programs. Only then can the effectiveness of the various mitigation measures be evaluated and, if necessary, modified.

Given the existing mandated mitigation measures and the existence of ASCOBANS, U.S. action may not be necessary and indeed would be difficult because the U.S. is not party to any of the relevant agreements. Nevertheless, the Office of International Affairs staff could attend and observe the ASCOBANS meetings, serving in an advisory capacity, providing technology or information transfer from U.S. experience with similar problems (e.g., approaches developed through the MMPA's incidental bycatch–reduction teams).

Western Central Atlantic

In the Western Central Atlantic, it is difficult to assess the magnitude of the threat posed to cetacean populations in the wider Caribbean region as a consequence of fisheries operations. Published information on bycatch is scarce. There is a great need for a systematic survey effort in the Caribbean and tropical Atlantic to acquire cetacean population estimates and to identify the species most frequently involved in fishery interactions.

UNEP's Caribbean regional seas program has recently promulgated a regional marine mammal action plan. In addition, it has also established a Regional Activity Centre in Guadeloupe for implementation of the protocol on Specially Protected Areas and Wildlife (SPAW). The U.S. became a party to the agreement in 2003. It could work through SPAW to ensure the effective implementation of the marine mammal action plan, specifically those parts related to documenting the range and abundance of cetaceans and the impacts of fishery bycatch and directed catches on cetacean populations in the wider Caribbean. Particular emphasis should be given to investigating tucuxis (*Sotalia*) along coastal waters of Honduras, Nicaragua, Costa Rica, Panama, Colombia, Venezuela, Guyana, Surinam, and French Guyana. A recent study of bycatch in the mouth of the Amazon indicated a kill of more than 1,050 tucuxis in a single year. Along with franciscanas, tucuxis are the most commonly caught cetaceans in Brazilian coastal gillnet fisheries.[324] The tucuxi may also be the cetacean most commonly caught as bycatch in coastal fisheries of the southern Caribbean Sea.

As a member of the agreement, the U.S. could encourage incorporation into the marine mammal action plan the objective of acquiring additional information on populations, fishing effort, and level of incidental bycatch. At this early stage, in the development of the agreement, emphasis on improving marine mammal science, technology transfer, and information sharing would be useful. The U.S. could hold a regional workshop to bring together scientists and managers within the wider Caribbean to specifically develop an action plan to assess cetacean populations and to document bycatch.

In addition, the U.S. is a member of the West Central Atlantic Fisheries Commission (WCAFC). This body was created in 1973 under FAO auspices, and in 1999 responded to an FAO review to take actions to strengthen its functions and responsibilities.[325] It is advisory only, but the U.S. could encourage revamping this body or creating a new one in the Caribbean

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[324] Beltrán, S., 1998. "Captura accidental de Sotalia fluviatilis (Gervais, 1853) na pescaria artesanal do Estuário Amazônico". M.Sc. thesis. Universidade do Amazonas, Manaus, Brasil. 100 pp. [In Portuguese] See also: Siciliano, S., 1994. Review of small cetaceans and fishery interactions in coastal waters of Brazil. Report of the International Whaling Commission (Special Issue) 15, 241–250.

[325] FAO. 1999. Progress Report on the Implementation of Conference Resolution 13/97 (Review of FAO Statutory Bodies and the Strengthening of FAO Regional Fishery Bodies) COFI/99/4. During this review the FAO abolished the Regional Fisheries Advisory Committee for the Southwest Atlantic (CARPAS) and the Inland Fishery Committee for Latin America and the Caribbean (COPESCAL). Available at http://www.fao.org/docrep/meeting/x0361e.htm

region in accordance with more recent trends for regional fishery management organizations, incorporating more of the principles of the Straddling Stocks Agreement. The Secretariat of the Caribbean Community made such a recommendation in 2003.[326] The international provisions of both the MMPA and the M-SFCMA call for this type of leadership to increase the tools available to bring fishing into compliance with the most recent international standards. A successor to the WCAFC could be a venue to advance a resolution on cetacean bycatch similar to what has been done for sea turtles in other fisheries organizations.

Should any documentation arise related to incidental bycatch of cetaceans during fishing on highly migratory stocks such as tuna or swordfish in the region, provisions of the Straddling Stocks Agreement might be raised in the ICCAT forum.

Eastern Central Atlantic

In the Eastern Central Atlantic, the clymene dolphin (Ghanaians call it the "common dolphin"), bottlenose, pantropical spotted, Risso's, long-beaked common, and rough-toothed dolphins; short-finned pilot whale, melon-headed whale, dwarf sperm, and Cuvier's beaked whale [327] may all be caught in large-meshed drift gillnets targeting tuna, sharks, billfish, manta rays, and dolphins. But the species most threatened by bycatch in West Africa is the Atlantic humpback dolphin. There is a significant need to document the bycatch of humpback dolphins in West African countries, especially in the coastal fisheries in Ghana and Togo, which have failed to yield a single record because of the severely depleted population.[328] Research is needed to establish the range, distribution, natural history, taxonomy, abundance, and fishery interactions of Atlantic humpback dolphins. A high priority area for dedicated field investigations is Ghana's Volta River region and western Togo. The Convention on Migratory Species could be used to encourage the Ghana and Togo fisheries and wildlife departments to ban or at least limit commerce in cetacean products (e.g., restrict consumption to local fishing communities). Additionally, Ghana should be encouraged to protect humpback dolphins by adding this species to the conservation program of Ada Sanctuary at the mouth of the Volta (Songhor RAMSAR site) and perhaps declare this site closed to gillnet fishing.

The U.S. is a party to the (relatively) new Convention on the Conservation and Management of Fishery Resources in the South East Atlantic Ocean (SEAFO). This is one of the new agreements done in the model of the Straddling Stocks Agreement. It incorporates key measures such as the precautionary approach, ecosystem conservation, and bycatch reduction. It gives port states authority to develop control measures, conduct inspections, and deploy observers. That means the U.S. could place observers on vessels in these fisheries. The agreement calls for research to assess effects of fishing on non-target species. The U.S. could use this forum to advance a resolution requiring parties to document cetacean population abundance and bycatch and report back to the secretariat.

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[326] CARICOM Secretariat. 2004. A Common Fisheries Regime for the Caribbean Sea. July 2004.

[327] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A. and Notarbartolo di Sciara, Giuseppe (compilers). (2003). Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans. IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139 pp.

[328] Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Drammeh, F., Jallow, A., Ndiaye, E. and Samba Ould Bilal, A.O. 2001a. Conservation efforts and field research on cetaceans in Senegal and The Gambia. Report to UNEP/CMS Secretariat, Bonn, Germany. See also Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Jallow, A.O., Ndiaye, E., Samba Ould Bilal, A.O., and Bamy, I.L. 2004. Distribution, status and biology of the Atlantic humpback dolphin *Sousa teuszii* (Kükenthal, 1892). Aquatic Mammals 30: 56–83.

Additionally, since at least the late 1960s, it has been speculated that dolphins are involved in the tuna purse-seine fishery in the eastern tropical Atlantic Ocean. The tuna vessels are registered in several countries, including France, Spain, and the U.S. as well as several West African countries. The levels of mortality, stock sizes, and even exact species involved are not known with certainty, and there is conflicting information on the extent of the problem. It has been suggested that dolphin mortality in this fishery could be very high, as many as 30,000 or more animals per year.[329] The species involved likely include several species of the genus *Stenella*, as well as common dolphins (*Delphinus* spp.)[330] Tuna-whale interactions are also known to occur, and baleen whales are considered to be good indicators of tuna schools.[331] Despite claims to the contrary, there is reason to suspect a serious problem that has been neglected for more than 30 years. Independent observer data on the composition and extent of the bycatch need to be obtained and published. Although observer programs may already exist in this fishery, adequate information to assess the cetacean bycatch is currently lacking. Section 16 USC 1385 (d)(1) of the MMPA sets up the conditions and documentation required in order to label tuna as "Dolphin Safe". Fisheries outside the eastern tropical Pacific Ocean must provide certain documentation to import tuna into the U.S. if the "Secretary [of Commerce] has determined that a regular and significant association occurs between dolphins and tuna."[332] The purpose of this language was to require the Secretary to investigate instances—such as the tuna-whale interactions suspected in the eastern tropical Atlantic where fisheries may be intentionally encircling, injuring, and possibly killing cetaceans—and use this information not only to govern the labeling of tuna, but also to bring about additional investigation and mitigation of any potential problem in forums such as ICCAT. Therefore, the U.S. can use both ICCAT and SEAFO to document the occurrence of intentional encirclement and, if necessary, devise and implement mitigation measures to bring the bycatch into compliance with the MMPA.

Mediterranean and Black Seas

In the Mediterranean, the focal species most affected by interactions with fisheries appear to be striped dolphin, common dolphin, harbor porpoise, and sperm whale. Both the Mediterranean and Black seas are covered by the ACCOBAMS agreement, and both have programs under the auspices of the UNEP Regional Seas Program. The Mediterranean UNEP program has more action plans and resources for cetacean conservation than does the Black Sea program, which is primarily focused on reversing decades of environmental degradation from pollution.

Incidental mortality of large numbers of sperm whales is known to have occurred in the high-seas driftnet fishery for swordfish, possibly reducing their abundance in the Mediterranean. Entanglement in high-seas swordfish driftnets kills between 7 and 14 sperm whales per year.[333]

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[329] Alverson, F.G., 1991. Tuna purse seine and gill/drift net fisheries in the oceans of the world and their relationship to tuna-dolphin, tuna-whale and tuna-whale shark associated schools. Unpublished Report Submitted to the CANAINPES Seccion Especializada en Pesca de Atun Programa Atun-delfin, Camara Nacional de la Industria Pesquera. 110 pp.

[330] Maigret, J. 1981. Introduction à l'étude des rapports entre les cétacés et la pêche thonière dans l'Atlantique tropical. *Bull. du Centre Natl. Rech. Oceanogr.* Pêches Mouadhibou **10**, 89–101.

[331] Alverson, *supra* note 321. F.G.,1991.

[332] Section 1385(d)(1)(B)(i).

[333] International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15:1–72. See also: Pace, D.S., Miragliuolo, A., Mussi, B. 2005. Behaviour of a nursery group of entangled sperm whales *(Physeter macrocephalus)* off Capo Palinuro (Southern

With no estimates available, surveys are needed to assess the abundance and distribution of sperm whales in the Mediterranean and the impact of this mortality on the Mediterranean sperm whale population.

Likewise, large numbers (perhaps approaching the thousands) of striped dolphins have been killed incidentally in the high-seas driftnet fishery for swordfish, possibly reducing their abundance in the Mediterranean. Incidental mortality may approach 1 percent of the population in the Alboran Sea and the Corsican–Ligurian Sea.[334]

Short-beaked common dolphins in the Mediterranean and Black seas have undergone a dramatic decline in abundance during the last few decades and have almost completely disappeared from large portions of their former range, including the northern Adriatic Sea, Balearic Sea, Provençal basin, and Ligurian Sea.[335] No credible information exists on the abundance of common dolphins (and other cetaceans) in the Black Sea. Other than the reported bycatch of 145 to 200 common dolphins in the Spanish swordfish driftnet fishery in 1993–1994, the threats posed to common dolphins by accidental killing in fishing gear are virtually undocumented.

The Black Sea population of harbor porpoises is classified as vulnerable on the IUCN Red List. These animals are threatened by accidental killing in large-mesh bottom-set gillnets for turbot, sturgeon, and dogfish. Mortality estimates are not available. However, available data indicate that the annual level of harbor porpoise bycatch may be in the thousands.[336]

The Black Sea needs a comprehensive effort to determine distribution patterns and estimate abundance of harbor porpoise as well as an effort, through interview surveys, visits to fish markets and landing sites, and on-board observer programs, to evaluate incidental catch

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Tyrrhenian Sea, Italy). Abstracts, 19Th Annual Conference of the European Cetacean Society, La Rochelle, France, 2–7 April 2005:69.

[334] International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15:1–72. See also: Pace, D.S., Miragliuolo, A., Mussi, B. 2005. Behaviour of a nursery group of entangled sperm whales *(Physeter macrocephalus)* off Capo Palinuro (Southern Tyrrhenian Sea, Italy). Abstracts, 19Th Annual Conference of the European Cetacean Society, La Rochelle, France, 2–7 April 2005:69.

[335] UNEP/IUCN. 1994. Technical report on the state of cetaceans in the Mediterranean. Mediterranean Action Plan Technical Reports Series No. 82, United Nations Environment Programme (UNEP), Regional Activity Centre for Specially Protected Areas, Tunis. 37 pp.

[336] Commercial hunting of Black Sea cetaceans, including harbor porpoises, was banned in 1966 in the former U.S.SR (present Georgia, Russia and Ukraine), Bulgaria, and Romania and, in 1983, in Turkey. The riparian states assumed international obligations to protect Black Sea cetaceans as contracting parties of the Convention on Biological Diversity (CBD), Convention on the Conservation of Migratory Species of Wild Animals (CMS), Convention on the Conservation of European Wildlife and Natural Habitats (Berne Convention), Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, Appendix II), and the Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS). The harbor porpoise, *P. phocoena*, is mentioned in Annex II of the EC Directive No.92/43/EEC on the conservation of natural habitats of wild fauna and flora. In 1996, the Ministers of Environment of Black Sea countries adopted cetacean conservation and research measures within the framework of the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea (paragraph 62). The harbor porpoise is included as Data Deficient in the regional Black Sea Red Data Book (1999). However, in 2002, it was listed as Endangered in the Provisional List of Species of the Black Sea Importance, an annex to the Black Sea Biodiversity and Landscape Conservation Protocol of the Bucharest Convention.

and illegal hunting. Results of the population and threat assessments should lead to the development of a basin-wide conservation plan.

Work should be undertaken to determine the distribution and abundance of sperm whales and common and striped dolphins in the Mediterranean and Black seas and their connecting waters and efforts should be made to evaluate the extent and risk posed by incidental mortality in fishing operations. There may be several avenues to accomplish this basic assessment work.

Potential avenues for basic assessment work may exist under the UNEP Regional Seas, Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (Entry into Force: 12 December 1999). Through the UNEP Regional Seas, the Mediterranean Program has linkages with the FAO and a host of other entities that have responsibility for fisheries, protected species, biodiversity, and migratory species. They all have action plans.[337] The ACCOBAMS Secretariat and Mediterranean Action Programme (SPA/RAC) signed a memorandum of understanding to coordinate the joint implementation of ACCOBAMS and the Barcelona Convention Action Plan on cetaceans.[338] In addition, the Secretariat of ACCOBAMS is on the advisory committee for the Strategic Action Program for Biodiversity (SAP BIO) to provide coordination for protection of threatened Mediterranean marine species and species management. Other frameworks that could provide support to Mediterranean coastal states for the acquisition of data and implementation of Action Plans, conservation of threatened species, and for species management include RAMSAR, the Bonn Convention and CITES.

ACCOBAMS has the authority to address bycatch of cetaceans in the Mediterranean and Black seas. ACCOBAMS came into force only in 2001 and therefore is still in its early stages of development. In the near future, ACCOBAMS Secretariat should work with national agencies and scientists to undertake the needed abundance surveys and to monitor incidental mortality to develop accurate bycatch estimates. It should establish scientifically sound bycatch limits and enforcement strategies. Without such estimates and a management framework, ACCOBAMS' ability to effectively regulate incidental mortality and develop conservation plans and measures will be severely diminished. Although the U.S. is not a party nation to ACCOBAMS[339], it could monitor progress and provide advice as the convention develops the conservation and management framework needed to address the threat of fisheries bycatch.

The high mortality of cetaceans in large-scale drift gillnet fisheries on the high seas has been largely eliminated, at least in some ocean regions, through decisive action by the United Nations General Assembly, which declared a global ban beginning in 1993 (See Chapter 3). However, the reach of this driftnet ban did not extend to several key areas such as the

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[337] For example, FAO cooperates with MAP in relation to responsible fishing through the General Fisheries Commission for the Mediterranean (GFCM); they have a memorandum of cooperation signed in 2000 with the Convention on Biological Diversity Executive Secretary for the harmonized implementation of the CBD and SPA Protocol in the Mediterranean and for the better implementation of the CBD program on the conservation and sustainable use of marine and coastal biological diversity. See also programs for assessments (e.g., NATURA).

[338] http://www.unep.org/regionalseas/Programmes/UNEP_Administered_Programmes/Mediterranean_Region/default.asp. Accessed 15 January 2006.

[339] The U.S. declined to join either ACCOBAMS or the Bonn Convention that underlies it because of concerns about the federal-state management relationship related to migratory waterfowl in the U.S. It has, however, become a member of specific protocols or MOUs negotiated under the Bonn Convention. Pers. Comm., NOAA OIA, March 2007.

Mediterranean Sea[340] and EEZs where cetacean bycatch remains significant and where illegal driftnet fishing poses a major threat to all of these species.

Pelagic driftnets have been prohibited in Spain since 1995. On 8 June 1998, the EU Fisheries Council adopted Council Regulation 1239/98 banning the use of driftnets by 1 January 2002 in all waters falling within the jurisdiction of Member States, as well as outside those waters. The EU driftnet ban entered into force on 1 January 2002. On 26 November 2003, ICCAT adopted, at its 18th Annual Meeting in Dublin, Ireland, Recommendation (03-04), which prohibits the use of driftnets in fisheries for large pelagic species in the Mediterranean by its Contracting Parties, Cooperating Non-Contracting Parties, Entities, and Fishing Entities. In practical terms, the recommendation prohibits driftnet fishing on the high seas or in territorial waters and closes a driftnet fishing loophole that could be used by countries that are members of ICCAT but not the EU. At the 20th Session of the General Fisheries Commission for the Mediterranean (GFCM) on 21–25 February 2005, the Commission adopted, as Recommendation GFCM/2005/3(A), ICCAT Recommendation 03-04 prohibiting the use of driftnets for fisheries of large pelagics in the Mediterranean Sea.

Despite these restrictions several nongovernmental organizations (NGOs) continued to assert that as many as 600 vessels with driftnets from 7–9 km in length, were operating throughout the Mediterranean Sea. World Wildlife Federation (WWF)–International claimed that the Moroccan driftnet fleet, with 177 vessels, was killing thousands of dolphins and other vulnerable species such as sharks and sea turtles in the Alboran Sea and around the Straits of Gibraltar. The WWF also alleged that Italian, French, Turkish, and most probably other fishing fleets were using driftnets in breach of existing legislation and the United Nations driftnet moratorium.[341]

In 2005, the U.S. confirmed the existence of a Moroccan driftnet fleet and began to work with the country on a plan to phase out Morocco's driftnet fleet. The U.S. has earmarked funds to help with some aspects of Morocco's driftnet elimination program. That same year, the EU and Morocco signed a new fisheries partnership agreement whereby 119 EU vessels were to be allowed to fish in Moroccan waters in exchange for EU compensation of approximately $42 million per year, the proceeds of which are designed to fund the conversion of the Moroccan driftnet fleet to more sustainable fishing activities.

Turkey, on the other hand, is still fishing in violation of the ICCAT and GFCM driftnet ban, administering a fleet of fewer than 100 driftnet vessels, each less than 15 meters long with fishing nets that are 800–1,000 meters long, targeting swordfish off the southwest corner of Turkey. In order to accede to the EU, Turkey must, as a prerequisite, agree to adopt the common rules, standards, and policies that make up the body of EU law —this would include terminating its driftnet fleet.

Following an order of the U.S. Court of International Trade, the U.S., on 19 March 1999, identified Italy as a nation for which there was reason to believe its nationals or vessels were conducting large-scale driftnet fishing beyond the EEZ of any nation, pursuant to the U.S. High Seas Driftnet Fisheries Enforcement Act (the Act). This marked the second time the U.S.

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[340] Tudela, S., Guglielmi, P., El Andalossi, M., Kai Kai, A. and Francesc Maynou, A.H. 2003. Biodiversity impact of the Moroccan driftnet fleet operating in the Alboran Sea (SW Mediterranean). WWF Mediterranean Programme Office, Rome.

[341] Imbert, G., Gaertner, J.-C., and Laubier, L., 2001b. Prevention a l'aide de repulsifs acoustiques des captures de dauphins par les thonailles. 10e Conference International sur les cetaces Mediterranee de la RIMMO. Juan-les Pins 16–18 Nov. 2001 (Abstract)

identified Italy pursuant to the Act (the first identification was in 1996). As a result of the identification, the U.S. began consultations with the government of Italy on 17 April 1999 to obtain an agreement to bring about the immediate termination of such activities. In July 1999, an agreement was reached. The 1999 driftnet agreement reiterated Italy's commitment to full implementation of the measures to combat large-scale high-seas driftnet fishing contained in the 1996 U.S.–Italy driftnet agreement. As a result of Italy's driftnet vessel conversion program (a product of the 1996 agreement), about 85 percent of Italy's driftnet fleet of 679 vessels were converted to other fishing methods or scrapped by March 2000. The Government of Italy expected the remaining vessels to continue to fish in Italian waters until the EU driftnet ban entered into force in 2002 (Italy is a member of the EU).

In 2003, the Italian government enacted legislation that required "compulsory dismissal or conversion" (boats could be scrapped or converted to another gear type) of the driftnet fishing licenses of the remaining 89 licensed driftnet vessels that did not participate in Italy's earlier driftnet conversion program. The legislation also seized and sealed the driftnets from all 89 vessels, cancelled the driftnet portions of the fishing licenses of all of the 89 remaining vessels, and deleted the names of those vessels from the EU Vessel Registry, which contains a unique registration number for each vessel.

Nevertheless, environmental groups continued to claim that Italian vessels were still fishing with driftnets in Mediterranean waters in 2005. In March 2005, the Royal Society for the Prevention of Cruelty to Animals (RSPCA) and the Humane Society International (HSI) reported that nine Italian driftnet vessels were fishing illegally (three may have been fishing in international waters). Additionally, in 2004, they identified in Ischia harbor 15 Italian vessels equipped with driftnets estimated to range in length from 9 to 84 kilometers. Of all of the vessels detected, five had the same registration numbers as vessels that had accepted the EU conversion buyout funds prior to the EU ban on driftnet fishing. Meanwhile, Oceana identified 37 Italian fishing vessels in six Italian ports and at sea with driftnets on board. Oceana reported that 18 of the 37 had previously received subsidies from the government of Italy to stop using driftnet gear.

Based on this information, the U.S. embarked on a series of bilateral and multilateral efforts to address this issue. In response, Italy told the U.S. that it strongly opposes illegal driftnet activities and that it is working with the GFCM to ban the use of driftnets in the Mediterranean Sea by non-European countries. Italy submitted a report to the U.S. detailing more than 189 driftnet violations and the seizure of 402 km of driftnets through the end of July 2005.

On the multilateral level, the U.S. appealed to the EC to take appropriate steps to strengthen enforcement of its driftnet ban. At the U.S.–EC high-level fisheries bilateral meeting in Washington, D.C., on 27 June 2005, the representative of the Directorate-General assured the U.S. delegation that the EC was actively engaged on this issue.

To date, the U.S. has continued to apply the provision of the High Seas Driftnet Fisheries Enforcement Act that denies entry of Italian large-scale driftnet vessels to U.S. ports and navigable waters. Since 29 May 1996, it has also required Italy to provide documentary evidence pursuant to the Dolphin Protection Consumer Information Act (16 USC 1371(a)(2)(E)) that certain fish and fish products it wishes to export to the U.S. are not harvested with large-scale driftnets on the high seas.

While the U.S. remains concerned by reports from conservation organizations in 2004 and 2005 that some Italian vessels and nationals may still be engaged in large-scale high-seas driftnet fishing; diplomatic actions and the threat of Pelly sanctions have not been effective at either deterring illegal driftnet fishing or bringing about Italy's full compliance with the various

international regulations banning driftnet fishing. The U.S. must continue efforts to work with Italy, the EC, and ICCAT to address this situation, but it should consider taking more aggressive action to sanction Italy under section 101 of the MMPA.

Southwestern Atlantic

The franciscana *(Pontoporia blainvillei)* is the most threatened species of small cetacean in the southwestern Atlantic Ocean. The tucuxis, dusky, and Commerson's dolphins also experience relatively high levels of incidental mortality; again, the impact on these populations is unknown. An estimated one to 10 percent of the population of franciscana is incidentally killed in gillnet fisheries (1,500–2,000 animals per year); most are juveniles aged one through three years.[342] There is still a great need to gather biological information on ecology, genetics, and mortality rates of franciscana. Additionally, range states should be encouraged to monitor and mitigate franciscanas bycatch.

Tucuxi are entangled in beach seines, shrimp and fish traps, and, more frequently, in set gillnets and driftnets throughout their range. They are frequently entangled in fishing gear, especially coastal gillnets in Brazil, and their flesh is used as bait in shark fisheries. Bycatch of tucuxis has been reported in gillnets in the Gulf of Venezuela. An estimated 938 animals were caught in drift nets from the port of Arapiranga during the summer of 1996 and an additional 125 caught during the winter.[343] In 1999, the IWC estimated 141 tucuxis were incidentally caught in fisheries.[344] Finally, pelagic trawls incidentally kill an estimated one percent to two percent of the populations of Commerson's and dusky dolphins, respectively.

There is a clear need for detailed information on fleet characteristics and dynamics and on the numbers and species composition of the bycatch. On-board observers are essential to assessing bycatch and must be made a priority. Moreover, the impacts of fishery mortality on cetacean populations can only be assessed if abundance estimates are available. Consequently, further research is needed to identify and delineate cetacean management units and acquire up-to-date abundance estimates for all populations in this region. Range states should develop and test devices to prevent dolphins from entering trawls and, if possible, assess the effectiveness and feasibility of using pingers to reduce dolphin mortality in the gillnet fisheries.

An FAO advisory committee (CARPAS) was established in the region in the 1970s, but was abolished in 1997 because of a long period of inactivity. A bilateral joint commission exists for the fisheries off Uruguay and Argentina to conduct assessments, fishery research, and other activities for the two nations' EEZ fisheries that operate off the coast seaward of the Rio de Plata—the Joint Permanent Commission for the Argentina/Uruguay Maritime Front (CTMFM).[345] This bilateral joint commission may be an avenue to encourage information collection under the auspices of this organization. Given the absence of any regional fishery management organization, the region may be a candidate for creation of a new RFMO under the standards of the Straddling Stocks agreement or an agreement for the region similar to ASCOBANS or ACCOBAMS. Certainly the fisheries in the area in question migrate along the EEZs of Uruguay, Argentina, and Brazil. Finally, the U.S. has recently instituted a trawl bycatch reduction team to

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[342] Culik, B.M., (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.

[343] IWC (2000)Annex K: Report of the Sub-Committee on small cetaceans, IWC, Cambridge, 2000

[344] IWC (2003) Annex K: Report of the Sub-Committee on small cetaceans, IWC, Cambridge, 2003

[345] http://www.ctmfm.org/

develop mitigation measures to reduce the serious injury and mortality of pilot whales and other pelagic dolphin species in trawl fisheries to levels approaching the zero mortality rate goal. The measures adopted by the trawl bycatch reduction team may provide the foundation for bilateral discussion with Argentina whereby the U.S. might provide technical and financial assistance to further test and implement these measures in the Argentine trawl fishery.

Pacific Ocean (Including Indian Ocean)

Major (in the top 20 for global, wild-capture landings) fisheries in the Pacific include Peruvian anchovy, Alaska pollock, skipjack tuna, chub mackerel, Japanese anchovy, Chilean jack mackerel, largehead hairtail, blue whiting, yellowfin tuna, capelin, Araucanian herring, and Akiami paste shrimp. Major fishing nations in the Pacific are China, Peru, Japan, Chile, U.S., Indonesia, Russian Federation, India, Thailand, Republic of Korea, Philippines, Malaysia, Mexico, Vietnam, and Taiwan.

Western Indian Ocean

In the western Indian Ocean, the incidental mortalities of spinner (4,000), spotted (1,500), common (1,000), and Risso's dolphins (1,300); pygmy sperm whales (2,700); dwarf sperm whales (2,700); and bottlenose dolphins (500–1,250) are particularly high in the Sri Lankan fisheries. With the exception of the Risso's dolphin, the magnitude of this bycatch for each of these species unknown because abundance estimates do not exist. The bycatch of Risso's dolphins is unsustainable, representing between 10-24 percent of the population.

The accidental mortality of bottlenose and humpback dolphins in anti-shark nets used to protect bathers along the Natal coast is unsustainable, amounting to 11–23 and 7–8 animals, respectively, per year or 9 percent of the bottlenose and 4 percent of the humpback dolphin population.[346] Additionally, off the coast of East Africa, observer programs estimated that the annual incidental fishing mortality was 8 percent and 5.6 percent of the estimated number of Indo-Pacific bottlenose dolphins and humpback dolphins in the area, respectively.

Sri Lanka and India fisheries deploy more than 1.5 million gillnets and incidentally entangle more than 12,000 to 27,000 cetaceans annually.[347] In 1993, Sri Lanka instituted legal protections for cetaceans, but poor enforcement of these laws has made them virtually meaningless.[348] Incidental mortality in fisheries is thought to be a significant conservation problem; thus, continued monitoring of the entanglement of dolphins along the Sri Lankan and Indian coast is very important as the expanding coastal gillnet fishery may greatly affect these dolphin species.

Reliable and current data on cetacean populations and mortality rates are nonexistent, for all practical purposes, making it impossible to assess the magnitude of the problem in this area

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[346] Jefferson, T.A., and Karczmarski, L., 2001. *Sousa chinensis*. *Mammalian Species* (American Society of Mammalogists) **655**, 9 pp. See also Cockcroft, V.G., 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. *South African Journal of Wildlife Research* **20(2)**, 44–51.

[347] Leatherwood, S., 1994. Report of the workshop on mortality in passive fishing nets and traps. Annex D. Re-estimation of incidental cetacean catches in Sri Lanka. In: W.F. Perrin, G.P. Donovan, and J. Barlow *(eds). Gill-nets and Cetaceans. Reports of the International Whaling Commission, Special Issue 15*, pp. 64–65. Cambridge, UK: International Whaling Commission.

[348] Ilangakoon, A., 1997. Species composition, seasonal variation, sex ratio and body length of small cetaceans caught off west, south-west and south coast of Sri Lanka. *Journal of the Bombay Natural History Society* **94**, 298–306.

and to establish clear priorities for conservation. What is needed is a comprehensive program to study cetacean populations and the impacts from hunting and fishing activities in the western Indian Ocean. Finally, efforts are needed to assess populations, habitats, and bycatch in rivers or portions of rivers where the Ganges River dolphin occurs.

Eastern Indian Ocean

In the eastern Indian Ocean, recent information on marine mammal–fishery interactions is lacking entirely. A now-terminated Taiwanese shark and tuna gillnet fishery operating off Northern Australia caught bottlenose dolphin, spinner dolphin, spotted dolphin, humpback dolphin, and false killer whale; other gillnet fisheries likely catch finless porpoise and Irrawaddy dolphin. The driftnet fisheries operating further offshore in the Bay of Bengal and the southern Indian Ocean may catch spinner dolphin, spotted dolphin, spectacled porpoise, southern right whale dolphin, and common dolphin.

On the eastern coast of India, as far south as Vishakhapatnam, is the westernmost range of the Irrawaddy dolphin and the only known freshwater population—in Chilka Lake India. This population is caught in gillnets and drag nets and may number as few as 50 remaining individuals. Consequently, there is a need for cetacean abundance surveys in rivers, lakes and along the east coast of this region as well as a rigorous monitoring program to document all cetacean mortality (especially of Irrawaddy dolphins in Chilka Lake). In general, this area would benefit from a regional management organization similar to ACCOBAMS, but for the entire Indian Ocean.

The Ganges River dolphin is listed as endangered by the IUCN and numbers 600-700 animals. Construction of 50 or more dams and barrages within the Ganges dolphin's historic range has drastically altered its habitat and fragmented the metapopulation. Deliberate killing of Ganges dolphins for meat and oil occurs in the middle Ganges near Patna, in the Kalni-Kushiyara River of Bangladesh, and in the upper reaches of the Brahmaputra.[349] Bycatch estimates are not available and the demand for these products means that there is little incentive for fishermen to reduce the bycatch or to release dolphins that are still alive when found in nets. A particular problem is the use of dolphin oil as an attractant for catfish.

A regional management body could take the lead in coordinating efforts to assess cetacean populations, estimate bycatch, establish science-based bycatch management frameworks, research promising new bycatch mitigation technologies, and contribute to the enforcement of cetacean protective laws. However, no such instrument exists in the region. The UNEP Regional Seas Programme has a set of action plans for the South East Asian region, which includes the Indian Ocean, but there is no convention yet, and the action plans to date have concentrated on building capacity in the region and on sustainable development in the coastal zone. The work plan does not even include a nominal mention of biodiversity conservation or species protection.

A new regional fishery management organization—the South West Indian Ocean Fisheries Commission—was constituted under the auspices of the FAO in 2004, and its mandate is to concentrate on coastal fisheries of the region. In February 2006, parties were expected to

[349] Smith, B.D. and Reeves, R.R. (eds.) 2000a. Report of the second meeting of the Asian river dolphin committee, 22–24 February 1997, Rajendrapur, Bangladesh. Pp.1–14 *in: Biology and Conservation of Freshwater Cetaceans in Asia* (eds. R.R. Reeves, B.D. Smith, and T. Kasuya). IUCN/SSC Occasional Paper No. 23, Gland, Switzerland and Cambridge, UK.

complete negotiations on an agreement for governing high-seas fisheries in the southern Indian Ocean (other than tuna, which are managed by the Indian Ocean Tuna Commission). The organization has set data collection as its highest priority, and it has responsibility for all living marine resources, not just fish. The organization will operate by the principles set out in the Code of Conduct for Responsible Fishing, including ecosystem approaches. The area of competence for the body, however, does not extend into the areas of the Indian Ocean adjacent to Sri Lanka, India, or other areas with critical issues of incidental bycatch.

Northwest Pacific

In the Northwest Pacific, incidental mortality in fisheries threatens Dall's porpoise, finless porpoise, and the Baiji. In the 1980s, the Japanese, Taiwanese, and South Korean squid driftnet fishery killed thousands to tens of thousands Dall's porpoise—reducing the Bering Sea population of Dall's porpoise to between 78 percent and 94 percent of its pre-exploitation size, and the Western Pacific population to between 66 percent and 91 percent of its original size.[350] Today, large numbers of Dall's porpoises still die in driftnets within national waters of Japan and Russia, where the U.N. ban on driftnets does not apply. The estimated bycatch in the Japanese salmon driftnet fishery operating in the Russian EEZ totaled close to 12,000 for the period 1993 to 1999, ranging from 643 to 3149 on an annual basis.[351] In addition, more than 17,168 small cetaceans are caught by Japan each year in direct harvests. Dall's porpoise, Baird's beaked whale, pilot whales, and bottlenose and Risso's dolphins are all caught in directed fisheries. The IWC Scientific Committee has expressed concern over the level of harvests of Dall's porpoise (14,992 from 1998 through 2002). These harvests highlight the need for an international agreement that regulates the direct harvests of small cetaceans.

Fisheries incidental mortality in the Yangtze River threatens the continued existence of the baiji. Electrofishing is the greatest threat to this species where 5 of 12 documented deaths in the 1990s have been attributed to the practice.[352] Previously, the main cause of mortality was the use of a snagline fishing gear called "rolling hooks." While some types of rolling hooks are illegal, their use continues within the limited remaining range of the baiji. Efforts are needed to end electrofishing and eliminate all forms of rolling hooks within the baiji's range.

In the Yangtze, electrofishing also threatens finless porpoises. Additionally, China's extensive fishing fleets use gear such as gill and trawl nets, known to kill cetaceans, with the bycatch of finless porpoises being especially high.[353] From 1985 through 1992, 114 finless porpoises were found off the coast of western and northeastern Kyushu, including part of the western inland sea of Japan: 84 were incidentally killed by fisheries—bottom gillnets killed 58;

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[350] Mangel M., 1993. Effects of high seas driftnet fisheries on the northern right whale dolphin *Lissodelphis borealis*. Ecol App 3: 221–229.

[351] IWC. 2002c. Report of the standing sub-committee on small cetaceans. *Journal of Cetacean Research and Management* **4** (Supplement), 325–338.

[352] Zhang, X., Wang Ding, Liu, R., Hua, Y., Wang, Y., Chen, Z., and Wang, L. 2001. Latest population of the baiji (*Lipotes vexillifer*) and its conservation in the Yangtze River, China. Pp. 41–53 *in:* [Proceedings of] Conference on Conservation of Cetaceans in China, March 2001, Shanghai. Published by Ministry of Agriculture, P.R. China.

[353] Parsons, E.C.M., and Wang, J.Y., 1998. A review of finless porpoises (*Neophocaena phocaenoides*) from the South China Sea. Pp. 287–306 *in:* The Marine Biology of the South China Sea. Proceedings of the Third International Conference on the Marine Biology of the South China Sea, Hong Kong, 28 October–1 November 1996 (ed. B. Morton). Hong Kong University Press.

surface gillnets killed 17; trapnets killed 7; trawl nets killed 1; and drifting ghost nets killed 1.[354] Finless porpoises were also incidentally captured most frequently in the coastal waters of China—totaling about 2,132 individuals in trawl, gillnet, and stow nets.[355] There is a tremendous need for a systematic abundance survey throughout the range of the finless porpoise and for better estimates of bycatch for this species.

Overall, given the large and growing fisheries of Japan, China, Korea, and Taiwan, there is a desperate need for both systematic bycatch assessments in these diverse fisheries and up-to-date abundance estimates. The region needs a competent management organization that could take the lead in coordinating efforts to assess cetacean populations, estimate bycatch and direct harvest, establish science-based bycatch and direct harvest management frameworks, research promising new bycatch mitigation technologies, and contribute to the enforcement of cetacean protective laws. Two scientific bodies and several regional advisory bodies might provide venues for basic assessment efforts or information exchange. The North Pacific Marine Science Organization (PICES) provides similar services to those of ICES in the North Atlantic. The Secretariat for the Pacific Community operates in the southern hemisphere, and likewise maintains data, collects scientific information, fishery data and so forth. Depending on U.S. interests and relationships, advisory bodies that might provide access include the Asia-Pacific Fisheries Commission, the South Pacific Forum Fisheries Agency, and the Asia Pacific Fisheries Commission. None of these bodies follows the currently preferred Straddling Stocks paradigm. This would be a region that deserves scrutiny under the rubric of the 2006 amendments to the M-SFCMA, either as a location where the U.S. would seek improved communication and information exchange, or identification and listing as nations that "fail to end or reduce bycatch of protected living marine resources by using regulatory measures that are comparable to those of the United States."[356]

Western Central Pacific

Roughly 1,700 bottlenose dolphins and 1,000 spinner dolphins are incidentally caught at unsustainable levels in gillnet, driftnet, and purse-seine fisheries in the western central Pacific off the coast of Australia. Perhaps 5 t0 50 percent of the population of Indo-Pacific humpback dolphins are incidentally captured in offshore driftnets and in inshore gillnets set to protect bathers from sharks north of Brisbane Australian and along the central section of the Great Barrier Reef. However, because poor population and bycatch estimates these percentages are suspect.

Spinner and Fraser's dolphins experience substantial bycatch in Philippine fisheries. In the Philippines, scientists estimated that about 2,000 dolphins—primarily spinner, pan-tropical spotted, and Fraser's—were being killed each year, probably at unsustainable levels, by a fleet of five tuna purse-seiners using fish-aggregating devices.[357] Scientists estimate that even more cetaceans may be caught in round-haul nets; one estimate for the eastern Sulu Sea was

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[354] Kasuy, T., 1999. Finless porpoise—*Neophocaena phocoenoides* (G. Cuvier, 1829). *in:* Handbook of Marine Mammals (Ridgway, S.H., Harrison, S.R., eds.) Vol. 6: The second book of dolphins and porpoises, pp 411–442 .

[355] Yang G., Zhou, K, Xu, X, Leatherwood, S., 1999. A survey on the incidental catches of small cetaceans in coastal waters of China. Yingyong Shengtai Xuebao 10: 713–716.

[356] S.Rpt. 109-229 at 45.

[357] Dolar, M.L.L., 1994. Incidental bycatch of small cetaceans in fisheries in Palawan, central Visayas and northern Mindanao in the Philippines. Rep. Int. Whal. Commn (Special Issue) 15:355–63.

2,000–3,000 per year.[358] Directed fisheries for small cetaceans were also reported, with as many as 200–300 dolphins caught annually in San Francisco and smaller numbers caught for bait in shark and chambered nautilus (*Nautilus pompilius*) fisheries in Palawan.[359] Currently there are no total bycatch estimates for the Philippines, but preliminary analyses of cetacean abundance surveys indicate that current bycatch is not sustainable.[360]

Incidental mortality in fisheries (e.g., gillnets, explosives) is likely the principal cause of depletion of Irrawaddy dolphins. The species has been seriously depleted in parts of Thailand and the Philippines.[361] Recent surveys indicate dramatic declines in range and abundance of the Mekong and Mahakam freshwater populations.[362] Irrawaddy dolphins in the Mahakam River, Indonesia, number fewer than 50 individuals and are listed as Critically Endangered under IUCN. An average of three dolphins per year die from gillnet entanglements, representing between 6 percent and 8.8 percent of the population.[363] The Irrawaddy dolphins living at the head of Malampaya Sound in Palawan, Philippines, number approximately 77 individuals (CV 27.4 percent). Between February and August 2001, five dolphins were accidentally killed in bottom-set nylon gillnets used to catch crabs (called *matang quatro* nets locally).[364] These levels of bycatch are unsustainable and are threatening the existence of Irrawaddy dolphins in Malampaya Sound—the only known population of the species in the Philippines.

Scientists have recommended that Irrawaddy dolphin mortality be eliminated or at least drastically reduced in these fisheries. This will require the development of socio-economic alternatives to help promote the conservation goal of reducing entanglement and that alternative gear or employment options be provided to gillnet fishermen. These efforts must be accompanied by long-term monitoring of dolphin abundance and mortality in these areas.

Scientists believe that there may have been a dramatic decline in the abundance of Irrawaddy dolphins in the Mekong River, and the Mekong population is a high priority for Red List assessment.[365] In the Mekong River from 2001 through 2003, an average of four deaths per

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[358] Dolar, M.L.L., 1994. Incidental bycatch of small cetaceans in fisheries in Palawan, central Visayas and northern Mindanao in the Philippines. Rep. Int. Whal. Commn (Special Issue) 15:355–63.

[359] *Id.*

[360] Dolar, M.L.L., 1999. Abundance, distribution and feeding ecology of small cetaceans in the eastern Sulu Sea and Tañon Strait, Philippines. Ph.D. dissertation, University of California, San Diego. Xxv + 241 pp. See also Perrin, W. F., 2002. Problems of marine mammal conservation in Southeast Asia. Proceedings of International Symposium 70th Anniversary of the Japanese Society of Fisheries Science. Fisheries Science 68, Supplement 1:238–242.

[361] Andersen, M., and Kinze, C.C., 2000. Review and new records of the marine mammals and sea turtles of Indochinese waters. *Natural History Bulletin of the Siam Society* **48**, 177–184.

[362] IWC. 2001a. Report of the standing sub-committee on small cetaceans. *Journal of Cetacean Research and Management* **3** (Supplement), 263–291.

[363] Kreb, D., 2002. Density and abundance estimates of the Irrawaddy dolphin, *Orcaella brevirostris*, in the Mahakam River of East Kalimantan, Indonesia: a comparison of survey techniques. *Raffles Bulletin of Zoology*, Supplement, 85–95.

[364] Dolar, M.L.L., Perrin, W.F., Gaudiano, J.P., Yaptinchay, A.A.S.P., and Tan, J.M.L., 2002. Preliminary report on a small estuarine population of Irrawaddy dolphins *Orcaella brevirostris* in the Philippines. *Raffles Bulletin of Zoology,* Supplement, 155–160.

[365] Baird, I.G., and Mounsouphom, B., 1997. Distribution, mortality, diet and conservation of Irrawaddy dolphins (*Orcaella brevirostris* Gray) in Lao PDR. *Asian Marine Biology* **14**, 41–48.

year were attributed to gillnet entanglement, representing 5.8 percent of a population estimated to number only 69 individuals.[366]

Finally, this area needs further research efforts to collect basic information. In the Philippines, Indonesia, Thailand, and elsewhere in the western central Pacific, relatively little is known about abundance, distribution, and bycatch levels of cetaceans such as the Irrawaddy dolphin, Indo-Pacific humpback dolphin, Indo-Pacific bottlenose dolphin, finless porpoise, and spinner dolphin (and its dwarf form). Comprehensive cetacean abundance and bycatch surveys are needed in order to develop effective mitigation strategies. This region needs a regional management body that could take the lead in coordinating efforts to undertake such assessments, as well as establish science-based bycatch management frameworks, research promising new bycatch mitigation technologies, and contribute to the enforcement of cetacean protective laws. There is also the need for capacity building, especially in the U.S. territories and small island nations, to sustain efforts to assess cetacean abundance, evaluate bycatch, and promote fishery conservation and management. The Western and Central Pacific Fisheries Commission may provide a mechanism to address and possibly mitigate the bycatch that has been documented in the tuna purse-seine fishery in the Philippines. Additionally, U.S. may make progress in documenting cetacean bycatch in the Western and Central Pacific through passage of a cetacean bycatch resolution with the Western and Central Pacific Fisheries Commission (See Appendix C).

Eastern Central Pacific

In the Eastern Central Pacific, the vaquita suffers the most significant incidental mortality in coastal gillnet fisheries and the false killer whale in longline fisheries.

The vaquita is threatened with extinction by gillnet fisheries. This porpoise, endemic to the upper Gulf of California, Mexico, numbers only in the low to mid-hundreds and may be declining as commercial and artisanal fisheries in the upper Gulf kill 35 to 40 vaquitas per year—6 percent to 7 percent of the population. The designation, in 1993, of a Biosphere Reserve in the Upper Gulf of California and Colorado River Delta has done little to protect vaquitas—despite the management plan calling for a ban on commercial fishing in its “nuclear zone.” Even the recommendations of the International Committee for the Recovery of the Vaquita have gone unheeded.

More recently the International Committee recommended that the southern boundary of the Biosphere Reserve be expanded to incorporate the known range of the vaquita. Other recommendations were that gillnets and trawlers be phased out in the entire Biosphere Reserve, effective enforcement of fishing regulations begin immediately, acoustic surveys for vaquitas be initiated, research on alternative gear types be started, public outreach and education be developed, consideration be given to the compensation of fishermen for lost income, research be initiated on vaquita habitat, and international and nongovernmental cooperation be fostered.[367]

Many scientists believe that banning gillnets in the entire range of the species is the single measure most likely to prevent extinction. This ban must be accompanied by socio-economic alternatives for the people whose incomes are affected by any restrictions. In its bilateral talks with Mexico, the U.S. must develop an intergovernmental plan or bilateral agreement to

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[366] Beasley, I., Chooruk, S., and Piwpong, N., 2002. The status of the Irrawaddy dolphin, *Orcaella brevirostris*, in Songkhla Lake, southern Thailand, Raffles Bulletin of Zoology, Supplement 10: 75–83.

[367] Rojas-Bracho, L., and Jaramillo-Legorreta, A.M., 2002. Vaquita *Phocoena sinus*. Pp. 1277–1280 *in: Encyclopedia of Marine Mammals* (eds. W.F. Perrin, B. Würsig, and J.G.M. Thewissen). Academic Press, San Diego, California.

implement the recommendations of the International Committee. The U.S. will have to provide the necessary financial assistance to implement and enforce the agreement. The Commission on Environmental Cooperation (CEC) under the North American Free Trade Agreement (NAFTA) promotes the effective enforcement of environmental law in Canada, Mexico and the U.S. as part of its mandate under a side agreement to NAFTA, the North American Agreement on Environmental Cooperation. Until 2003, the Commission had a grants fund, but it is no longer operational. The CEC has been called upon to step in to compel the three North American nations to follow their own or cooperative environmental laws. In one case, citizens groups asked the CEC to make a determination about whether Canada was enforcing its own law regarding species at risk. The case is still open and under consideration by the CEC Secretariat.[368]

The impact of the longline fisheries off Hawaii is emerging as a potential problem for several species. NMFS recognizes three stocks of false killer whales in the central Pacific: a Hawaiian stock within U.S. waters surrounding the Hawaiian archipelago, a Palmyra stock within U.S. waters surrounding Palmyra Atoll, and an undefined stock throughout international waters and the rest of the Pacific Islands Region. Mortality and serious injury from the Hawaiian and Palmyra stocks have exceeded sustainable levels (1.6 percent to 2.5 percent of the population).[369] Of even greater concern is the undocumented number of false killer whales caught by international fisheries—a bycatch that may be significant. The U.S. must use both the Inter-American Tropical Tuna Commission and the Western-Central Pacific Fisheries Commission Tuna Treaty, as well as the MMPA, to advocate documentation of the problem and take measures to reduce the incidental mortality of false killer whales in tuna longline fleets. Whatever mitigation strategies are developed through research or bycatch reduction teams should be implemented internationally through these two regional fisheries management organizations. International bycatch provisions of the 2006 amendments to the M-SFCMA also provide a mechanism to initiate discussions with flag states in this region.

In the eastern tropical Pacific portion of the Eastern Central Pacific, what few quantitative data are available, indicate the magnitude of the cetacean bycatch in coastal and artisanal gillnet fisheries of the eastern tropical Pacific is high.[370] Due to the inshore nature of these fisheries, they tend to affect cetaceans that are already subject to other forms of exploitation and habitat degradation. An exploratory study of artisanal gillnet fishery bycatch levels in relation to estimates of small cetacean abundance in the eastern tropical Pacific estimated overall annual mortality rates of 4.4–9.5 percent.[371] Scientists believe that mortality rates may be even higher for coastal subspecies (e.g., coastal spotted and Central American spinner dolphins, *S. a. graffmani* and *S. l. centroamericana*, respectively) because animals from these

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[368] Species at Risk. Submmission ID: SEM-06-005, Party concerned: Canada. Date filed: 10/10/2006 Status: Open Latest update: 8 Feb. 2007. Available online at http://www.cec.org/citizen/submissions/details/index.cfm?varlan=english&ID=114. Last accessed 14 March 2007.

[369] The PBR for the Hawaiian stock is 1.0, and the estimated mortality is 4.4 animals.

[370] Vidal, O, Van Waerebeek K. and Findley L.T., 1994. Cetaceans and gillnet fisheries in Mexico, Central America and the wider Caribbean: a preliminary review. Report of the International Whaling Commission (Special Issue) 15, 221–233

[371] Palacios, D.M., and Gerrodette, T., 1996 Potential impact of artisanal gillnet fisheries on small cetacean populations in the Eastern Tropical Pacific. Southwest Fisheries Science Center Administrative Report LJ-96-11, La Jolla, California. 15 pp

populations are likely overrepresented, relative to their abundance, in the bycatch.[372] A NOAA–SWFSC report estimated annual incidental mortality in artisanal gillnets were 16,596 in Costa Rica and 3,581 in Panama.[373] Information on bycatch in Guatemala, El Salvador, Honduras, and Nicaragua is still lacking.

These small cetacean species that are not restricted to U.S. territorial waters, and for which no cooperative management agreements exist with Mexico to address the bycatch in their coastal fisheries, present a particular problem. These artisanal gillnet fisheries are widely dispersed, involve many relatively small vessels, and operate at subsistence or small-scale commercial levels. The same is true for the other Central American nations. The U.S. must work with Mexico, Costa Rica, Panama, Guatemala, El Salvador, Honduras, and Nicaragua; and local fishermen, scientists, and nongovernmental groups to jointly undertake abundance and quantitative bycatch estimates for these coastal fisheries. In particular, the U.S. must forge a bilateral agreement with Mexico to cooperatively manage some of these cetacean species—especially the trans-boundary species. Additionally, the U.S. should consider developing a regional management organization of the "Americas" to conserve and manage cetaceans in Central and South America.

The U.S. should use its bilateral discussions with these nations, the existing Inter-American Tropical Tuna Commission (especially under the new provisions of the Antigua Convention) to advance proposals and resolutions to document cetacean abundance and bycatch. The U.S. should consider undertaking joint cetacean abundance surveys in Mexican waters and elsewhere throughout Central America. The U.S. could look for opportunities to engage in technology transfer and capacity building by partnering the staff of the Inter-American Tropical Tuna Commission, national universities, and the staff of NMFS Southwest Fisheries Science Center to conduct the need cetacean research and outreach to the fishing community.

Southwest Pacific

In the southwest Pacific, Hector's dolphins number around 7,400, with 7,270 (CV 16.2 percent) distributed around New Zealand's South Island[374] and some 100 individuals (called Maui's dolphins) off the west coast of North Island, New Zealand.[375] According to IUCN, the species is listed as Endangered and the North Island population as Critically Endangered. In the South Island, the population is declining. The Banks Peninsula Marine Mammal Sanctuary, created in 1988 to reduce bycatch off the Canterbury coastline, has not achieved its goal—16 Hector's dolphins (CV 39 percent) were captured in 1997–1998.[376] Scientists have estimated

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[372] Palacios, D.M., and Gerrodette, T., 1996 Potential impact of artisanal gillnet fisheries on small cetacean populations in the Eastern Tropical Pacific. Southwest Fisheries Science Center Administrative Report LJ-96-11, La Jolla, California. 15 pp

[373] *Id.*

[374] Slooten, E., Dawson, S., and Rayment, W., 2002. Quantifying abundance of Hector's dolphins between Farewell Spit and Milford Sound. Published Client Report on Contract 3076, funded by Conservation Services Levy. Department of Conservation, Wellington, New Zealand. http://csl.doc.govt.nz/dsis35.pdf.

[375] Russell, K. ,1999. "The North Island Hector's dolphin: a species in need of conservation". Unpublished M.Sc. thesis, University of Auckland.

[376] Baird, S.J., and Bradford, E., 2000. Estimation of Hector's dolphin bycatch from inshore fisheries, 1997/98 fishing year. Published Client Report on Contract 3024, Conservation Services Levy. Available: www.doc.govt.nz/cons/scires/csl.pdf.

that, to meet the PBR-standard of the U.S., the north and south boundaries of the sanctuary must be extended 30 to 60 nautical miles.

For Maui's dolphin the situation is grave. Because Maui's dolphins have been reduced to such low levels, scientists concluded that human-induced mortality must be reduced to zero (from a bycatch of roughly three animals per year) to allow the North Island population to recover. In August 2001, the New Zealand Minister of Fisheries created a protected area that prohibits recreational and commercial gillnet fishing within four nautical miles of shore along a 400 km segment of the west coast of the North Island. An observer program is also planned for trawlers and Danish seine vessels fishing in the area closed to gillnetting. Even though Hector's and Maui's dolphins are species of concern, given the national laws and actions taken to date, there appears to be no role for the U.S. to take to promote greater conservation of this species.

Southeast Pacific

In the southeast Pacific, the dusky dolphin, Burmeister's porpoise, the Chilean dolphin, and possibly southern right whale dolphins and Peale's and Commerson's dolphins are the species most frequently captured by a variety of fisheries. Scientists have estimated that between 10,000 and 20,000 small cetaceans per year die in Peruvian fisheries, and most of these are dusky dolphins—this bycatch is large enough to cause serious concern for the continued existence of these species.[377] The Peruvian bycatch of dusky dolphins and Burmeister's porpoise highlight the blurred boundaries between strictly incidental mortality and direct harvests for dolphin meat and blubber to be used as shark bait.[378] Despite the Peruvian government's closure of markets for dolphin meat and other conservation laws, there is still an increasing use of cetacean meat as bait in the shark fishery. Dolphins are rarely landed openly on shore; instead, they are usually hidden and sold clandestinely or transferred to shark-fishing boats at sea.[379]

The species of most concern continue to be the dusky dolphin, which is caught in the greatest numbers, and Burmeister's porpoise. In the 1990s, in Peru alone, the annual directed harvest of Burmeister's porpoise and dusky dolphin each amounted to 500 to 2,000 animals, based on direct accounts of landings. Over a 15-year period dusky dolphins have fallen from 78 percent of the total catch to only 40 percent.[380] This continuous decline of dusky dolphins as a proportion of the overall cetacean bycatch, with roughly constant fishing effort, is consistent with the hypothesis that abundance of this species has been decreasing off central Peru.[381]

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[377] Van Waerebeek, K., Van Bressem, M.F., Alfaro-Shigueto, J., Sanino, G.P., Montes, D., and Ontón, K. 1999. A preliminary analysis of recent captures of small cetaceans in Peru and Chile. International Whaling Commission, Cambridge, UK. Document SC/51/SM17. See also: Van Waerebeek, K., Alfaro-Shigueto, J., Montes, D., Onton, K., Santillan, L., Van Bressem, M.-F., and Vega, D., 2002. Fisheries related mortality of small cetaceans in neritic waters of Peru in 1999–2001. International Whaling Commission, Scientific Committee Document SC/54/SM10, Cambridge, UK.

[378] *Id.*

[379] *Id.*

[380] Van Waerebeek, K., Alfaro-Shigueto, J., Montes, D., Onton, K., Santillan, L., Van Bressem, M.-F., and Vega, D., 2002. Fisheries related mortality of small cetaceans in neritic waters of Peru in 1999–2001. International Whaling Commission, Scientific Committee Document SC/54/SM10, Cambridge, UK.

[381] Van Waerebeek, *supra* note 369.

Authorities in Peru remain unconvinced that any action beyond merely outlawing commerce is needed to reduce the mortality of cetaceans in fisheries. Consequently, in Peru there is still a need for reliable estimates of total fishing mortality for each species in Peruvian waters and for better information on stock structure and reliable estimates of abundance for the affected stocks. Finally, there is a need for aggressive enforcement of the existing measures. Peru is a disturbing case study for incidences where bycatch of small cetaceans becomes a market in cetacean meat and a gateway to direct harvests. If dusky dolphins and Burmeister's porpoises are to survive, the mortality of these species must be drastically reduced and the existing laws fully enforced.

The existing intergovernmental organizations in the region include the IATTC and the Permanent Commission for the South Pacific (CPPC). The Permanent Commission does have action plans for conservation of biodiversity and protection of marine mammals. It is difficult to ascertain the effectiveness of this action plan, but the U.S could inquire about it and seek more details either in its bilateral discussions with Chile or within the IATTC. The Pacific in general, but also the west coast of Central and South America is in need of a regional management body that could require and coordinate efforts to assess cetacean populations, estimate bycatch, establish science-based bycatch management frameworks, research promising new bycatch mitigation technologies, and contribute to the enforcement of cetacean protective laws. This regional management body should be developed along the model of the Straddling Stocks Agreement. The U.S. could use its M-SFCMA mandate to make international efforts to reduce bycatch as a mechanism to participate in such a regional organization. Finally, given Peru's reluctance to undertake additional measures, the Office of International Affairs might consider taking action under the embargo provisions under section 101 of the MMPA or making Peru aware of its obligations under the new provisions of the M-SFCMA.

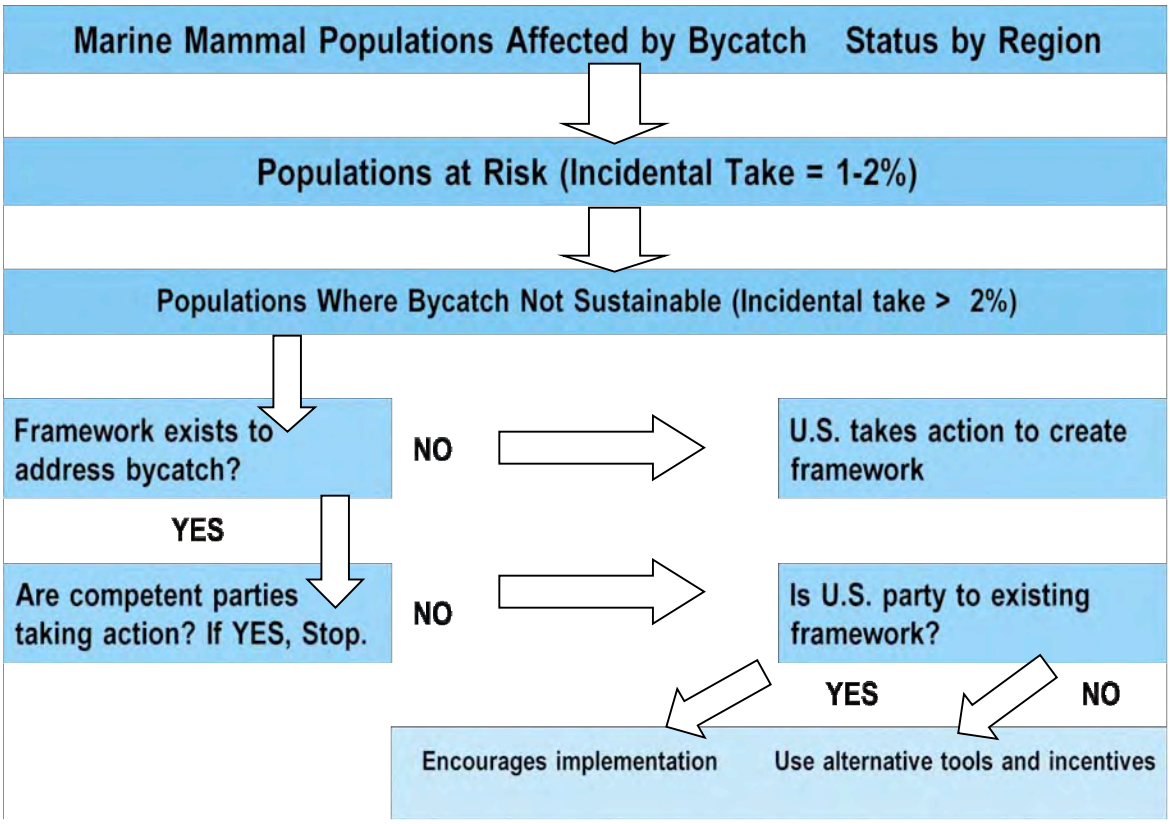
CHAPTER 6. RECOMMENDATIONS – ACTION PLAN

In Chapter 2, a review of the scientific literature summarized issues where incidental catch of marine mammals in fisheries is affecting populations already at risk. This summary highlighted needs that have been identified by scientific and management bodies such as national management agencies, the International Whaling Commission Scientific Committee, and nongovernmental organizations such as the IUCN. Chapter 5 further narrowed the scope of critical issues on a regional basis to populations where bycatch is unsustainable, where no regime exists to take action to reduce bycatch, or where measures exist, but have not been taken.

Table 5.1 points up where gaps occur in basic knowledge about abundance and bycatch, as well as gaps in the framework for management measures or implementation and enforcement of measures where a framework exists. Using the example of harbor porpoise in the Kiel & Mecklenburg Bight, it becomes clear that this animal has been assessed as vulnerable by the IUCN, but there is no recent abundance estimate, no estimate of bycatch mortality, and no mechanism to monitor bycatch in fisheries. Even though a regional agreement is in place, and though bordering states are parties to the agreement, no action has been taken to mitigate the effects of bycatch.

As illustrated by the above example, the analysis thus far has attempted to narrow the scope of possible U.S. action by starting with a description of all marine mammal problems that have been identified around the world, then examining the highest risk populations and the threats they face then focusing on threats posed by fishery bycatch. Further narrowing takes place by identifying whether competent parties are taking action, and if not, whether there is a role for the U.S. to play. Figure 6 illustrates how the narrowing of scope takes place.

Figure 6. Narrowing the Scope of Action Options



This chapter takes the gap analysis produced in Chapter 5, and examines the issues against legal pathways, rather than geographic regions, by posing the following questions:

- Does the United States have authority or capacity to act?
- Can the United States encourage action by relevant parties?
- Can the United States advocate amendment of an existing agreement or development of a new one?
- Can the United States use training and technical assistance, scientific cooperation, and similar actions in lieu of (or in addition to) legal action?

The recommendations provided in Chapter 6 are those of the authors, although they may also have been advocated by others and identified in Chapter 2. These recommendations represent actions to address not necessarily the most urgent problems, but the most urgent problems the U.S. has competence and capacity to address. Some of the recommendations have general application to the cetacean bycatch problem, and others are directed at specific areas and fishery interactions. The authors have made no assessment of whether fiscal resources exist to accomplish these actions.

The following narrative sections describe actions the U.S. could take to fill the gaps by using its own authority under MMPA or M-SFCMA, by engaging with its partners under international, bilateral or multilateral agreements, by encouraging the development of new agreements or new bycatch approaches under existing frameworks, and finally, where no treaty structure exists, by using incentives or other tools such as technology transfer. Proposed actions in the first sections have national mandates, legislative authority or U.S. policy behind them. The remaining set of proposals is a list of possibilities for actions that lie outside U.S. governmental authority, but might be advanced through the international community, diplomatic circles or public-private partnerships.

Without a doubt the one consistent need that permeates all species in all regions is the need for cetacean abundance and bycatch estimates. Estimates of total bycatch or bycatch rate are difficult to obtain, especially in developing countries where extensive coastal or artisanal fisheries account for most of the bycatch. Additionally, very low bycatch rates are difficult and costly to measure. Likewise, it is difficult and costly to obtain precise abundance estimates in low cetacean density areas. Capturing this information will require that fishery agencies, parties to international fisheries treaties, and regional fisheries management organizations incorporate bycatch monitoring and bycatch reduction measures into existing and future management regimes. Proposals for how this might be done are described below.

Actions Under MMPA Section 108

Section 108 (a)(1) of the MMPA calls upon the Secretary of Commerce through the Secretary of State to initiate negotiations as soon as possible for the development of bilateral or multinational agreements with other nations for the protection and conservation of all marine mammals covered under the MMPA.

Actions to propose new international bycatch treaties or multilateral agreements

Section 108 (a)(2)(A) calls upon the Secretary of State to initiate negotiations with all foreign governments engaged in commercial fishing found to be unduly harmful to any species or population stock of marine mammals to develop bilateral and multilateral treaties with such countries to protect marine mammals. There are several areas that would benefit from a regional management agreement similar to ASCOBANS or ACCOBAMS. Such an agreement should be based on the precautionary approach and should establish internationally the goal

and objectives of Sections 117 and 118 of the MMPA. Any international agreement should contain provisions to: (a) estimate the population and stock discrimination/structure of cetaceans within an agreement area, (b) estimate cetacean bycatch (including information on the sex, relative age, or life-stage of bycaught animals) through an independent observer program, (c) document and monitor fishing effort and areas and times of operation, (d) provide mechanisms to test and develop new technologies to reduce bycatch, (e) institute mechanisms for participation of all stakeholders in the development and review of conservation and management measures, (f) establish a risk-averse science-based method for setting bycatch limits (g) develop effective means for enforcement, and (h) incentives and disincentives to bring about compliance.

Three areas are high priorities for action: the Indian Ocean, Pacific Ocean, and North, Central, and South America (the Americas).

Indian Ocean

As discussed in Chapter 5, the commercial fisheries in the Western and Eastern Indian Ocean capture spinner dolphins, Risso's dolphins, bottlenose dolphins, hump-backed dolphins, Ganges river dolphins, and Irrawaddy dolphins at unsustainable rates. Moreover, there are few national laws and virtually no international protection. There is an overwhelming need to assess the various marine mammal populations, estimate bycatch throughout the entire Indian Ocean, establish science-based bycatch management frameworks, research promising new bycatch mitigation technologies, contribute to the enforcement of cetacean protective laws, estimate fishing effort, and describe the spatial and temporal characteristics of the fishery.

A regional management body could take the lead in coordinating and undertaking such efforts. The UNEP Regional Seas Programme does have a set of action plans for the South East Asian region, which includes the Indian Ocean. But there is no convention yet, and the action plans to date have concentrated on building capacity in the region, and on sustainable development in the coastal zone. The work plan does not even include a nominal mention of biodiversity conservation or species protection.

The greatest challenge to the development of an Indian Ocean regional cetacean agreement is the lack of any role for the U.S. because it is not a range state for such an agreement. With limited U.S. involvement, creation of such an agreement could fall to Australia and would require careful collaboration to achieve an agreement.

There are fishery agreements in the region, but most relate to high seas fisheries such as tuna, and do not apply to the nearshore areas where much of the bycatch of cetaceans occurs. However, to the degree that any of the offshore fisheries had interactions with cetaceans, either the Straddling Stocks Agreement or provisions of the M-SA would provide the U.S. leverage to begin discussions with flag and coastal states.

Pacific Ocean

The Pacific Ocean is ripe for a regional multilateral treaty to protect cetaceans. In this region, Dall's porpoise, finless porpoise, baiji, spinner dolphins, Fraser's dolphins, Irrawaddy dolphins and false killer whales are threatened by commercial fisheries and in some cases, directed harvests. The western Pacific presents a particular challenge as it is a mixture of driftnet catches off Russia and Japan, directed harvests for Dall's porpoise off Japan, and small-scale incidental captures of critically endangered species such as the baiji in the Yangtze River of China. For the most part, the coastal fisheries of Japan, China, Korea, and Taiwan have not

been described in any detail. Moreover, bycatch estimates reported to the International Whaling Commission are suspect and possibly underreported.

The western central Pacific presents its own set of challenges. Here the coastal fisheries of the Philippines and other south Pacific islands capture thousands of spinner, spotted and Fraser's dolphins in commercial fisheries; further complicating matters are the directed harvests of other cetacean species. In a completely different habitat, the Irrawaddy dolphins of the freshwater rivers of the Mekong, Mahakam, and Malalmpaya Sound are critically endangered and continually threatened by entanglement in small gillnet fisheries.

In addition, incidental mortality in fisheries in the central Pacific, Eastern central Pacific, Southwest Pacific, and the Eastern Tropical Pacific (discussed below) could potentially be regulated as part of a Pacific regional cetacean multilateral agreement. Such an agreement would need to call upon parties to conduct comprehensive cetacean stock assessments throughout the entire Pacific, provide annual estimates of bycatch in all fisheries, provide annual reports of the number of cetacean captured in directed harvests, and provide detailed fisheries data including the number of vessels, gear, landings, area and times of operation.

There are several fishery management agreements that apply in the region, including some to which the U.S. is a party. These provide linkage either through the bycatch prevention directives of the Straddling Stocks Agreement or might be fisheries to evaluate and possibly list under the M-SA. Nevertheless, this area may benefit from a Pacific-wide regional management agreement dedicated to addressing the threats to cetaceans.

The Americas (Atlantic and Pacific)

The incidental capture of cetaceans on both the Pacific and Atlantic coasts of South America is cause for concern. Along the Pacific coast of South America, dusky dolphins and Burmeister's porpoise, Chilean dolphins and Commerson's dolphins are captured in large numbers. The Peruvian laws that prohibit the sale of small cetaceans go virtually unenforced. The scope of the take is probably underestimated since port surveys alone cannot provide an accurate bycatch estimate given the clandestine sale or undisclosed transfer of carcasses at sea. Bait fisheries in Chile and Peru still exist and incidental mortality in Ecuadorian coastal fisheries is poorly documented but is thought to number in the thousands. Off Mexico and Central America, the incidental mortality of cetaceans in coastal fisheries is undocumented but preliminary estimates for some areas such as Costa Rica number more than ten thousand.

On the Atlantic coast of South America, tucuxis, dusky dolphins and Commerson's dolphins are taken in coastal gillnet and trawl fisheries; and Atlantic coast estimates of both cetacean abundance and bycatch are completely lacking for Mexico and Central America.

A regional agreement for North, Central, and South America would promote international scientific research, technology transfer (e.g. pingers and trawl bycatch reduction measures), and better compliance with national laws. For example, franciscanas range across the borders of Brazil, Uruguay, and Argentina and although protected by law in all three countries, a regional agreement would ensure consistency in addressing the bycatch problem. In 1991, the governments of Colombia, Chile, Ecuador, Panama, and Peru approved an Action Plan for the Conservation of Marine Mammals in the Southeast Pacific; but it appears little progress has been made in implementing this plan. Overall, Central and South America are in need of improved abundance estimates, stock delineation, and bycatch estimates for all cetaceans that inhabit Central and South America. In addition, better descriptions of fishing effort, operational time and areas are still needed for much of this region.

There is little in the way of regional cooperation in fishery management in this region,

and most of the action is taken at a national level. If the U.S. determines that these nations have bycatch of protected species, it could use the M-SA listing provisions to certify and leverage discussions for action.

Area/Issues That Would Benefit From A Bilateral Approach

The MMPA calls upon the Secretary of Commerce through the Secretary of State to initiate negotiations with foreign governments which are engaged in or which have persons or companies engaged in commercial fishing operations which are found by the Secretary of Commerce to be unduly harmful to any species or population stock of marine mammal, for the purposes of entering into bilateral and multilateral treaties with such countries to protect marine mammals…(16 U.S.C. 1378(a)(2)(A)). The Office of International Affairs should use its bilateral discussions to develop such agreements to reduce marine mammal bycatch. As a matter of priority are the bilateral discussions with Canada and Mexico.

U.S. – Mexico for vaquita and coastal gillnet fisheries

Since 1983, NMFS, NOAA, and the predecessor agency to the Mexican Secretaría de Mexico Ambiente, Recursos Naturales, y Pesca (SEMARNAP) have met annually to discuss bilateral fisheries issues. The countries have negotiated two active and one inactive memoranda of understanding (MOUs) between NMFS and SEMARNAP: (1) MEXUS-Gulf research program, (2) MEXUS-Pacífico research program, and an information exchange under an inactive MOU. The discussions have focused on conservation and management, including the protection of marine mammals and endangered species (especially turtles and mammals). Shark and shrimp management and bycatch reduction have also been discussed.[382]

Chapter 2 describes the long history of attempts to protect the vaquita. The most promising efforts are those of the International Committee (International Committee) for the Recovery of the Vaquita, which recommended that: the southern boundary of the Biosphere Reserve be expanded to incorporate the known range of the vaquita; gillnets and trawlers be phased out in the entire Biosphere Reserve; effective enforcement of fishing regulations begin immediately; acoustic surveys for vaquitas be initiated; research on alternative gear types be started; public outreach and education be developed; consideration be given to the compensation of fishermen for lost income; research be initiated on vaquita habitat; and international and non-governmental cooperation be fostered.[383] Many scientists believe that banning gillnets in the entire range of the species is the single measure most likely to prevent extinction. Implementation of these recommendations, especially the ban, will require significant financial resources and must be accompanied by socio-economic alternatives for the people whose incomes are affected by any restrictions. Perhaps as a result, the Mexican government seems to lack the political will to decisively implement these recommendations. Nevertheless there has been some progress through a newly decreed special protection zone, financial support from the Ministry of the Environment to assist fishermen, the voluntary agreement of fishermen to phase out nets with meshes of more than 6 inches (144mm), and investigations into alternative gears and fishing methods for the shrimp fishery. Socio-economic assistance is critical to bring about the necessary changes in fishing habits and to support the ongoing buy-out of the larger meshed nets.

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[382] http://www.nmfs.noaa.gov/ia/bilateral/docs/U.S.-Mexico%2005.doc

[383] Rojas-Bracho, L. and Jaramillo-Legorreta, A.M. 2002. Vaquita *Phocoena sinus*. Pp.1277–1280 *in:Encyclopedia of Marine Mammals* (eds. W.F. Perrin, B. Würsig, and J.G.M. Thewissen). Academic Press, San Diego, California.

In the course of bilateral discussions the U.S. could offer economic assistance and even consider a debt for conservation swap to provide the funds necessary to implement these recommendations and to create socio-economic opportunities that will enable Mexico to, in particular, implement the ban on gillnets and to enforce the restriction. The International Committee should be the body that puts together an action plan to implement their recommendations, including an estimate of the costs. The government to government bilateral could become the vehicle to officially adopt such provisions through a specific bilateral agreement.

Canada for right whales

The U.S. holds bilateral meetings with Canada under the authority of the Magnuson Fishery Conservation and Management Act, 16 U.S.C. 1822(a), which authorizes the Secretary of State to negotiate international fisheries agreements, and 16 U.S.C. 1855(d), which authorizes the Secretary of Commerce to promulgate regulations necessary to carry out the Magnuson Act. The focus of the discussions is bilateral, multilateral and global fisheries conservation and management issues of benefit to both parties. The U.S. and Canada discuss coordination with regard to conservation and management of shared stocks (such as Pacific albacore, Pacific hake, and species of mutual concern in the Gulf of Maine) and coordination and strategies for improving conservation and management within the Northwest Atlantic Fisheries Organization (NAFO). Global fisheries issues of interest to the U.S. and Canada include various international fisheries management agreements and initiatives (such as the FAO International Plans of Action for Seabirds, Sharks, Capacity and IUU Fishing and the UN Fish Stocks Agreement).[384]

As stated previously, the North Atlantic right whale is a transboundary species and thus it faces similar conservation challenges in both U.S. and Canadian waters. NOAA has stated that it, "intends, with the appropriate federal agency or agencies, to initiate the negotiation of a bilateral Conservation Agreement with Canada to ensure that, to the extent possible, protection measures are consistent across the border and as rigorous as possible in their protection of right whales."[385] To date no specific language of such an agreement has been published and it is uncertain whether NOAA has begun these discussions.

It has been recommended both in the North Atlantic Right Whale Recovery Plan and by noted marine mammal scientists that NOAA should engage in such bilateral discussions. Bilaterally agreed-upon management policy, regular joint meetings, and cooperative action are essential for the protection of this critically endangered migratory species.[386] It is recommended that NMFS expedite these discussions and develop a joint plan.[387]

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[384] http://www.nmfs.noaa.gov/ia/bilateral/docs/US-Canada%20-%2005.doc

[385] Silber, GK and Bettridge S. 2006. United States' Actions to Reduce the Threat of Ship Collisions With North Atlantic Right Whales Prepared for the International Whaling Commission's Working Group on Ship Strikes and Presented at the International Whaling Commission's Conservation Committee, St. Kitts, 9 June 2006. National Marine Fisheries Service. Silver Spring, Maryland.

[386] Sayles JS and Green DM 2005 Bilateral Action for Right Whales **Science** 9 December 2005: Vol. 310. no. 5754, pp. 1616 – 1618.

[387] Currently, two National Marine Fisheries Service staff are members on the Canadian Right Whale recovery team—one from Northeast Regional Office and one from Northeast Fishery Science Center.

Bilaterals related to free trade negotiations

The U.S. is currently engaged in bilateral discussions on living marine resource issues with many countries and fishing entities, including Chile, China, Japan, Russia, Vietnam, Taiwan, and the European Union. The Office of International Affairs should elevate cetacean bycatch issues highlighted in this report in each of these bilateral discussions and request that these nations provide estimates of bycatch in their commercial fisheries and cetacean abundance estimates for cetaceans that interact with these fisheries. The Office of International Affairs should use these bilateral discussions as a vehicle to make progress to gather information and urge development of conservation and management measures to reduce cetacean bycatch.

Actions to amend existing agreements

Section 108 (a)(4) mandates that the Secretary of Commerce through the Secretary of State initiate the amendment of any existing international treaty for the protection and conservation of any species of marine mammal to which the U.S. is a party in order to make such treaty consistent with the purposes and policies of the Act.

The Convention for the Regulation of Whaling is perhaps the only international treaty that meets this standard. For years, non-whaling nations have attempted to expand the purview of the International Whaling Commission by introducing such issues and subcommittees as the Subcommittee on Small Cetaceans, Subcommittee on Whalewatching, and Working Group on Estimation of Bycatch and Other Human-Induced Mortality. While these bodies are valuable sources of information and provide opportunities for scientific exchange and recommendations, they have no real power to bring about compliance with any of their recommendations. Until the Convention for the Regulation of Whaling is modified to explicitly provide the IWC with authority to regulate both the direct and incidental harvest of small cetaceans, progress to address these issues through the IWC will be limited. The major obstacles to such an undertaking are that the U.S. and other non-whaling, conservation-minded nations no longer have the three-quarters majority needed to amend the convention and a growing majority that support the viewpoint that the IWC does not have competence over small cetaceans. Nevertheless, the Office of International Affairs should consider how it might modify the Convention to broaden the IWC's authority to regulate bycatch and to make the Convention more consistent with the purposes and policies of the MMPA, as it relates to bycatch in commercial fisheries.

Actions Under MMPA Section 101

Mediterranean Driftnets

The nations that still continue to fish illegally with driftnets are Morocco, Turkey and Italy. It appears that Morocco and the U.S. have devised a plan to convert the Morroccan driftnet fleet to more sustainable fishing practices.[388]

Turkey on the other hand is still fishing in violation of the ICCAT and GFCM driftnet ban, administering a fleet of fewer than 100 driftnet vessels, each less than 15 meters long, with fishing nets that are 800-1,000 meters long, targeting swordfish off the southwest corner of Turkey. On its face, it appears that Turkey may not be violating the UN Driftnet Moratorium.

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[388] 2005 Report Of The Secretary Of Commerce To The Congress Of The United States Concerning U.S. Actions Taken On Foreign Large-Scale High Seas Driftnet Fishing Pursuant To Section 206(E) Of The Magnuson-Stevens Fishery Conservation And Management Act, As Amended By Public Law 104-297, The Sustainable Fisheries Act Of 1996. Available at http://www.americanalbacore.com/documents/HSDN_Report_02_21_06.doc

Nevertheless, the U.S. must take action to better document and ascertain the scope and magnitude of this fishery. The U.S. should also require that Turkey provide documentary evidence under both Section 101(a)(2)(A) and (F).

Italy is still driftnet fishing, with reports of between 15 to 37 Italian vessels operating from six Italian ports illegally driftnet fishing. To date, the U.S. certified Italy under the Pelly Amendment but lifted that certification in 1997. The U.S. continues to apply the provision of the High Seas Driftnet Fisheries Enforcement Act that denies entry of Italian large-scale driftnet vessels to U.S. ports and navigable waters. Since 29 May 1996, it has also required Italy to provide documentary evidence pursuant to the Dolphin Protection Consumer Information Act (16 U.S.C. 1371(a)(2)(E)) that certain fish and fish products it wishes to export to the U.S. are not harvested with large-scale driftnets on the high seas.

The U.S. has expressed its concern that some Italian vessels and nationals may still be engaged in large-scale high seas driftnet fishing. However, "The United States believes that the efforts now in progress [diplomatic discussions and Italian enforcement action] need some time to come to fruition and that the ultimate result of these efforts will be the complete elimination of any residual large-scale high seas driftnet fishing by Italian vessels and nationals that may still be occurring in the Mediterranean Sea."[389]

Italy's violation of the various driftnet bans has been ongoing for more than a decade and diplomatic actions and threat of Pelly sanctions have not been effective at either deterring illegal driftnet fishing or bringing about Italy's full compliance with the various international regulations banning driftnet fishing. The U.S. must take action under Section 101(a)(2) (16 U.S.C 1371(a)(2)) to ban the imports of fish and fish products from Italy, and it must certify and impose Pelly sanctions on Italy for violating the driftnet moratorium and the provisions of ICCAT which ban driftnets.

There are several fishery management agreements that apply in the region, such as ICCAT, to which the U.S. is a party. These provide linkage either through the relevant management commission or the bycatch prevention directives of the Straddling Stocks Agreement. The U.S. also could use the provisions of the M-SA to evaluate these driftnet fisheries and possibly certify Italy, Turkey and Morocco as nations that "fail to end or reduce bycatch of protected living marine resources by using regulatory measures that are comparable to those of the U.S., taking into account different conditions."

Takes in Peruvian Fisheries

Between 10,000 and 20,000 cetaceans die each year in Peruvian fisheries. This fishing mortality is causing the decline of Dusky dolphins and may also threaten the long-term survival of Burmeister's porpoise. Authorities in Peru remain unconvinced that any action beyond those already taken to prohibit commerce is needed to reduce the mortality of cetaceans in fisheries. Peru's enforcement of its national laws is poor and action is necessary to prohibit the capture of small cetaceans for bait and food. Additionally, efforts are needed to reduce the bycatch. The U.S. should take action, similar to that taken with Chile in regard to the Chilean crab fishery, to engage in bilateral discussions with Peru to devise a cooperative agreement to reduce cetacean bycatch and direct harvest. The trigger for such discussions could be the threat of an embargo of Peruvian fish products under Section 101(a)(2)(A).

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[389] 2005 Report Of The Secretary Of Commerce To The Congress Of The United States Concerning U.S. Actions Taken On Foreign Large-Scale High Seas Driftnet Fishing Pursuant To Section 206(E) Of The Magnuson-Stevens Fishery Conservation And Management Act, As Amended By Public Law 104-297, The Sustainable Fisheries Act Of 1996. Available on line at http://www.americanalbacore.com/documents/HSDN_Report_02_21_06.doc

Actions Under M-SFCMA

Section 202(h)(1) of the Magnuson-Stevens Fishery Conservation and Management Act calls on the Secretary of State, in cooperation with the Secretary of Commerce, to seek to secure international agreements to establish standards and measures for bycatch reduction that are comparable to the standards and measures applicable to U.S. fishermen if they conclude that it is necessary and appropriate.

New provisions in the Magnuson-Stevens Act call for the U.S. to promote improved monitoring and compliance for high seas fisheries or fisheries governed by international or regional fishery management agreements.[390] Among other provisions, the revised Act calls for improved communication and information exchange among law enforcement organizations, an international monitoring network, an international vessel registry, expansion of remote sensing technology, technical assistance to developing countries and support of a global vessel monitoring system for large vessels

There are several regional fisheries management agreements that may be vehicles to request that parties to such agreements assess cetacean populations and stocks, estimate bycatch, take measures to reduce bycatch and report their findings and actions back to the regional fisheries management secretariat.

The purposes of RFMOs and UNEP regional seas agreements are different. However, using both approaches would enable managers to come at the bycatch problem from both the side of improving fishery performance by using best practices to reduce bycatch, and work in concert with planners in the regional seas program to engage conservation, protection, and mitigation measures in the action plans.

Global Plan of Action for Marine Mammals

In the early 1980s UNEP and the Food and Agriculture Organization of the UN finalized and adopted a Global Plan of Action for Marine Mammals (MMAP), the central goal of which is to generate a consensus among governments on which to base their policies for marine mammal conservation under the auspices of UNEP. Several Regional Seas Programmes have incorporated marine mammal conservation into their Action Plans and protocols—the Mediterranean, South-East Pacific, Wider Caribbean and Eastern Africa regions. These plans include development of regional and national management plans for threatened species, research and monitoring programs and establishment of marine parks and protected areas. More to the point, a few regional seas conventions have established regional action plans dealing specifically with marine mammals.[391] Wherever regional seas conventions exist, the Office of International Affairs should seek to participate in those conventions and work to advance marine mammal/cetacean action plans that will result in creating the necessary infrastructure and process to reduce cetacean bycatch.

The MMAP should be revised and retooled to increase its relevance and usefulness. UNEP is in the process of revising and reevaluating the present relevance of this action plan given that nearly three decades have passed since it was first developed in 1978. UNEP is retooling the Marine Mammal Action Plan in consultation with CMS, CITES, the Convention on Biological Diversity, the regional seas conventions and action plans and relevant partner

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[390] Section 207(a)

[391] Notably, the Mediterranean has adopted action plans for the Mediterranean monk seal and cetaceans. The South-East Pacific has an Action Plan for the Conservation of Marine Mammals in the region, and the Caribbean Environment Programme has a Regional Management Plan for the West Indian Manatee.

organizations, including IUCN, in order to present a revised MMAP to the Fourth Global Meeting of Regional Seas Conventions and Action Plans. The Office of International Affairs should monitor and participate in this process wherever possible to ensure that the revised MMAP embodies the purposes and policies of the MMPA.

South Pacific Regional Environment Program

A recently formed Memorandum of Understanding (MoU) for the Conservation of Cetaceans and their Habitats in the Pacific Islands Region provides an institutional umbrella for Pacific Island Countries (PICs) to conserve Pacific Island whales and dolphins (cetaceans) and their habitats. It was negotiated under the auspices of the Convention on Migratory Species (CMS), in close collaboration with the Secretariat of the Pacific Regional Environment Programme (SPREP) based in Apia, Samoa and signed by Australia, Cook Islands, Federated States of Micronesia, Fiji, France, New Zealand, Niue, Samoa and Vanuatu. Contracting parties to CMS are Australia, Cook Islands, France, New Zealand and Samoa. The MoU's entry into effect is very timely and coincides with SPREP's review of its Whale and Dolphin Action Plan. The Action Plan will form an integral part of the MoU. The accompanying Action Plan calls upon signatories to reduce threats, respond to strandings and entanglements, and to protect habitat, including migratory corridors. Cooperation, information exchange, education and public awareness activities are also significant components of the Action Plan. In addition, signatories need to undertake more training, research and monitoring. Working towards sustainable and responsible cetacean-based tourism is another objective. The fisheries interaction objective is mostly focused on cetacean depredation of fish caught on longlines. An Action Plan from a SPREP Longline/Cetacean Interactions Workshop calls for further research into the species involved in depredation, extent of impact and possible methods for mitigation. To date, the signatories do not believe that bycatch and entanglement in fishing gear are a significant issue. The Office of International Affairs should work to expand this Action Plan to undertake the necessary cetacean abundance research and to more thoroughly document the frequency of cetacean bycatch.

Caribbean SPAW Protocol

The promulgation of a regional marine mammal action plan under UNEP's Caribbean regional seas program and the establishment in Guadeloupe of a Regional Activity Centre (RAC) for implementation of the protocol on Specially Protected Areas and Wildlife (SPAW Protocol), provide the International Affairs Office a means to develop regional networks, collaborative studies and training activities to promote scientific understanding of the cetaceans and cetacean bycatch and to further develop the scientific and technical capacity of the region.

The body that might fill the role of a RFMO in the Caribbean is the West Central Atlantic Fisheries Commission (WCAFC). Because it is advisory only, the U.S. might encourage efforts to revamp it in accordance with more recent trends for regional fishery management organizations, incorporating more of the principles of the Straddling Stocks Agreement. This region might be a place to use the resources provided in the M-SA amendments to foster creation of a new regional management body, to bring fishing into compliance with the most recent international standards. This region is adjacent to the U.S., includes U.S. territory, and would be a logical place to extend diplomatic, technical and conservation efforts.

Northwestern Atlantic Fisheries Organization

Even though NAFO's focus is on the conservation and management of stocks of commercially valuable groundfish and other species, the members—Bulgaria, Canada, Cuba, Denmark, European Union, France, Iceland, Japan, Korea, Norway, and Russia—can provide information critical to understanding the bycatch of cetaceans in these fisheries. Given NAFO's

on-going efforts to minimize bycatch and the fledging NAFO initiative on application of ecosystem considerations to the Organization's fisheries management decision-making, the organization would be a likely partner in helping to reduce cetacean bycatch. In 2006, NAFO passed a resolution calling upon contracting parties to generally support adoption and implementation of the FAO Guidelines to Reduce the Mortality of Sea Turtles in Fishing Operations, to provide information on existing domestic data collection (e.g., species identification, fate and condition at release, relevant biological information, and gear configuration) and/or observer training efforts relating to sea turtle interactions in NAFO-managed fisheries in the NAFO Convention Area. The resolution also calls upon NAFO Parties to consider, where appropriate, increasing cooperation both among NAFO Contracting Parties and with other regional, subregional and global organizations, to facilitate sharing of data and development of compatible and appropriate bycatch reduction measures. Such efforts may be enhanced by integration of sea turtle interaction data collection by NAFO observers.

The U.S. should propose a similar resolution for cetaceans within NAFO with particular emphasis on the bycatch of harbor porpoise.

Southeast Atlantic Fisheries Organization

The Commission has a broad range of fishery conservation and management functions (See Chapter 4), however, the types of conservation and management measures anticipated under the Convention include measures relating to the quantity of any species that may be caught; the areas and periods in which fishing may occur; the size and sex of any species that may be taken; the fishing gear and technology which may be used; the level of fishing effort; and the designation of regions and sub-regions.

SEAFO includes in its convention provisions that take into account the impact of fishing operations on ecologically related species such as seabirds, cetaceans, seals and marine turtles. It calls for conservation and management measures for species belonging to the same ecosystem as, or associated with or dependent upon, the harvested fishery resources. Parties are to ensure that fishery practices and management measures take into account the need to minimize harmful impacts on living marine resources as a whole and to protect biodiversity in the marine environment. In addition, the Scientific Committee is provided with the authority to assess the status and trends of relevant populations of living marine resources. Finally, the convention also has provisions for an observer program.

Recognizing the threats to cetaceans from fisheries that occur off the west coast of Africa, SEAFO appears to offer the vehicle to make progress towards assessing the cetacean populations of this region, the bycatch of the fisheries that operate here, and adopt effective monitoring and mitigation measures. The Office of International Affairs should participate in this fisheries organization and offer a resolution similar to that discussed for NAFO (See Appendix D).

Western Central Pacific

The new regional convention in this area calls for the adoption of measures to minimize waste, discards, catch by lost or abandoned gear, pollution originating from fishing vessels, catch of non-target species, both fish and non-fish species, and impacts on associated or dependent species, in particular endangered species. The agreement promotes the development and use of selective, environmentally safe and cost-effective fishing gear and techniques and protection of marine biodiversity. Of particular interest is the fact that this convention specifically provides for adoption of, "where necessary, conservation and management measures and recommendations for non-target species and species dependent on or associated with the target stocks, with a view to maintaining or restoring populations of

such species above levels at which their reproduction may become seriously threatened." The scientific experts used by the Commission may also conduct assessments of highly migratory fish stocks, non-target species, and species belonging to the same ecosystem or associated with or dependent upon such stocks, within the Convention Area.

In short, the Western Central Pacific Fisheries Commission includes the provisions necessary to call upon Parties to assess cetacean populations, fisheries bycatch, and to develop and implement measures to reduce cetacean bycatch. In December 2005, the Commission adopted a resolution addressing sea turtle bycatch. The Office of International Affairs should put forward a resolution that calls upon nations to assess cetacean populations within their waters, estimate bycatch in their coastal fisheries, and provide this information to the Commission. An example of such a resolution is provided in Appendix C.

South West Indian Ocean

One of the newest commissions is the South West Indian Ocean Fisheries Commission (SWIOFC). Although it is only advisory at present, it will focus on coastal fisheries of East Africa and island states in the region, and has a mandate for responsible management and regional cooperation on fisheries policy. Its first priority will be data collection. There is not much leverage for the U.S. in this region.

Southeast Pacific Ocean

The Southeast Pacific region spans the entire length of the Pacific coast of South America from Panama to Cape Horn, encompassing tropical, sub-tropical, temperate and sub-antarctic systems and crossing the boundaries of five countries—Chile, Peru, Ecuador, Colombia and Panama. One of the initial activities in the region was the drafting of a regional diagnosis on the state of marine mammals based on the national consultation reports. The governments, with the purpose of enhancing the application in the South East Pacific of the Global Programme of Action for the Conservation, Management and Use of Marine Mammals, approved the Plan of Action for the Conservation of Marine Mammals in the South East Pacific. A meeting of experts held in Costa Rica in January 1995 resolved that there had been progress in terms of research, management and legislation to protect these species.

A Regional Course on Catch, Monitoring, Data Collection Techniques and Assessment of Marine Mammals Stocks took place in 1997, in Guayaquil, Ecuador. National studies have also been conducted on the development of techniques for monitoring marine mammal mortality rates. Several projects are currently being carried out to launch different campaigns with the purpose of increasing awareness among communities of artisanal fishermen and authorities.[392] Despite these many efforts, it is still difficult to determine what effect these assessments are having on the water to assess cetacean populations or monitor or reduce cetacean bycatch. This is an area where concrete information on the progress that has been made by each nation in implementing these action plans and assessments should be shared with the U.S. through bilaterals and through other regional fisheries management organizations such as the Inter-American Tropical Tuna Commission.

One approach that might be effective in this region is to create a forum for information exchange. At present, there is no nexus between the MMAP and the IATTC, nor is there feedback or data exchange between the regional seas program and the regional fishery management entity. The management structure in this area is well developed and has a long history of conservation and bycatch reduction through gear and best practices. The IATTC

[392] CPPS (2004) (Accessed 06/07/04) http://www.cpps-int.org. Last updated 21/05/04

would be an effective partner to engage in this region.

Actions Under MMPA Title III

Title III of the MMPA—International Dolphin Conservation Program—addresses the capture of dolphins in purse seine fisheries predominantly in the eastern tropical Pacific Ocean. However, Congress was concerned that the association, encirclement, and capture of dolphins in purse seine nets to capture tuna may occur in other oceans. References to this issue occur several times within this title. First, Congress states that it is the policy of the U.S. to "encourage observer coverage on purse seine vessels fishing for tuna outside of the eastern tropical Pacific Ocean in a fishery in which the Secretary has determined that a regular and significant association occurs between marine mammals and tuna, and in which tuna is harvested through the use of purse seine nets deployed on or to encircle marine mammals." Likewise the Dolphin Protection Consumer Information Act's labeling provisions state that it is unlawful to label a product 'Dolphin Safe' if it comes from a fishery where "the Secretary has determined that a regular and significant association occurs between dolphins and tuna (similar to the association between dolphin and tuna in the eastern tropical Pacific Ocean)…"[393]

Although neither Title III nor the Dolphin Protection Consumer Information Act explicitly require a determination and a list of fisheries for which the Secretary has determined that a regular and significant association occurs between dolphins and tuna, it is inferred that such determination should be made. Moreover, new language in the M-S reauthorization amendments also requires a determination to be made identifying and listing of nations that "fail to end or reduce bycatch of protected living marine resources by using regulatory measures that are comparable to those of the United States." Insofar as was able to be determined, the NMFS has never taken action under Title III of MMPA. In the absence of such a determination, tracking and verification of tuna coming from other oceans than the ETP may be incomplete or flawed. The new international title of the M-SFCMA may provide needed impetus to investigate further. The paragraphs below summarize instances where the literature indicates some level of interactions with purse seine fisheries and cetaceans. The level and significance is poorly documented, but in most cases there are regional fishery management organizations that should be used to allocate the observer coverage necessary to define the scope and frequency of the interaction.

Western Central Pacific Ocean

In the Philippines, scientists estimated that about 2000 dolphins, primarily spinner, pan-tropical spotted, and Fraser's, were being killed each year by a fleet of five tuna purse seiners using fish-aggregating devices. The annual bycatch of small cetaceans in a single tuna driftnet fishery in Negros Oriental was estimated at about 400.[394] Similarly, there have been indications of dolphin bycatch immediately west of the 150°W Longitude, the line differentiating the eastern tropical Pacific and western central Pacific tuna treaties. The latter treaty should be the tool to investigate and mitigate the occurrence of bycatch in coastal purse seine fisheries like the Philippine purse seine fishery.

West Coast of Africa

For more than four decades scientists have speculated that dolphins are encircled and

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[393] 16 U.S.C 1385(d)(1)(B)(i)

[394] Dolar, M.L.L. 1994. Incidental takes of small cetaceans in fisheries in Palawan, central Visayas and northern Mindanao in the Philippines. Rep. Int. Whal. Commn (Special Issue) 15:355-363.

captured in tuna purse seine fisheries in the eastern tropical Atlantic Ocean, especially off the west coast of Africa. The levels of mortality, stock sizes, and even exact species involved are not known with certainty although the interactions most likely include several species of the genus Stenella, as well as common dolphins (*Delphinus spp*.).[395] It has been suggested that dolphin mortality in this fishery could be up to 30,000 or more animals per year.[396] Tuna/whale interactions are also known to occur, and baleen whales are considered to be good indicators of tuna schools.[397] Independent observer data are needed to define the composition and extent of the bycatch. The Office of International Affairs should work through ICCAT to either request that ecosystem working group of the Standing Committee on Research and Statistics SCRS to investigate, undertake a pilot study to conduct the research, or request greater levels of observer coverage necessary to define the extent of this problem.

Actions Under MMPA Title II

The Marine Mammal Commission was established under Title II of the MMPA. The Act calls upon the Commission to undertake a review and study of the activities of the U.S. pursuant to international conventions relating to marine mammals.[398] The Commission is also required to recommend to the Secretary of State appropriate policies regarding existing international arrangements for the protection and conservation of marine mammals, and suggest appropriate international arrangements for the protection and conservation of marine mammals.[399] Given these mandates, the Office of International Affairs might look to the Commission as a partner with whom to execute the recommendations in this report and to develop and further refine an annual strategy to reduce the international bycatch of cetaceans.

The Office of International Affairs might look to the Commission for its scientific expertise in developing international scientific programs or partnerships to begin to make progress on the research needs. The Office of International Affairs should also work with the Commission to develop resolutions and amendments to regional fishery management organizations that it might want the State Department to advance in these forums. Finally, the Commission might assist the Office of International Affairs in developing information for the reports mandated under the MMPA and Magnuson-Stevens Act. The Office of International Affairs could also work with the Commission to develop a strategy for each body to complete its mandates under both the MMPA and the Magnuson-Stevens Act.

Potential for New Legislation on Cetacean Bycatch

In the 109th Congress, Senator Barbara Boxer (D-CA) introduced S. 1224, the National Oceans Protection Act of 2005. The bill contains subtitle C—Cetacean and Sea Turtle Conservation Act of 2005 (Appendix E), which directs the Secretary of Commerce to enter into negotiations with countries that engage in commercial fishing operations that adversely impact

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[395] Maigret, J. 1981. Introduction à l'étude des rapports entre les cétacés et la pêche thonière dans l'Atlantique tropical. *Bull. du Centre Natl. Rech. Oceanogr.* PêchesMouadhibou **10**, 89–101.

[396] Alverson, F.G. 1991. Tuna purse seine and gill/drift net fisheries in the oceans of the world and their relationship to tuna-dolphin, tuna-whale and tuna-whale shark associated schools. Unpublished Report Submitted to the CANAINPES Seccion Especializada en Pesca de Atun Programa Atun-delfin, Camara Nacional de la Industria Pesquera. 110pp.

[397] *Id.*

[398] 16 U.S.C. 1402 (a)(1).

[399] 16 U.S.C. 1402 (a)(5).

cetaceans or sea turtles that result in agreements requiring such countries to reduce bycatch of such animals to at least sustainable levels. The bill, supported by the environmental community, further demonstrates Congress' interest in international cetacean bycatch and their desire to make progress in addressing the issue. The bill was never acted upon, but since introduction, subtitles of the National Oceans Protection Act have either been included in other introduced bills or enacted elsewhere.

In Appendix F[400], a proposed draft bill, patterned after the legislation in Appendix E, is provided. Section 5 of the draft bill calls for the negotiation of bilateral and multilateral agreements with foreign governments to reduce cetacean bycatch to sustainable levels. The bill also contains two critical provisions—establishment of a grant program and a bycatch database—the need for which will be discussed elsewhere in this chapter. The grant program provides foreign entities with funding to develop fishing gear and methods to reduce bycatch. But the more critical need is for assessments of abundance and bycatch monitoring. The bycatch database would create a sorely needed resource to collect information on cetacean bycatch, the development and use of appropriate fishing gear and methods, and efforts to reduce cetacean bycatch. This database could be linked to other databases that are being developed as part of the Integrated Ocean Observing System (IOOS) and the Global Earth Observing System of Systems (GEOSS). Finally, the bill authorizes sorely needed funds dedicated to this program at the level of ten million dollars annually for the implementation of this program.

The Office of International Affairs should consider developing similar legislation as an Administration bill. It is highly likely the conservation community could be enlisted to help advocate introduction and passage of such legislation.

Actions through the United Nations

In May 2007, President George W. Bush urged the U.S. Congress to ratify the United Nations Convention on the Law of the Sea (UNCLOS), a departure from more than 20 years of U.S. policy in opposition to the treaty. UNCLOS is described in detail in Chapter 4, but in general, it provides a legal framework within which countries may agree to carry out activities in the oceans and seas. The General Assembly of the United Nations convened the Third United Nations Conference on the Law of the Sea, which adopted UNCLOS in 1982, after several preceding negotiating sessions. The General Assembly annually considers and reviews ocean affairs and the law of the sea based on annual comprehensive reports prepared by the Secretary-General.

In November 1999, the General Assembly established an open-ended informal consultative process in order to facilitate the annual review by the General Assembly, which includes consideration of the Secretary-General's annual report on oceans, UNCLOS, the UN Straddling Stocks Agreement, and issues of particular interest as well as consideration of any particular resolution or decision of the General Assembly, any relevant special reports of the Secretary-General and any relevant recommendations of the Commission on Sustainable Development.

Since 2001 the General Assembly has passed two UNCLOS resolutions each year. One, typically referred to as the Oceans and Law of the Sea Resolution, recalls and reaffirms provisions related to the UNCLOS and highlights specific actions that the General Assembly

[400] While the previous legislation contained provisions for both sea turtles and cetaceans, for purposes of this report the authors focused these provisions only on cetaceans. Nevertheless, the same issues are also of concern to sea turtles and any legislation that moves forward should include provisions to reduce sea turtle bycatch.

either encourages, urges, or requests parties to undertake.[401] Similarly, the sustainable fisheries resolution relates to implementation of the provisions of the United Nations Convention for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks and it recalls and reaffirms the provisions of this agreement and calls upon parties to take specific action.

For example, in 2006, the sustainable fisheries resolution:

> *Urges* States, including those working through subregional or regional fisheries management organizations and arrangements, to implement fully the International Plan of Action for the Conservation and Management of Sharks, notably through the collection of scientific data regarding shark catches and the adoption of conservation and management measures, particularly where shark catches from directed and non-directed fisheries have a significant impact on vulnerable or threatened shark stocks, in order to ensure the conservation and management of sharks and their long-term sustainable use, including by banning directed shark fisheries conducted solely for the purpose of harvesting shark fins and by taking measures for other fisheries to minimize waste and discards from shark catches, and to encourage the full use of dead sharks;
>
> *Requests* States and regional fisheries management organizations and arrangements to urgently implement, as appropriate, the measures recommended in the Guidelines to Reduce Sea Turtle Mortality in Fishing Operations 12 and the International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries of the Food and Agriculture Organization of the United Nations in order to prevent the decline of sea turtles and seabird populations by reducing by-catch and increasing post-release survival in their fisheries, including through research and development of gear and bait alternatives, promoting the use of available by-catch mitigation technology, and promotion and strengthening of data-collection programmes to obtain standardized information to develop reliable estimates of the by-catch of these species.[402]

The Office of International Affairs could work to include similar language in the sustainable fisheries resolution that calls upon states to implement the MMAP (preferably the revised version) and to take urgent action to assess cetacean population within their waters, document cetacean bycatch and reduce bycatch. This approach provides top-down support through the General Assembly for the recommended actions that have been made at the bottom-up regional fisheries management agreement/organization level.

Incentives

Incentives can be combined with mandates to provide impetus for compliance with international agreements. In the past, countries have used access agreements, favorable trade status, development grants and other economic assistance (such as aid for construction of freezer or dock facilities) to encourage coastal states or flag states to change fishing behavior. In the current world fishery situation, incentives that fall in the realm of fishery development are

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[401] *See, e.g.* UNGA Resolution on Oceans and Law of the Sea A/RES/61/222 (16 March 2007).

[402] 2006 UNGA Resolution on Sustainable Fisheries. A/RES/61/105.

not a tool of choice, but incentives that relate to capacity reduction or effort limitation might be considered. Technology transfers or research grants might be useful incentives. The FAO has ongoing programs examining buyouts and other mechanisms for capacity reduction in which the U.S. has been participating.

Favorable price or favorable trading partner status is another type of incentive, but must be considered carefully in light of rules on tariffs and trade. This is the flip side of import restrictions, trade sanctions or requirements that importers provide proof of origin for some fish (see, for example, the ICCAT requirements outlined in Chapter 4). One mechanism the private sector has employed in an effort to provide a price benefit for seafood products is certification that fish was caught in a sustainable manner. This approach varies from consumer-oriented programs such as seafood cards that urge shoppers and restaurant diners to choose items labeled "green," to more rigorous industry-oriented programs such as certification by the Marine Stewardship Council. In this latter approach, an applicant fishery sector must prove through responses to a set of criteria, that it can achieve a score that translates as "sustainable." The certification is done by a third-party examiner, and follows a rigorous review process.[403] The criteria already include an assessment of bycatch and interaction with protected species, but scoring guidelines are created for each fishery under examination. In cases where cetacean bycatch is an issue, it might be useful to work with the MSC to place emphasis on at-risk cetaceans during creation of scoring guidelines. Although to date most of the fisheries that have undergone MSC assessment have been large, industrial fisheries, the organization has devoted study to methods for assessing smaller, coastal and artisanal fisheries, and is currently developing guidelines for such approaches. These cases may have application for cetacean protection in areas with coastal fisheries such as Asia and Africa.

Labeling programs, whether "dolphin safe," country of origin, MSC, or other certification that the product was caught according to a set of rules and standards, are only as good as the infrastructure necessary to conduct and enforce the tracking and compliance. To the degree that standards for avoidance of cetacean bycatch can be integrated into existing, required programs for seafood tracking, this incentive could be an effective tool.

An opportunity to further consideration of cetacean bycatch as an element of sustainable seafood certification and labeling could be to conduct a session on incentives at an international seafood show or conference. In recent months major seafood retailers such as Wal*Mart have made a show of pushing sustainable seafood. They join the ranks of Whole Foods and others who have been on the "green" bandwagon longer, but have less of an impact on the market. In some cases, these major players have foundations and sources of funding that might be applied to research or gear investigation or technology transfer. The tremendous influence that buyers such as Wal*Mart have on the supply chain is not to be underestimated.

New Technology

Ocean observing via satellites is an emerging technology whose applications are only beginning to be employed in resource conservation. Data on temperature, salinity, and other geophysical and oceanographic information can be related to fronts where predators and prey are most likely to be found. The data that fishing fleets use to figure out where fishing is most productive can be used to predict where marine mammals are most likely to be fishing, too. It might be possible to delineate avoidance areas by overlaying time/place/temperature information gathered through the International Ocean Observing System. The Global Earth

[403] A description of the MSC certification process is available online at . See also, Eco-labelling in Fisheries: what is it all about? B. Phillips, T. Ward & C. Chaffee, eds. Blackwell Science, Oxford, UK. 2003.

Observation System of Systems[404] provides a framework to integrate numerous data sets that may provide insight into the interaction of fishing fleets and cetaceans. These new technologies offer precision and potential to integrate data that have not be available heretofore. It is important to bring this potential to the attention of scientific committees in regional and international management bodies.

Building Capacity for Assessments and Mitigation

Capacity building is a term that refers to the enhancement of human capabilities through a combination of education and infrastructure improvement. Capacity building is crucial to providing local scientists with the skills necessary to undertake research to make progress on conservation efforts to reduce cetacean bycatch. The Office of International Affairs should seek opportunities to expand programs of scholarships to study abroad, transfer technology, engage in collaborative research, and continue programs of professional development. Any training effort should involve practical field experience that results in products such as formal population assessments, management plans, or bycatch estimates. In the end, training programs will only be successful if they are accompanied by the opportunities for local researchers to use the skills that they develop to conduct cetacean research and conservation and bycatch reduction in that region. In addition, the infrastructure necessary to aid researchers in applying these skills must be available or be able to be easily developed. The Office of International Affairs should look for opportunities to facilitate workshops that bring together researchers from a particular region to address a particular cetacean bycatch issue so they may identify and agree on priorities, coordinate research activities, standardize methodology, and enhance the analytical skills of participants.

Below are examples of ongoing programs with which the Office of International Affairs could partner to achieve some of the research needs identified throughout this report.

Programs to develop aid to undertake or establish population assessment, bycatch estimation, and bycatch reduction programs

International cetacean bycatch reduction efforts are affected by the adequacy of the science and management capacity of every coastal nation. Well-trained scientists and high-quality laboratories and equipment contribute to our understanding of cetacean bycatch. There are a variety of U.S. programs designed to assist in ocean and coastal science capacity building. The U.S. Agency for International Development, as part of its mission to expand democracy and improve the lives of citizens in the developing world, sponsors programs that promote natural resource management.

Sea Grant International—the Need for International Internships

In its 2004 report the U.S. Commission on Ocean Policy recommended that: “Congress should significantly expand the National Sea Grant College Program as part of doubling ocean and coastal research funding.” President Bush’s U.S. Ocean Action Plan states, “In response to direct requests from interested foreign governments and universities, the Administration will conduct a donors conference in Latin America, hold a workshop in Southeast Asia, and develop a technical assistance plan in North Africa in order to help introduce and adapt the successful U.S. Sea Grant system of applied research, extension, and education to countries in these regions. Sea Grant will help create a global network of institutions dedicated to applying the knowledge and technologies that lead to sustainable forms of coastal and marine resource

[404] A description of GEOSS is available online at http://www.epa.gov/geoss/

development and conservation."

This statement demonstrates the reach of The National Sea Grant College Program, but the international reach of this program has been limited. The Office of International Affairs should work with Congress and the National Sea Grant College Program to strengthen the international component of Sea Grant. Through international internships Sea Grant could evolve to become a marine environmental stewardship version of the Peace Corps—a Sea Corps. From the viewpoint of international bycatch reduction, students could undertake international internships to foster global capacity to reduce cetacean bycatch worldwide by adapting the Sea Grant model of applied research, extension and education to international contexts. These internships could become the mechanism to train international scientists and provide nations with the tools and personnel needed to assess cetacean population abundance, estimate bycatch, and test promising mitigation measures.

Partnerships with Academia and Environmental NGOs

World Wildlife Fund (WWF) bycatch reduction efforts

World Wildlife Fund undertakes several programs to address bycatch. WWF's first International Smart Gear Competition was held in 2005. The competition brings together the fishing industry, research institutes, universities, and government, to "inspire and reward practical, innovative fishing gear designs that reduce sea turtles, birds, marine mammals, cetaceans and non-target fish."[405] In 2006, the competition drew more than 80 entries from 26 countries. An international panel of gear technologists, fisheries experts, and representatives of the seafood industry, fishermen, scientists, researchers and conservationists judged the entries. The annual award has been between $25,000 and $50,000 and has gone to research to modify longline, gillnet, and shrimp trawl fisheries or gear.

In January 2002, WWF organized an international workshop that brought together the world's leading scientists on cetacean bycatch to formulate a plan for making progress toward solving the global bycatch problem. This workshop resulted in a plan for reducing cetacean bycatch, an international strategy, the formation of a network, and the creation of a virtual Resource Center, which aims to assist fishermen, scientists, environmentalists and the public in working together to address cetacean bycatch. Working closely with WWF, the International Cetacean Bycatch Task Force conducts research and training in areas with the most severe bycatch problems, works with fishermen to develop cetacean-safe fishing techniques and actively advocates for more resources and attention in international policy arenas.

Duke University

Duke Center for Marine Conservation, through the Nicolas School of Environment and Earth Sciences, is involved in a global assessment of the impact of fisheries bycatch on marine mammals, seabirds, and sea turtles. The overall goal of the program is to reduce fisheries bycatch of these vulnerable species and promote sustainable fisheries. Through synthesis of existing data, collaboration and coordination of ongoing research efforts, Duke hopes to develop new approaches to bycatch assessment looking across gear types and taxa and to place bycatch into an oceanographic context.

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[405] Information available on line at bycatch.

Society for Marine Mammalogy

In 1999 the International Society for Marine Mammalogy established a program to help support marine mammal research in economically disadvantaged countries. Individual awards of up to $1000 may be made annually and each award may be renewed for up to three years. The grants are intended to support field research, the purchase of essential equipment, travel to field sites, or other fundamental research components.

Small grant programs

U.S. law has numerous provisions for grants and gear research. The Cetacean Conservation Act (Appendix E) contains provisions for a small grant program. The MMPA has provisions for research into gear development. In past years, the Saltonstall Kennedy Grant Program administered by NMFS has made bycatch avoidance research projects a themed priority. Although the program was cancelled in FY 2007 for lack of funding, it may be revived in the future. The annual budget and appropriations cycle usually spawns numerous line item projects that provide money for research into fishery bycatch of protected species. The Office of International Affairs should look for opportunities to either develop or use existing grant programs to fund the research needs identified in this report.

Additionally, the Office of International Affairs might look to develop a public/private partnership with external institutions and the fishing industry to either expand these existing programs or to initiate a new small grant program that would enable it to meet its obligations under the MMPA and the Magnuson-Stevens Act.

Additional Steps to Document Bycatch Worldwide

Workshop on bycatch similar to 1990 La Jolla event

In October 1990, the Workshop on Mortality of Cetaceans in Passive Fishing Nets and Traps was held in La Jolla, California. The idea for this workshop began six years earlier, but budget constraints delayed the workshop. The workshop included a symposium of contributed papers and consideration of incidental mortality in traps and other passive fishing gear. The International Whaling Commission Special Issue—Gillnets and Cetaceans that was published in 1994, remains a important, though dated, source of information on cetacean bycatch

The WWF workshop held in Annapolis in January 2002 produced a recommendation that was forwarded to the IWC Subcommittee on Small Cetaceans; that recommendation was that countries should develop formal national plans of assessment to estimate bycatch rates. “Such Plans would include collection and analysis of data to describe fishing fleets, including the size of the fleet (number of vessels), fishing methods, fishing areas and measures of fishing effort. They should also include where appropriate bycatch monitoring schemes based on independent observations when possible.”

The IWC Subcommittee on Small Cetaceans has proposed a series of regional workshops, sponsored by the IWC, to advance assessment and mitigation of cetacean by-catches. “The main thrust of the workshops would be to conduct the necessary assessment, monitoring and mitigation functions that will lead, where necessary, to the reduction of bycatch and alleviation of the conservation threat to the population or species under consideration.”[406]

[406] Annex L, Report of the Subcommittee on Small Cetaceans, IWC 2004.

The Subcommittee recognized that many advances have been made in the assessment and mitigation of cetacean bycatch since the 1990 IWC workshop and they questioned whether another workshop of the scope and scale of the 1990 workshop was appropriate. Given the case-specific nature of the problem, the comments of the Subcommittee seemed to support the recommendation of either a national plan (such as the plans of assessment) or a series of broad-based regional workshops focusing on regions where bycatch problems have been identified as a priority.

The Office of International Affairs should take the lead in this effort. The workshops should not be held in the US but in regions where the bycatch problem occurs. The workshops should include an assessment of the problem and consideration of appropriate mitigation and monitoring measures. Workshop participants should include international scientists/experts on cetacean bycatch, invited experts on the biology of the most affected species, local scientists, fishery managers, representatives of the fishing industry and non-governmental organizations and government decision makers. The Office of International Affairs should collaborate with the Convention on Migratory Species, the Committee on Fisheries of the UN Food and Agriculture Organization, IUCN, relevant international and regional fishery organizations in the development and execution of these workshops. Finally, these workshops should not be a one-time occurrence but should be repeated every several years.

CHAPTER 7. PRIORITY RECOMMENDATIONS

Throughout this report the authors identify a combination of both research needs (Chapters 2 and 5) and recommendations for agency action (Chapter 6). With more than twenty recommendations, and limited agency resources (staff and budget), it is necessary to set some priorities among the recommendations. While recognizing that there will be agency considerations, budget and policy guidance and diplomatic opportunities that will arise and that cannot be predicted here, the authors attempted to rank the recommended actions by using a set of scoring criteria. The information in Table 7.1 illustrates how to score the recommendations against two types of measures.

The first overarching criterion analyses the level of risk to the population and the conservation benefit of implementing a particular recommendation. The subcriteria ask whether the recommendation:

- Assists a critically endangered species;
- Assists a species at risk (listed under the IUCN Red List);
- Addresses unsustainable bycatch;
- Aids a trans-boundary species;
- Will help meet a critical research need (e.g., provide information on cetacean abundance or bycatch estimates).

The second overarching criterion evaluates the ease and effectiveness of implementation. The subcriteria query whether legal frameworks and capacity to implement mitigation measures exist:

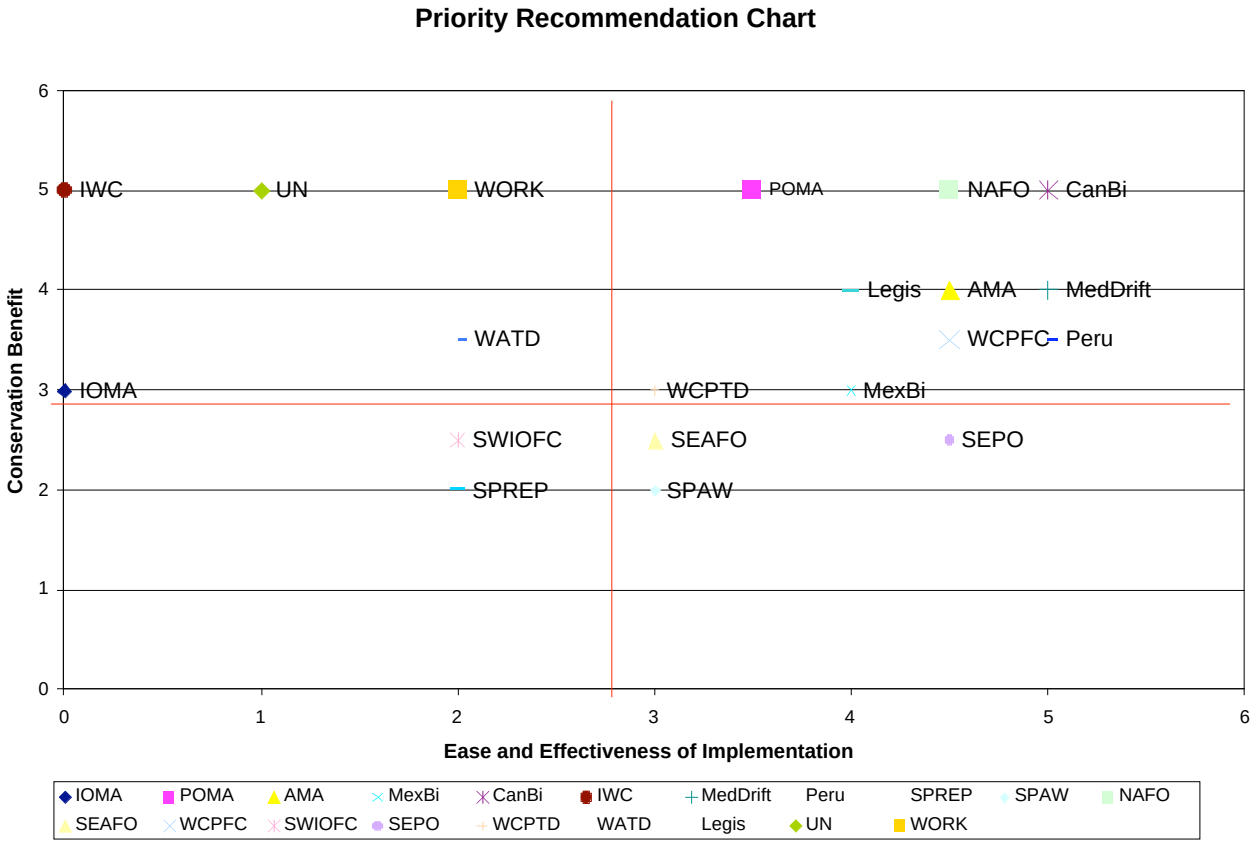
- Regional agreement is in place that can be used to implement the recommendation;
- Bilateral agreement is in place that can bring about prompt action;
- National legislation is in place that either requires enforcement or modification to strengthen conservation requirements;
- Mitigation strategies or possible solutions are available to be used or tested;
- Institutional capacity is such that intervention is feasible.

Each recommendation was analyzed, and a point value assigned based on the number of subcriteria that it satisfied. Those subcriteria denoted with a question mark indicate that, based on the literature, there is some level of uncertainty. In these situations, a half of a point was scored. The results of that evaluation are summarized in Table 7.1

Table 7.1 Analysis to Develop Priority Recommendations					
Recommendation Title	Acronym	Conservation Benefit Criteria	Total # of Pts	Ease/Effectiveness of Implementation Criteria	Total # of Pts
Indian Ocean Multilateral Agreement	IOMA	2,3,5	3		0
Pacific Ocean Multilateral Agreement	POMA	1,2,3,4,5	5	1,2,4,5(?)	3.5
Americas Multilateral Agreement	AMA	1,3,4,5	4	1,2,3,4,5(?)	4.5
US/Mexico Bilateral	MexBi	1,3,5	3	2,3,4,5	4
US/Canada Bilateral	CanBi	1,2,3,4,5	5	1,2,3,4,5	5
Amend IWC	IWC	1,2,3,4,5	5		0
Mediterranean Driftnets	MedDrift	2,3,4,5	4	1,2,3,4.5	5
Peruvian Fisheries Bycatch	Peru	2,3(?),4,5	3.5	1,2,3,4,5	5
South Pacific Regional Environment Program	SPREP	3,5	2	1,5	2
Caribbean SPAW Protocol	SPAW	3,5	2	1,4,5	3
Northwestern Atlantic Fisheries Organization	NAFO	1,2,3,4,5	5	1,2(?)3,4,5	4.5
Southeast Atlantic Fisheries Organization	SEAFO	3,4(?),5	2.5	1,2,4	3
Western Central Pacific Fisheries Commission	WCPFC	1,3,4,5(?)	3.5	1,2,3,4(?),5	4.5
Southwest Indian Ocean Fisheries Commission	SWIOFC	1,(?),3,5	2.5	1,3	2
Plan of Action for Marine Mammals in the Southeast Pacific Ocean	SEPO	3,4,(?),5	2.5	1,2,3,4,5(?)	4.5
Western Central Pacific--tuna/dolphin interactions	WCPTD	3,4,5	3	1,4,5	3
West Coast of Africa--tuna/dolphin interactions	WATD	2,3,4(?),5	3.5	1,4	2
Bycatch Legislation	Legis	1,2,3,4,5	4	1,2,4,5	4
United Nations General Assembly Resolution	UN	1,2,3,4,5	5	1	1
Workshops for Science and Technology Transfer	WORK	1,2,3,4,5,	5	4,5	2

The ranking is then graphed with Conservation Criterion on the y-axis and the Legal Framework Criterion on the x-axis. The following example demonstrates how the priorities may group into sectors that will serve as the basis for prioritization. Figure 7 shows the distribution of the various recommendations.

Figure 7. Priority Ranking Scheme



Discussion and Further Analysis of the Priorities

Top Priority

Ten recommendations fall within the Top Priority. Four of these can be categorized as bilateral negotiations that are either ongoing or should be initiated. They are the US/Mexico (MexBi) bilateral, the US/Canada bilateral (CanBi), negotiations related to Pelly Certification of Italy and other Mediterranean nations for the use of driftnets (MedDrift), and the initiation of bilateral negotiations (possibly in response to an MMPA Section 101 Pelly petition) with Peru to reduce cetacean bycatch and bring about greater enforcement of its national laws. The Canada, Mexico, and Mediterranean driftnet negotiations all have a lengthy history but joint efforts to take the necessary action to begin to resolve the bycatch problems have been slow. With additional effort substantial progress could be made to reduce cetacean bycatch through these negotiations over the next one to two years. The same is true if the Office of International Affairs initiated discussions with Peru similar to those that it has undertaken with Chile. Peru has both the legal framework and the scientific infrastructure in place to better assess cetacean abundance and bycatch and to control it.

Three recommendations that occur in the Top Priority fall under actions that can be taken to reduce cetacean bycatch under existing multi-lateral agreements and will likely require two to three years of effort to achieve progress. These are: the Northwestern Atlantic Fisheries Organization (NAFO); Western Central Pacific Fisheries Commission (WCPFC); and a subset of the Western Central Pacific tuna/dolphin interactions (WCPTD). NAFO and the WCPFC have

recently adopted resolutions to assess and mitigate sea turtle bycatch in longline and purse seine fisheries. Appendix C provides an example of a resolution that calls upon member nations to estimate cetacean stock abundance and bycatch within their waters and to report the results of their findings back to the Secretariat of that particular agreement. It also calls upon member nations to take action where possible to reduce cetacean bycatch. The purpose of such a resolution is to use existing multilateral fisheries commissions or agreements as a mechanism to gather and share scientific information and to work collaboratively on techniques to reduce cetacean bycatch. In the situation where interactions are either suspected or scantily documented between purse seine fishing vessels fishing for tuna and dolphins, the WCPFC provides the framework to allow the U.S. to investigate the frequency and magnitude of this interaction and to mitigate any potential bycatch.

The final three recommendations will take three to five years to achieve and require either the adoption of new legislation (Legis) or the negotiation of new multilateral agreements specifically focused on cetaceans within a particular geographic region such as the Pacific Ocean Multilateral Agreement (POMA) or the Americas Multilateral Agreement (AMA). The cetacean bycatch legislation referred to here and included in Appendix E has been introduced at least once in the 108th Congress. While many of its mandates calling for international negotiations to reduce cetacean bycatch overlap with existing mandates in both the MMPA and the M-SFCMA, the provisions calling for the development of an international bycatch database are sorely needed and well worth the effort to secure passage of such legislation. This database could ultimately provide the baseline information needed by both the Office of International Affairs and the Office of Protected Resources to improve cetacean conservation and management and to meet the mandates of both the MMPA and the M-SFCMA. Section 108 provides the authority for the Secretary of Commerce to work through the Secretary of State to negotiate multilateral agreements to protect and conserve cetaceans. The areas most in need of such an agreement are the Pacific Ocean and the east and west coasts of Mexico, Central and South America. For these multilaterals, an agreement similar to the Inter-American Convention for the Protection and Conservation of Sea Turtles would provide an appropriate model.[407] One of the many measures called for in the Inter-American Convention is the "reduction, to the greatest extent practicable, of the incidental capture, retention, harm or mortality of sea turtles in the course of fishing activities, through the appropriate regulation of such activities, as well as the development, improvement and use of appropriate gear, devices or techniques, including the use of turtle excluder devices (TEDs)…"[408] An international effort to negotiate this type of agreement would likely take five years to complete and ratify, yet it would provide the framework to assess cetacean abundance and bycatch and would likely have benefits beyond cetacean bycatch reduction including reducing direct harvests and consumption, preventing habitat degradation, and providing a mechanism to address issues

[407] The Inter-American Convention is founded on the concepts of other critical international accords, such as the United Nations Convention on the Law of the Sea, the United Nations Conference on the Environment and Development and the Code of Conduct for Responsible Fisheries, adopted by the Conference of the Food and Agriculture Organization (FAO) of the United Nations in its 28th Session (1995). It complies with the measures established in other international instruments, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora and the World Trade Organization. The Inter-American Convention compliments the Bonn Convention or CMS. All species of sea turtles found in the western hemisphere are listed in both Appendix I and Appendix II of the Bonn Convention, and the text of CMS includes many concepts fundamental to regional conservation of migratory marine animals, such as sea turtles. In the same vein, the Protocol concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (known also as the Cartagena Convention) is totally complementary to the Inter-American Convention.

[408] Article IV(h) of the Inter-American Convention to Protect and Conserve Sea Turtles.

such as climate change and the adverse impacts of anthropogenic sound and contaminants.

Second Tier Priority

The second tier priority—at the top left corner of the graph—includes adoption of a United Nations General Assembly Resolution on cetacean bycatch (UN); workshop for science and technology transfer (WORK); an Indian Ocean Multilateral Agreement (IOMA); modifications to the International Whaling Commission to recognize its competence to manage small cetaceans (IWC); and investigations into West Coast of Africa tuna/dolphin interactions (WATD). While there is potentially great conservation benefit in either modifying the mandate of the IWC or negotiating a new cetacean specific IOMA, the likelihood of success is remote. The current membership composition of the IWC makes such changes unlikely and progress on the issues already identified through the Small Cetacean Subcommittee has been slow. In the Indian Ocean, the U.S. has little capacity or leverage to either spark negotiations for such an agreement (given the geography, it is unlikely that the U.S. would be a party to such an agreement) or to take action against nations like Sri Lanka or India for cetacean bycatch or harvests.

Within the next two to three years the U.S. could make progress in two areas. First, it could take a leadership role to hold a series of regional bycatch workshops, similar to the one held in La Jolla in the early 1990s. These workshops could review the status of cetacean populations and what is known about cetacean bycatch in each participating country. They could also become a forum to discuss the use of existing mitigation measures and testing and development of new technologies to reduce bycatch. This information provides the foundation for actions recommended in association with other bilateral and multilateral negotiations or agreements and mandates under the MMPA and the MS-FCMA. Second, the U.S. could use the framework of both ICCAT and SEAFO to investigate the interaction between tuna purse seine vessels fishing for tuna off the coast of West Africa and whales and dolphins. Allegations and sparse documentation of these interactions have existed for more than twenty years. By placing observers on tuna vessels fishing in these areas through the auspices of the RFMOs, the organizations could help document the occurrence of association of tuna schools with whales and dolphins and the frequency of encirclement and magnitude of any bycatch.

Finally, the Office of International Affairs could work to introduce a measure that calls upon parties to reduce cetacean bycatch as part of the sustainable fisheries resolution. This resolution relates to implementation of the provisions of the United Nations Convention for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks and it recalls and reaffirms the provisions of this agreement and calls upon parties to take specific actions. Although U.N. resolutions are not binding, passage of a measure that includes precise language on cetacean bycatch and requests that parties take a specified course of action (e.g. assess cetacean abundance, estimate bycatch, establish bycatch limits, and mandate bycatch mitigation) might provide impetus to regional fishery management bodies and parties to other regional agreements to carry out efforts described earlier for venues such as NAFO, ICCAT, WCPFC, and SEAFO.

Third Tier Low Priority

These recommendations fall in the bottom two quadrants of the graph and encompass five recommendations. Four of these call for continued work within existing multilateral agreements to elevate the issue of cetacean bycatch. They are: Southeast Atlantic Fisheries Organization (SEAFO); the Caribbean SPAW Protocol (SPAW); the Marine Mammal Action Plan in the Southeast Pacific Ocean (SEPO); and the South Pacific Regional Environment

Program (SPREP). SPAW, SEPO, and SPREP all have some form of marine mammal/cetacean action plan that provides a framework from which to assess cetacean stock abundance and to estimate bycatch. Because these plans encourage technology transfer and scientific exchange they would be fertile ground for the regional workshops previously discussed. And although they ranked lower than the recommendations pertaining to action within the IWC, IOMA, or the UN, they should likely be elevated in priority to the second tier, given the framework that already exists and the natural alignment with the WORK recommendation.

Finally, for the reasons outlined in Chapter 6 and earlier in this chapter related to agreements in the Indian Ocean, efforts to achieve bycatch reduction through the Southwest Indian Ocean Fisheries Organization should be a low priority. The U.S. will have little leverage and a great deal of difficulty in affecting change within this agreement.

Conclusion

Based on the analysis conducted in this chapter, Table 7.2 proposes four categories for priorities and lists the recommendations under each. As part of an overall action plan to reduce cetacean bycatch and comply with the mandates under the MMPA and the M-SFCMA over the next one to three years, it is recommended that the Office of International Affairs focus its efforts on the short term top- and second tier priorities.

Table 7.2 Priority Recommendations
Short Term (1-3 yrs)—Top Priorities--Bilateral Agreements
US/Mexico Bilateral (MexBi)
US/Canada Bilateral (CanBi)
Mediterranean Driftnets (MedDrift)
Peruvian Fisheries Bycatch (Peru)
Workshops for Science and Technology Transfer (WORK)
Short Term (1-3 yrs)—Second Tier Priorities—Multilateral Agreements
Northwestern Atlantic Fisheries Organization (NAFO)
Western Central Pacific Fisheries Commission (WCPFC)
Western Central Pacific--tuna/dolphin interactions (WCPTD)
Southeast Atlantic Fisheries Organization (SEAFO)
West Coast of Africa--tuna/dolphin interactions (WATD)
Plan of Action for Marine Mammals in the Southeast Pacific Ocean (SEPO)
Caribbean SPAW Protocol (SPAW)
South Pacific Regional Environment Program (SPREP)
Long Term (3-5 yrs)—Top Priorities—Multilateral Agreements
Pacific Ocean Multilateral Agreement (POMA)
Americas Multilateral Agreement (AMA)
Bycatch Legislation (Legis)
United Nations General Assembly Resolution (UN)
Low Priority Recommendations
Amend IWC (IWC)
Southwest Indian Ocean Fisheries Commission (SWIOFC)
Indian Ocean Multilateral Agreement (IOMA)

Appendix A. Review of Cetacean Incidental Mortality in International Fisheries

Increasing attention has been paid in the last decade or two to the ways in which fisheries may impact cetacean populations. Most research done recently has addressed the accidental killing of cetaceans in fishing operations, a source of mortality that has given rise to serious concerns about the status of several cetacean populations.[1] More than half of the fifty-seven initiatives recommended in the IUCN—The World Conservation Union's Species Survival Commission Conservation Action Plan for the World's Cetaceans deal with bycatch.[2] Conflicts between cetaceans and commercial fisheries are increasing in frequency and intensity because of increasing human populations and the demand for seafood as a protein source. However our knowledge about the global extent of cetacean bycatch is poor and fragmented and the significance of this bycatch to cetacean populations is lacking in most nations. Species including the baiji and the vaquita, and local populations of humpback dolphins, striped and bottlenose dolphins and the harbor porpoise were singled out as being unlikely to be able to sustain current catch levels. [3]

Conflicts between marine mammals and fisheries were reviewed on a worldwide basis in 1984 and 1991.[4] Subsequently, numerous studies and investigations of marine mammal fishery interactions have been implemented around the world.[5] The purpose of this Appendix is to summarize subsequent publications on this subject, and to demonstrate the overall scale of such conflicts. The International Whaling Commission estimates that kill rates of as low as 2 percent of a cetacean population may not be sustainable, depending on the life history of the species and the age and sex composition of the kill. Likewise the US Congress established as part of the MMPA the potential biological removal level (PBR), which establishes a sustainable bycatch limit for cetaceans at less than 2 percent of a cetacean population.[6] These numbers were used as our benchmarks. Species at risk are those species where the bycatch represents between one and two percent of the population estimate. Species where the bycatch is unsustainable are those where the bycatch exceeds two percent of the population estimate.

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[1] In January 2002 a group of experts on marine mammal bycatch concluded that "incidental capture in fishing operations is the major threat to whales, dolphins, and porpoises worldwide. Several species and many populations will be lost in the next few decades if nothing is done. Urgent national and international action is needed." Read, A.J., and A.A. Rosenberg (convenors). 2002. Draft International Strategy for Reducing Incidental Mortality of Cetacean in Fisheries. http://cetaceanbycatch.org/intlstrategy.cfm.

[2] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A. and Notarbartolo di Sciara, Giuseppe (compilers). (2003).

Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans. IUCN/SSC

Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp

[3] Id. See also. Andrew J. Read, Phebe Drinker, Simon Northridge (2006) Bycatch of Marine Mammals in U.S. and Global Fisheries Conservation Biology 20 (1), 163–169.

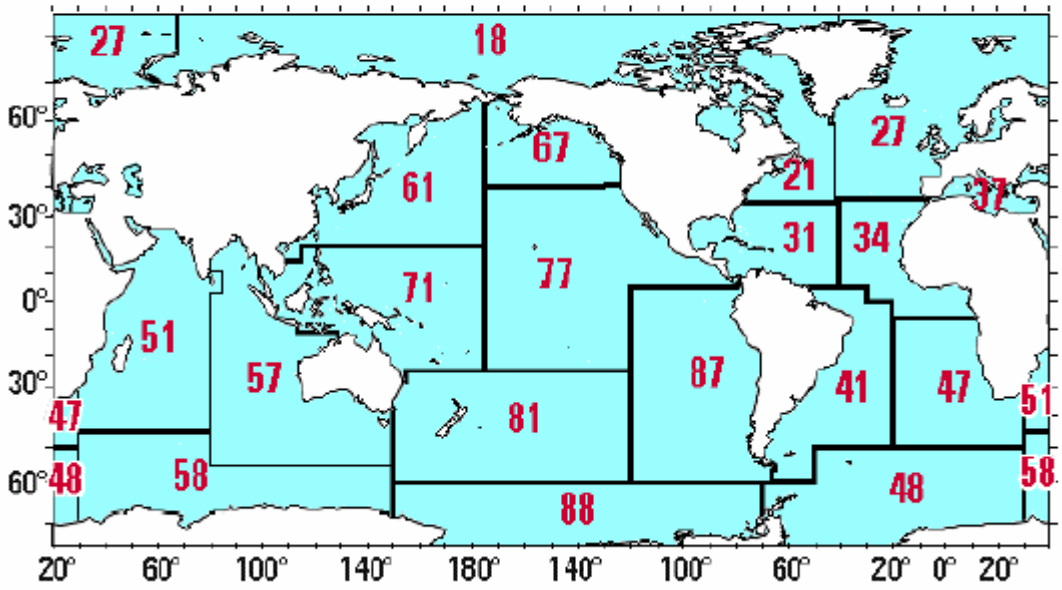
[4] Northridge, S.P., [1991] An updated world review of interactions between marine mammals and fisheries. FAO Fish. Tech. Paper 251 (Suppl 1). 58pp.

[5] Northridge, S.P. and Hofman, R.J. 1999. Marine mammal interactions with fisheries. Pp.99–119 *in: Conservation and Management of Marine Mammals* (eds. J.R. Twiss, Jr. and R.R. Reeves). Smithsonian Institution Press, Washington, DC. See also Read, A.J., and A.A. Rosenberg (convenors). 2002. Draft International Strategy for Reducing Incidental Mortality of Cetacean in Fisheries. http://cetaceanbycatch.org/intlstrategy.cfm.

[6] Wade, P.R. 1998. Calculating limits to the allowable human-caused mortality of cetaceans and pinnipeds. Marine Mammal Science 14:1-37

The interactions are considered on the basis of FAO statistical areas, which are shown on the map below. The use of FAO statistical areas to discuss regional bycatch issues is carried throughout the report. Appendix A presents, in tabular format, for each cetaceans species for which there are documented bycatch records, estimates of species abundance and bycatch, as well as information on the type of fisheries that interact with or accidentally catch that cetacean species. The information in this Appendix provides the foundation for further analysis that are undertaken in Chapters 2 and 5 of this report.

Food and Agriculture Organization (FAO) Statistical Areas



AREA 21 NORTHWEST ATLANTIC

The Northwest Atlantic includes cetaceans within the US EEZ, since the focus of this report is international bycatch, and the assessment and mitigation of bycatch in the United States is governed under the MMPA, the description for this area will focus only on international bycatch of shared cetacean stocks.

Species	***Eubalaena glacialis* Northern right whale**	
Abundance Estimate	300	
Fisheries	Right whales are entangled in cod trap, lobster trap lines, groundfish gillnets, herring weirs. A mother and calf were released from a herring weir in 1976.	
Estimated Annual Mortality	1.2/yr 2000-2004	
Species	***Balaenoptera physalus* Fin whale.**	
Abundance Estimate	2,814 (Georges Bank to mouth of Gulf of St. Lawrence	
Fisheries	Fin whale entangled in lobster trap lines (3), groundfish gillnets (6), a herring weir and a squid trawl (1) since 1976.[7]	
Estimated Annual Mortality	No recent estimates of mortality for fin whales outside the US EEZ are available.	
	Up to 3 fin whales per year have been reported entangled in inshore fishing gear in Newfoundland, of those 5 out of 12 fin whales caught in inshore fishing gear in Newfoundland were dead.[8]	
Species	***Balaenoptera acutorostrata* Minke whale.**	
Abundance Estimate	Canadian East Coast (Georges Bank to the mouth of the Gulf of St. Lawrence)[9]	2,998
	west Greenland	
	central North Atlantic[10]	60,000
	northeastern North Atlantic	120,000
Fisheries	Read reported interactions between minke whales and gillnets in Newfoundland and Labrador, cod traps in Newfoundland, and herring weirs in the Bay of Fundy.[11]	

[7] Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

[8] NOAA (2006) Draft Atlantic Marine Mammal Stock Assessment Report at 28

[9] NOAA (2006) Draft Atlantic Marine Mammal Stock Assessment Report at 28

[10] IUCN Red List

[11] Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int

Estimated Annual Mortality[12]	From 1991 through 1996 scientists observed no minke whales taken in fishing vessels operating in Canadian waters.[13] During 1997 to 2001, there were no confirmed mortalities or serious injuries in Canadian waters as reported by the various, small-scale stranding and observer data collection programs in Atlantic Canada. No additional information is available on Canadian mortalities from 2002 to present. During 1980 to 1990, 15 of 17 minke whales were released alive from herring weirs in the Bay of Fundy. During January 1991 to September 2002, 26 minke whales were trapped in herring weirs in the Bay of Fundy. Of these 26, 1 died and several (number unknown) were released alive and unharmed.[14]
Species	***Megaptera novaeangliae* Humpback whale.**
Abundance Estimate	Barents and Norwegian Sea 889
Fisheries	Reports of collisions with fixed fishing gear set for groundfish around Newfoundland averaged 365 annually from 1979 to 1987 (range 174-813). An average of 50 humpback whale entanglements (range 26-66) was reported annually between 1979 and 1988, and 12 of 66 humpback whales that were entangled in 1988 died.[15] Between 1979 and 1992, Newfoundland and Labrador, cod traps caused the most entanglements and entanglement mortalities--21% of humpbacks. Between 1975 and 1990, gillnets are primarily responsible for 20% of humpback

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Whal. Commn Special Issue 15: 133-147.

[12] Additional, but somewhat dated information indicates that Lien et al (1987) estimated average entanglement rates of around 11 minke whales per year in Newfoundland's inshore fisheries. Between 1979 and 1985 58% of such entanglements were in cod traps and 21% in gillnets (O'Hara et al 1986). Lien et al report that around 75% of such entanglements are mortalities. Read suggests some possible mortality in Gulf of St. Lawrence set gillnet fisheries, and also reports two minke whale deaths in Bay of Fundy herring weirs between 1980 and 1990.

Other Fisheries--Six minke whales were reported entangled during 1989 in the now non-operational groundfish gillnet fishery in Newfoundland and Labrador. One of these animals escaped and was still towing gear, the remaining 5 animals died. Salmon gillnets in Canada, now no longer being used, had taken a few minke whales. In Newfoundland in 1979, one minke whale died in a salmon net. In Newfoundland and Labrador, between 1979 and 1990, it was estimated that 15% of the Canadian minke whale takes were in salmon gillnets. A total of 124 minke whale interactions were documented in cod traps, groundfish gillnets, salmon gillnets, other gillnets and other traps. The salmon gillnet fishery ended in 1993 as a result of an agreement between the fishermen and North Atlantic Salmon Fund (Read 1994). Five minke whales were entrapped and died in Newfoundland cod traps during 1989. The cod trap fishery in Newfoundland closed in 1993 due to the depleted groundfish resources (Read 1994).

[13] Hooker, S.K., R.W. Baird and M.A. Showell. 1997. Cetacean strandings and bycatches in Nova Scotia, Eastern Canada, 1991-1996. Meeting document SC/49/O5 submitted to the 1997 International Whaling Commission meeting in Bournemouth, UK. Hooker *et al.* (1997) summarized bycatch data from a Canadian fisheries observer program that placed observers on all foreign fishing vessels operating in Canadian waters, on between 25% and 40% of large Canadian fishing vessels (greater than 100 feet long), and on approximately 5% of smaller Canadian fishing vessels. During 1991 through 1996, no minke whales were observed taken.

[14] NOAA (2006) at 31

[15] Lein, J. , W. Ledwell, and J. Naven. 1988. Incidental entrapment in inshore fishing gear during 1988: A preliminary report to the Newfoundland and Labrador Department of Fisheries and Ocean, 15 pp.

	entanglements and entanglement mortalities in the Gulf of Maine.[16]	
Estimated Annual Mortality	0.6/yr 2000-2004	
Species	***Stenella coeruleoalba* Striped dolphin**	
Abundance Estimate	Maryland to the Bay of Fundy	52,055 (CV = 0.57)
Fisheries	Gillnet, trap, and trawl fisheries	
Estimated Annual Mortality	In review of Canadian gillnet and trap fisheries, no mortalities were documented.[17] However, Baird reported two records of incidental mortality; in the late 1960's and early 1970's, two mortalities each, were reported in trawl and salmon net fisheries.[18] Between January 1993 and December 1994, 36 Spanish deep-water trawlers, covering 74 fishing trips (4,726 fishing days and 14,211sets), were observed off the Grand Bank. A total of 47 incidental catches were recorded, which included two striped dolphins. The incidental mortality rate for striped dolphins was 0.014/set.[19]	
Species	***Delphinapterus leucas* White whale.**	
Abundance Estimate[20]	North Water (Baffin Bay)	28,000
	West Greenland	2,000
	Cumberland Sound	485
	Frobisher Bay	No info
	Ungava Bay (endangered)	<50
	West Hudson Bay (not at risk)	25,100
	Foxe Basin	1,000
	South Hudson Bay	1,299
	James Bay	3,300
	East Hudson Bay	1,014
	St. Lawrence River (endangered)	1,238

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[16] Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

[17] Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

[18] Baird, R.W., S. K. Hooker, H. Whitehead, and R. Etcheberry. 1997. A Review of records of striped dolphins (*Stenella coeruleoalba*) from Canadian waters. IWC Doc. SC/49/SM4, 10 pp.

[19] Lens, S. 1997. Interactions between marine mammals and deep water trawlers in the NAFO regulatory area. ICES CM 1997/Q:8. 10 pp.

[20] IWC (2000) Report of the Scientific Committee from its Annual Meeting 3-15 May 1999 in Grenada J. Cetacean Res. Manage 2(Suppl).

Fisheries	Entanglement in inshore fisheries in Newfoundland, including entrapments in Gulf of St Lawrence groundfish gillnets, and in Canadian cod traps.[21]
Estimated Annual Mortality	No Mortality Estimates

Species	***Globicephala melaena* Longfinned pilot whale**
Abundance Estimate	Maryland to the Bay of Fundy 15,728[22]
Fisheries	An unknown number of pilot whales have been entangled in Newfoundland, Labrador, and Bay of Fundy groundfish gillnets; Atlantic Canada and Greenland salmon gillnets; and Atlantic Canada cod traps.[23]
Estimated Annual Mortality	Between January 1993 and December 1994, 36 Spanish deep-water trawlers, were observed off the Grand Banks, they incidentally caught 1 long-finned pilot whale for an incidental mortality rate of 0.007 pilot whales /set. From 1991-1996, Canadian fisheries observer data indicated that long-finned pilot whales were bycaught (number of animals in parentheses) in bottom trawl (65); midwater trawl (6); and longline (1) gear. Recorded bycatches by year were: 16 in 1991, 21 in 1992, 14 in 1993, 3 in 1994, 9 in 1995 and 6 in 1996. Pilot whale bycatches occurred in all months except January-March and September. [24]

Species	***Lagenorhynchus acutus* Atlantic white-sided dolphin.**	
Abundance Estimate	Gulf of Maine Stock	51,640 (CV 0.38)[25]
	Gulf of St. Lawrence Stock	11,740 (CV=0.47)
	Labrador Sea Stock	No Abundance Estimate
Fisheries	White-sided dolphins were entangled in gillnet fisheries, longlines, herring weirs and trawls	
Estimated Annual Mortality	There is little information available that quantifies fishery interactions involving white-sided dolphins in Canadian waters. Two white-sided dolphins were reported caught in groundfish gillnet sets in the Bay of Fundy during 1985 to 1989, and 9 were reported caught in West Greenland between 1964 and 1966 in the now non-operational salmon drift nets. Several (number not specified) were also caught during the 1960's in the now non-operational Newfoundland and Labrador groundfish gillnets. From 1965 to 1982, a few (number not specified) were caught in	

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[21] Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

[22] Current estimate includes short-finned pilot whales as the two species cannot be differentiated during surveys.

[23] Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

[24] Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

[25] NOAA (2006) at 85

an experimental drift gillnet fishery for salmon off West Greenland.[26]

From 1991 through 1996, an estimated 6 white-sided dolphins were observed entangled. One animal was from a longline trip south of the Grand Banks in November 1996 and the other 5 were captured in the bottom trawl fishery off Nova Scotia in the Atlantic Ocean; 1 in July 1991, 1 in April 1992, 1 in May 1992, 1 in April 1993, 1 in June 1993 and 0 in 1994 to 1996.[27]

Canada is working on an estimation of small cetacean bycatch for Newfoundland fisheries using data collected during 2001 to 2003. White-sided dolphins were reported to have been caught in the Newfoundland nearshore gillnet fishery and offshore monkfish/skate gillnet fisheries.

One animal was caught but released alive in a herring weir.

Species	***Phocoena phocoena* Harbour porpoise.**	
Abundance Estimate	Gulf of Maine/Bay of Fundy Stock	89,700 (CV = 0.22)[28]
	Gulf of St. Lawrence Stock	21,700 (CV=0.38)[29]
	Newfoundland and Greenland	No Abundance Estimate
Fisheries	Gulf of Maine/Bay of Fundy harbor porpoise entanglements have been in the Canadian Bay of Fundy groundfish sink gillnet and herring weir fisheries	
Estimated Annual Mortality	In Canada, the total average annual mortality between 2000 -2004 is 55 animals. The average annual mortality in the Canadian groundfish sink gillnet fishery (2000 – 2004) is 51 harbor porpoise The average annual mortality in the Canadian Herring Weir fishery (2000 – 2004) is 4.4 harbor porpoise.[30]	

Bay of Fundy Sink Gillnet

During the 1980's, Canadian harbor porpoise bycatch in the Bay of Fundy sink gillnet fishery, was estimated at 94-116 in 1986 and 130 in 1989.[31] In 1993, an observer program provided a total bycatch estimate of 424 harbor porpoises (± 1 SE: 200-648) from 62 observed trips, (approximately 11.3% coverage of the Bay of Fundy trips); and in 1994, the bycatch estimate was 101 harbor porpoises (95% confidence limit: 80-122), from 171 observed trips (covering 49% of the gillnet trips).[32]

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[26] Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

[27] NOAA (2006) at 89

[28] NOAA (2006) at 111

[29] NOAA (2006) at 111

[30] NOAA (2006) at 111

[31] Trippel, E. A., J. Y. Wang, M. B. Strong, L. S. Carter, and J. D. Conway. 1996. Incidental mortality of harbour porpoise (*Phocoena phocoena*) by the gillnet fishery in the lower Bay of Fundy. Can. J. Fish. Aquat. Sci. 53:1294-1300.

32 Trippel, E. A., J. Y. Wang, M. B. Strong, L. S. Carter, and J. D. Conway. 1996. Incidental mortality of harbour porpoise (Phocoena phocoena) by the gillnet fishery in the lower Bay of Fundy. Can. J. Fish. Aquat. Sci.53:1294-1300.

During 1995, due to groundfish quotas being exceeded, the gillnet fishery was closed from July 21 to August 31. During the open fishing period of 1995, 89% of the trips were observed, approximately 30% of observed trips used pingered nets, and the estimated bycatch was 87 harbor porpoises.[33] During 1996, the Canadian gillnet fishery was closed during July 20-31 and August 16-31 due to groundfish quotas and the estimated bycatch was 20 harbor porpoises.[34] Trippel estimated that during 1996, gillnets equipped with acoustic alarms reduced harbor porpoise bycatch rates by 68% over nets without alarms.[35] During 1997, groundfish quotas again closed the fishery during portions of July and August, and a harbor porpoise time-area closure was implemented in September in the Swallowtail area- the estimated bycatch was 43 animals.[36] Again, in 1997, Trippel estimated that gillnets equipped with acoustic alarms reduced harbor porpoise bycatch rates by 85% over nets without alarms in the Swallowtail area of the lower Bay of Fundy.[37] For the years 1998-2001, the estimated annual mortality was 38 for 1998, 32 for 1999, 28 for 2000, and 73 for 2001.[38] Estimates of variance are not available. From 2002 to 2004 there is no bycatch estimate due to a lack of an observer program.

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33 Trippel, E. A., J. Y. Wang, M. B. Strong, L. S. Carter, and J. D. Conway. 1996. Incidental mortality of harbour porpoise (Phocoena phocoena) by the gillnet fishery in the lower Bay of Fundy. Can. J. Fish. Aquat. Sci 53:1294 1300.

34 Trippel, E. A., M. B. Strong, J. M. Terhune, and J. D. Conway. 1999. Mitigation of harbour porpoise (Phocoena phocoena) bycatch in the gillnet fishery in the lower Bay of Fundy. Can. J. Fish. Aquat. Sci. 56:113-123.

35 Trippel, E. A., M. B. Strong, J. M. Terhune, and J. D. Conway. 1999. Mitigation of harbour porpoise (Phocoena phocoena) bycatch in the gillnet fishery in the lower Bay of Fundy. Can. J. Fish. Aquat. Sci. 56:113-123.

36 DFO [Department of Fisheries and Oceans]. 1998. Harbour porpoise bycatch in the lower Bay of Fundy gillnet fishery. DFO Maritimes Regional Fisheries Status Report 98/7E. [Available from Department of Fisheries and Oceans, Resource management Branch, P.O. Box 550, Halifax, NS B3J 2S7, Canada.]

37 Trippel, E. A., M. B. Strong, J. M. Terhune, and J. D. Conway. 1999. Mitigation of harbour porpoise (Phocoena phocoena) bycatch in the gillnet fishery in the lower Bay of Fundy. Can. J. Fish. Aquat. Sci. 56:113-123.

38 Trippel, E.A., and Shepherd, T.D. 2004. By-Catch of Harbour Porpoise (Phocoena phocoena) in the Lower Bay of Fundy Gillnet Fishery from 1998-2001. DFO Res. Doc. 2004/2521.

39 Smith, G.J.D., A.J. Read, and D.E. Gaskin. 1983. Incidental catch of harbor porpoises, (*Phocoena phocoena*) in herring weirs in Charlotte County, New Brunswick, Canada. Fish Bull., U.S. 81(3):660-2

40 Read, A.J. 1994. Interactions between cetaceans and gillnet and trap fisheries in the northwest Atlantic. Rep. int Whal. Commn Special Issue 15: 133-147.

41 Neimanis, A.S., H.N. Koopman, A.J. Westgate, L.D. Murison and A.J. Read. 2004. Entrapment of harbour porpoises (Phocoena phocoena) in herring weirs in the Bay of Fundy, Canada. J.Cet. Res. Manag. 6(1):7-17.

42 Neimanis, A.S., H.N. Koopman, A.J. Westgate, L.D. Murison and A.J. Read. 2004. Entrapment of harbour porpoises (Phocoena phocoena) in herring weirs in the Bay of Fundy, Canada. J.Cet. Res. Manag. 6(1):7-17.

43 Neimanis, A.S., H.N. Koopman, A.J. Westgate, L.D. Murison and A.J. Read. 2004. Entrapment of harbour porpoises (Phocoena phocoena) in herring weirs in the Bay of Fundy, Canada. J.Cet. Res. Manag. 6(1):7-17.

44 Lesage, V., J. Keays, S. Turgeon, and S. Hurtubise. 2003. Incidental mortality of harbour porpoises in the gillnet fishery of the Estuary and Gulf of St. Lawrence in 2000-2002. Canadian Science Advisory Secretariat. Research Document 2003/069. Available at http://www.dfo-mpo.gc.ca/csas/

45 Lesage, V., J. Keays, S. Turgeon, and S. Hurtubise. 2003. Incidental mortality of harbour porpoises in the gillnet fishery of the Estuary and Gulf of St. Lawrence in 2000-2002. Canadian Science Advisory Secretariat. Research Document 2003/069. Available at http://www.dfo-mpo.gc.ca/csas/

Herring Weirs

Harbor porpoises are caught in Canadian herring weirs, but there have been no recent efforts to observe bycatch. In the 1980's, approximately 70 harbor porpoises became trapped annually and, on average, 27 died each year.[39] In 1990, at least 43 harbor porpoises were trapped in Bay of Fundy weirs.[40] In 1993, a cooperative program between fishermen and Canadian biologists was initiated; as a result, between 1992 and 1994, 206 of 263 harbor porpoises caught in herring weirs were released alive.[41] Mortalities (and releases) were 11 (and 50) in 1992, 33 (and 113) in 1993, and 13 (and 43) in 1994.[42] Since that time, an additional 682 harbor porpoises have been documented in Canadian herring weirs, of which 637 were released or escaped, 36 died, and 9 had an unknown status. Mortalities (and releases and unknowns) were 5 (and 60) in 1995; 2 (and 4) in 1996; 2 (and 24) in 1997; 2 (and 26) in 1998; 3 (and 89) in 1999; 0 (and 13) in 2000, 14 (and 296) in 2001, 3 (and 46 and 4) in 2002, and 1 (and 26 and 3) in 2003, and 4 (and 53 and 2).[43]

Gulf of St. Lawrence gillnet

This fishery interacts with the Gulf of St. Lawrence harbor porpoise stock, not the Gulf of Maine/Bay of Fundy harbor porpoise stock. Using questionnaires to fishermen, scientists determined a total of 2,180 (95% CI 1012-3802) and 2,478 (95% CI 1591-3464) harbor porpoises were entangled in 2000 and 2001, respectively.[44] The largest takes were in July and August around Miscou and the North Shore of the Gulf of St. Lawrence. An at-sea observer program, conducted during 2001 and 2002, concluded that resulting bycatch estimates were unreliable, due to low observer coverage that was not representative of the fishing effort.[45]

Newfoundland gillnet

This fishery interacts with the Newfoundland harbor porpoise stock, not the Gulf of Maine/Bay of Fundy harbor porpoise stock. Estimates of incidental catch of harbor porpoises are currently being calculated for 2001- 2003 for the Newfoundland nearshore cod and Greenland halibut fisheries, and the Newfoundland offshore fisheries in lumpfish, herring, white hake, monkfish and skate.

AREA 27 NORTHEAST ATLANTIC

There are very few recent comprehensive studies on cetacean abundance or population sizes in this area. The most recent abundance estimates are provided in the tables below. Note that the estimate of cetacean abundance in a specified survey region is not equivalent to an estimate of population size, as biological populations may extend over wider areas, or conversely may be contained within a sub-area of the survey region. Very little is actually known about stock structure in this region. Since abundance estimates are usually snapshots of animal density and abundance over a short period of time, the actual density or abundance of these highly migratory cetaceans within a survey region may vary considerably either seasonally or inter-annually if those animals range outside the survey area. For animals with seasonal migrations, an estimate of abundance in one part of the range should not be used as an indication of abundance throughout the year.

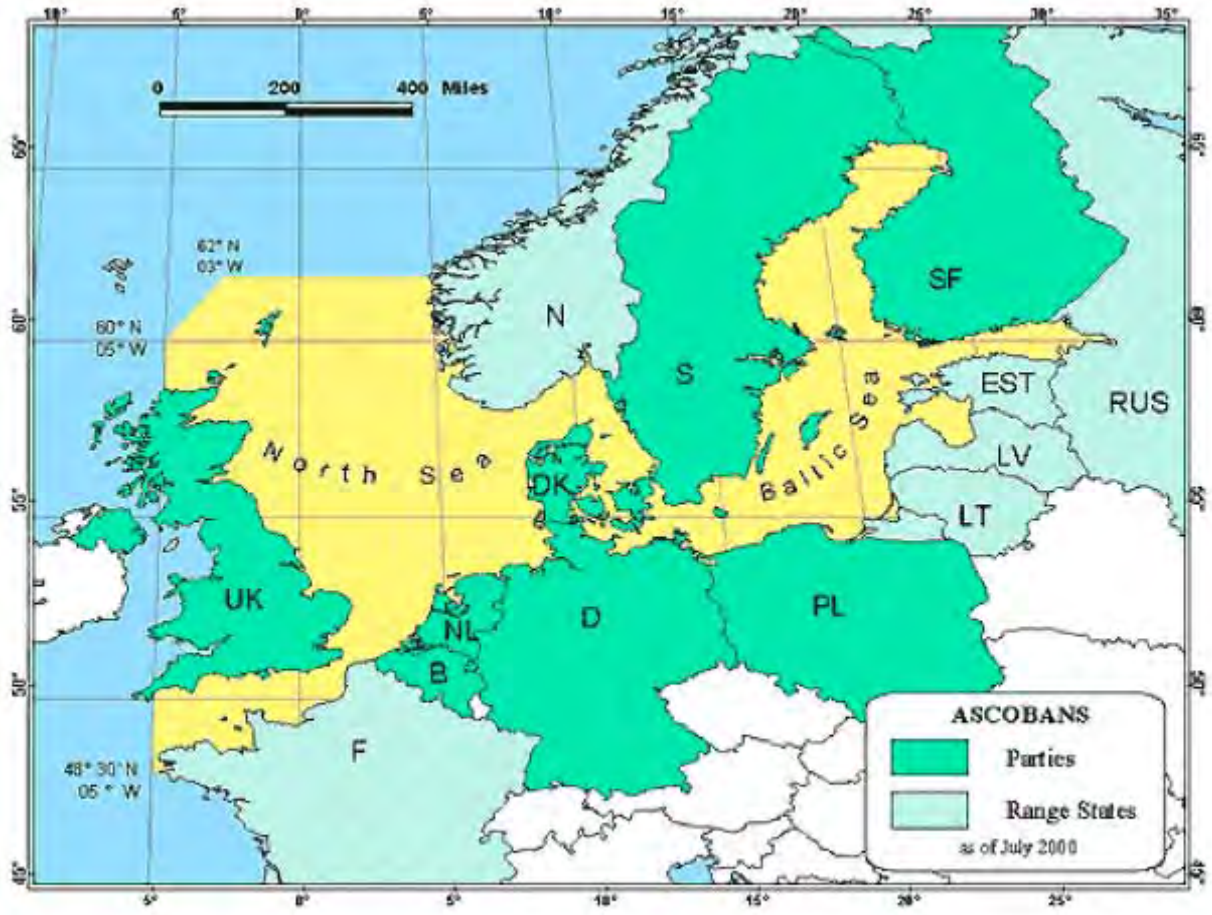

Fig. 1 – Area currently covered by the ASCOBANS agreement and ASCOBANS Parties and Range States

Species	***Phocoena phocoena*** **Harbor porpoise.**		Fisheries	Mortality Est./% Take
Abundance Estimate[46]	Northern and Central North Sea	61,335	Danish, UK gillnet fisheries for various species	2,700[47]/4.1%
	Kattegat and Oeresund	36,046 (20,276-64,083)	German, Danish, Swedish gillnet fisheries	83[48]/ .2%

46 Hammond PS, Berggren P, Benke H, Borchers DL, Collet A, Heide-Jorgensen MP, Heimlich S, Hiby AR, Leopold MF, Oien N, 2002. Abundance of harbour porpoise and other cetaceans in the North Sea and adjacent waters. Journal of Applied Ecology 39:361-376.

47 Harwood J, Andersen LW, Berggren P, Carlström J, Kinze CC, McGlade J, Metuzals K, Larsen F, Lockyer CH, Northridge SP, Rogan E, Vinther M, Walton M, 1999. Assessment and reduction of the bycatch of small cetaceans in European waters (BY-CARE) - Executive summary. Report to the European Commission on contract CT05-0523, St. Andrews, Scotland, NERC Sea Mammal Research Unit.

48 Not all included bycatch estimates are based on independent observer schemes. Kaschner K, 2001. Harbour porpoises in the North Sea and Baltic - bycatch and current status. Report for the Umweltstiftung WWF - Deutschland; 82.

Skagerrak	4,738	Swedish gillnet fisheries for cod & Pollock	114[49]/2.4%
Kattegat	4,009	Swedish gillnet fisheries for cod & pollock	50[50]/1.2%
Kiel & Mecklenburg Bight	588 (240-1,430)	Included in Kattegat & Oeresund estimate above	
Southwestern Baltic proper	599 (200-3,300)	Danish, Finish, Polish & Swedish drift & bottom-set gillnet fisheries	13[51]/2.1%
Northern North Sea	98,564 (66,679-145,697)	(north of 56°N) Danish, UK gillnet fisheries for various species	5,000[52]/5%
Southern & Central North Sea	169,888 (124,121-232,530)	Danish, Swedish, UK, Belgian, Dutch, German gillnet fisheries for various species	7,493[53]/4.3%
Celtic Sea	36,280 (12, 828-102,604)	Irish gillnet fishery for hake (14- 22m vessels), UK gillnet fishery for hake (> 15 m vessels)	2,200[54]/6.2%

49 Abundance estimate derived using SCANS density estimates, scale-downed to Swedish EEZ Harwood J, Andersen LW, Berggren P, Carlström J, Kinze CC, McGlade J, Metuzals K, Larsen F, Lockyer CH, Northridge SP, Rogan E, Vinther M, Walton M, 1999. Assessment and reduction of the bycatch of small cetaceans in European waters (BY-CARE) - Executive summary.

Report to the European Commission on contract CT05-0523, St. Andrews, Scotland, NERC Sea Mammal Research Unit. See also: CEC, 2002a. Incidental catches of small cetaceans. Report of the meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC(2002) 376, Brussels, BL, Commission of the European Communities; 83.

50 Abundance estimate derived using SCANS density estimates, scale-downed to Swedish EEZ Harwood J, Andersen LW, Berggren P, Carlström J, Kinze CC, McGlade J, Metuzals K, Larsen F, Lockyer CH, Northridge SP, Rogan E, Vinther M, Walton M, 1999. Assessment and reduction of the bycatch of small cetaceans in European waters (BY-CARE) - Executive summary. Report to the European Commission on contract CT05-0523, St. Andrews, Scotland, NERC Sea Mammal Research Unit. See also: CEC, 2002a. Incidental catches of small cetaceans. Report of the meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC(2002) 376, Brussels, BL, Commission of the European Communities; 83

51 Not all included bycatch estimates are based on independent observer schemes. Kaschner K, 2001. Harbour porpoises in the North Sea and Baltic - bycatch and current status. Report for the Umweltstiftung WWF - Deutschland; 82.

52 Mean Annual Estimated Take between 1987-2001. Harwood J, Andersen LW, Berggren P, Carlström J, Kinze CC, McGlade J, Metuzals K, Larsen F, Lockyer CH, Northridge SP, Rogan E, Vinther M, Walton M, 1999. Assessment and reduction of the bycatch of small cetaceans in European waters (BY-CARE) - Executive summary. Report to the European Commission on contract CT05-0523, St. Andrews, Scotland, NERC Sea Mammal Research Unit.

53 Not all included bycatch estimates are based on independent observer schemes. Kaschner K, 2001. Harbour porpoises in the North Sea and Baltic - bycatch and current status. Report for the Umweltstiftung WWF - Deutschland; 82.

54 Bycatch mortalities do not include other set net fisheries or other fisheries in the same area. UK & Irish fishing effort decreased in recent years, CEC, 2002a. Incidental catches of small cetaceans. Report of the meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC(2002) 376, Brussels, BL, Commission of the European Communities; 83.

North Sea	268,800	Danish gillnets for cod, turbot, hake	2,971[55]	1.3%
		UK gillnets for cod, skate, turbot, sole	436	

Species	***Lagenorhynchus acutus* Atlantic white-sided dolphin**	
Abundance Estimate[56]	Celtic Shelf[57]	833 (159- 4,360)
	Central North Sea[58]	9,242 5,344-15,981)
	Northern North Sea[59]	1,685 (690 – 4,113)
	Northern North Sea	74,626 (35,000–160,000)
	West of Ireland	490 (1,134–10,015)
Fisheries	White-side dolphins are susceptible to capture in mid-water trawl fisheries.	
Estimated Annual Mortality	In 1996 and 1998 respectively, the Irish driftnet fishery for albacore caught 2 and 15 white-sided dolphins.[60]	
	Approximately 196 (5 – 493) white-sided dolphins have been caught in pelagic trawl fisheries for horse mackerel and mackerel southwest of Ireland.[61] Small numbers have been taken by Spain in the deep water trawl fishery for Greenland halibut.	
	In 1999, bycatch in the Irish experimental pelagic pair trawl fishery for albacore off western Ireland and the southern Bay of Biscay resulted in the capture of two Atlantic white-sided dolphins.[62]	

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55 CEC, 2002a. Incidental catches of small cetaceans. Report of the meeting of the subgroup on fishery and the environment (SGFEN) of the Scientific, Technical and Economic Committee for Fisheries (STECF). SEC(2002) 376, Brussels, BL, Commission of the European Communities; 83. Impact based on combined current bycatch estimates of all Danish and most UK gillnet fisheries, does not include Norwegian, Dutch, Belgian, German and other UK fleets and is therefore likely an underestimate.

56 Hammond PS, Berggren P, Benke H, Borchers DL, Collet A, Heide-Jorgensen MP, Heimlich S, Hiby AR, Leopold MF, Oien N, 2002. Abundance of harbor porpoise and other cetaceans in the North Sea and adjacent waters. Journal of Applied Ecology 39:361-376. See also: MacLeod K, 2001. The spatial and temporal distribution of cetaceans off the west coast of Scotland in relation to environmental factors: implication for marine management (Ph.D.). London: University of Greenwich.

57 Estimate is for white-sided and white-beaked dolphins

58 Estimate is for white-sided and white-beaked dolphins

59 Estimate is for white-sided and white-beaked dolphins

60 Lesage, V., J. Keays, S. Turgeon, and S. Hurtubise. 2003. Incidental mortality of harbour porpoises in the gillnet fishery of the Estuary and Gulf of St. Lawrence in 2000-2002. Canadian Science Advisory Secretariat. Research Document 2003/069. Available at http://www.dfo-mpo.gc.ca/csas/

61 Lesage, V., J. Keays, S. Turgeon, and S. Hurtubise. 2003. Incidental mortality of harbour porpoises in the gillnet fishery of the Estuary and Gulf of St. Lawrence in 2000-2002. Canadian Science Advisory Secretariat. Research Document 2003/069. Available at http://www.dfo-mpo.gc.ca/csas/

62 BIM. 2000. Diversification trials with alternative tuna fishing techniques including the use of remote sensing technology. Final report of EU Contract 98/010, Bord Iascaigh Mhara (BIM), Dun Laoghaire, Ireland.

Species	***Tursiops truncatus* Bottlenose dolphin.**	
Abundance Estimate	Moray Firth[63]	129 (110- 174)
	Brittany[64]	30
	Mont St. Michel [65]	6
	Arachon[66]	60
	French Coast[67]	250-300
	Cornwall[68]	15
	Dorset[69]	5
	Cardigan Bay[70]	135 (85-214)
	Shannon Estuary[71]	113 (94-161)
	Dingle Bay[72]	12
Fisheries	Bottlenose dolphins have been reported caught in gillnets in the south of England in very small numbers, some mortality in Irish driftnet fisheries, and occasional captures in French fisheries.	
Estimated Annual Mortality	In 1996 and 1998 respectively, the Irish driftnet fishery for albacore caught 6 and 45 bottlenose dolphins.[73]	
	From 2000 to 2003, French reported between 9 – 10 bottlenose dolphins	

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63 Wilson B, Hammond PS, Thompson PM, 1999. Estimating size and assessing trends in a coastal bottlenose dolphin population. Ecological Applications 9:288-300.

64 ICES, 1996. Report of the Study Group on Seals and Cetaceans in European Seas (CM 1996/N:01). ICES; 27.

65 ICES, 1996. Report of the Study Group on Seals and Cetaceans in European Seas (CM 1996/N:01). ICES; 27.

66 ICES, 1996. Report of the Study Group on Seals and Cetaceans in European Seas (CM 1996/N:01). ICES; 27.

67 ICES, 2002. Report of the Working Group on Marine Mammal Population Dynamics and Habitat (CM 2002/ACE:02). ICES; 27.

68 ICES, 1996. Report of the Study Group on Seals and Cetaceans in European Seas (CM 1996/N:01). ICES; 27.

69 White R, Webb A, 1995. Coastal birds and marine mammals of mid Dorest. Peterborough, UK, Joint Nature Conservation Committee; 48.

70 Baines ME, Reichelt M, Evans PGH, Shepherd B, 2002. Comparison of the abundance and distribution of harbor porpoise (*Phocoena phocoena*) and bottlenose dophins (*Tursiops truncatus*) in Cardigan Bay, UK (Abstract). Liege, Belgium, ECS.

71 Ingram SN, 2000. The ecology and conservation of bottlenose dolphins in the Shannon estuary (Ph.D.). Cork, Ireland: University College.

72 ICES, 1996. Report of the Study Group on Seals and Cetaceans in European Seas (CM 1996/N:01). ICES; 27.

73 Harwood, J., Andersen, L.W., Berggren, P., Carlström, J., Kinze, C.C., McGlade, J., Metuzals, K., Larsen, F., Lockyer, C.H., Northridge, S., Rogan, E., Walton, M., Vinther, M., 1999. Assessment and reduction of the by-catch of small cetaceans (BY-CARE). Final report to the European Commission on FAIR-CT05-0523.

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	incidentally caught in French fisheries in the Atlantic[74]	
	From 2000 to 2003, Spain reported between 2 – 8 bottlenose dolphins incidentally caught in Spanish fisheries in the Atlantic[75]	
Species	***Delphinus delphis* Common dolphin.**	
Abundance Estimate	Celtic Sea[76]	75,449 (22,900 - 284,900)
	Bay of Biscay[77]	61,888 (35,461 - 108,010)
	Celtic Sea & Western Waters[78]	101,205 (55125 – 185802)
Fisheries	Common dolphins are caught in Irish salmon driftnets, mackerel purse seines in the southwest of Britain, English midwater trawl research cruises in the Channel, and unidentified type of trawl in the Channel. There is a considerable accidental catch of small cetaceans in the English bottom set net fishery off the southwest coast of England. Catches of common dolphins in various French fisheries continue, and large numbers of animals with evidence of entanglement have washed up on French Atlantic coasts in the past few years. There is also a large French gillnet fishery in this area operating along similar lines to the English one, as well as several trawl fisheries.	
Estimated Annual Mortality[79]	Dutch horse mackerel	101 (4-214)
	French hake	203 (4-529)
	French tuna	95 (3-287)
	French bass	25 (1-83)
	French tuna driftnet	415 (265 – 564)
	UK tuna driftnet	61 (16 – 106)
	Celtic Sea hake gillnet	200 (4 – 500)

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[76] Hammond PS, Berggren P, Benke H, Borchers DL, Collet A, Heide-Jorgensen MP, Heimlich S, Hiby AR, Leopold MF, Oien N, 2002. Abundance of harbour porpoise and other cetaceans in the North Sea and adjacent waters. Journal of Applied Ecology 39:361-376. See also: MacLeod K, 2001. The spatial and temporal distribution of cetaceans off the west coast of Scotland in relation to environmental fators: implication for marine management (Ph.D.). London: University of Greenwich.

[77] Goujon M, 1996. Captures accidentelles du filet maillant dérivant et dynamique des populations dedauphins au large du Golfe de Gascogne. Rennes Cedex, France: Ecole Nationales Superieure Agronomique de Rennes. See also: Goujon M, Antoine L, Collet A, Fifas S, 1993. Approche de l'impact écologique de la pecherie thonière au filet maillant dérivant en Atlantique nord-est. RI.DRV-93034, IFREMER; 47.

[78] Rogan E, 1999. Relationship between bycatch in the Irish drift-net fishery for albacore, dolphin population size and operational features - Chapter 5. In: Assessment and reduction of the bycatch of small cetaceans in European waters (BY-CARE) (Harwood J, Andersen LW, Berggren P, Carlström J, Kinze CC, McGlade J, Metuzals K, Larsen F, Lockyer CH, Northridge SP, Rogan E, Vinther M, Walton M, eds). St. Andrews, Scotland: NERC Sea Mammal Research Unit.

[79] Tregenza, NJC and Collet, A. 1998. Common dolphin *Delphinus delphis* bycatch in pelagic trawl and other fisheries in the North East Atlantic. *Report of the International Whaling Commission* 48: 453-459

The French driftnet fishery for albacore in the northeast Atlantic in the early 1990s caught between 420– 460 dolphins, apparently both white-sided and striped dolphins (1992, 410 (325-495); 1993, 419 (266-572)).

On the North coast of Spain, 7 common dolphins were caught in fishing gear between 1977 and 1987 and 11 common dolphins were caught in fishing nets in Portugal in 1980. Common dolphins are frequently caught in coastal Portuguese fisheries: 47% of those reported were from gillnet fisheries.

In 1996 and 1998 respectively, the Irish driftnet fishery for albacore caught 356 and 2,522 common dolphins.[80]

In 1999, bycatch in the Irish experimental pelagic pair trawl fishery for albacore off western Ireland and the southern Bay of Biscay resulted in the capture of 127 common dolphins.[81]

From 1999-2001, bycatch in the pelagic trawl fisheries for mackerel, herring, bass, sprats, pilchards, blue whiting, and anchovy was 53 common dolphins—all of which were in the bass fishery in the Channel.

From 2000 to 2003, French reported from 41 – 218 common dolphins incidentally caught in French fisheries in the Atlantic.[82]

From 2000 to 2003, Ireland reported from 1 – 16 common dolphins incidentally caught in Irish trawl fisheries in the Atlantic.[83]

From 2000 to 2003, Spain reported from 3 – 77 common dolphins incidentally caught in Spanish fisheries in the Atlantic.[84]

From 2000 to 2003, the United Kingdom reported between 12 – 72 common dolphins incidentally caught in UK trawl fisheries in the Atlantic.[85]

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[80] Harwood, J., Andersen, L.W., Berggren, P., Carlström, J., Kinze, C.C., McGlade, J., Metuzals, K., Larsen, F., Lockyer, C.H., Northridge, S., Rogan, E., Walton, M., Vinther, M., 1999. Assessment and reduction of the by-catch of small cetaceans (BY-CARE). Final report to the European Commission on FAIR-CT05-0523.

[81] BIM. 2000. Diversification trials with alternative tuna fishing techniques including the use of remote sensing technology. Final report of EU Contract 98/010, Bord Iascaigh Mhara (BIM), Dun Laoghaire, Ireland.

[82] Annex L. Report of the Sub-Committee on Small Cetaceans. 2004

[83] Annex L. Report of the Sub-Committee on Small Cetaceans. 2004

[84] Annex L. Report of the Sub-Committee on Small Cetaceans. 2004

[85] Annex L. Report of the Sub-Committee on Small Cetaceans. 2004

Species	***Stenella coeruleoalba* Striped dolphin**	
Abundance Estimate	Bay of Biscay[86]	73,843 (36,113–150,990)
	Celtic Sea & Western Waters[87]	66,824 (37,583 - 118,813)
Fisheries	Striped dolphins are recorded “sporadically” in fishing gear in northern Spain, and in French and Portuguese Atlantic fisheries.	
Estimated Annual Mortality	Estimates of catches in the French albacore driftnet fishery for 1992/3 were 1,172 striped dolphins.[88] In 1992, the fishery caught 1,193 (946-1440) striped dolphins and in 1993, it killed 1,152 (732-1572) dolphins.[89]	
	In 1995, the UK driftnet fishery for albacore caught 104 striped dolphins (38 – 169).[90]	
	In 1996 and 1998 respectively, the Irish driftnet fishery for albacore caught 136 and 964 striped dolphins.[91]	
	In 1999, bycatch in the Irish experimental pelagic pair trawl fishery for albacore off western Ireland and the southern Bay of Biscay resulted in the capture of eight Striped dolphins.[92]	
	From 2000 to 2003, French incidentally caught between 9 – 16 striped dolphins in French fisheries in the Atlantic[93]	

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86 Goujon M, Antoine L, Collet A, Fifas S, 1993. Approche de l'impact écologique de la pecherie thonière au filet maillant dérivant en Atlantique nord-est. RI.DRV-93034, IFREMER; 47.

87 Rogan E, 1999. Relationship between bycatch in the Irish drift-net fishery for albacore, dolphin population size and operational features - Chapter 5. In: Assessment and reduction of the bycatch of small cetaceans in European waters (BY-CARE) (Harwood J, Andersen LW, Berggren P, Carlström J, Kinze CC, McGlade J, Metuzals K, Larsen F, Lockyer CH, Northridge SP, Rogan E, Vinther M, Walton M, eds). St. Andrews, Scotland: NERC Sea Mammal Research Unit.

88 Tregenza, NJC and Collet, A. 1998. Common dolphin *Delphinus delphis* bycatch in pelagic trawl and other fisheries in the North East Atlantic. *Report of the International Whaling Commission* **48**: 453-459 See also: Goujon M, Antoine L, Collet A, Fifas S, 1993. Approche de l'impact écologique de la pecherie thonière au filet maillant dérivant en Atlantique nord-est. RI.DRV-93034, IFREMER; 47.

89 Goujon estimates that the French driftnet fishery for tuna caught 1,722 (1365-2079) common, striped and bottlenose dolphins, and long-finned pilot whales in 1992; and 1,654 (1115-2393) common, striped and bottlenose dolphins, and long-finned pilot whales in 1993. Goujon M, Antoine L, Collet A, Fifas S, 1993. Approche de l'impact écologique de la pecherie thonière au filet maillant dérivant en Atlantique nord-est. RI.DRV-93034, IFREMER; 47.

90 Tregenza, NJC and Collet, A. 1998. Common dolphin *Delphinus delphis* bycatch in pelagic trawl and other fisheries in the North East Atlantic. *Report of the International Whaling Commission* **48**: 453-459

91 Harwood, J., Andersen, L.W., Berggren, P., Carlström, J., Kinze, C.C., McGlade, J., Metuzals, K., Larsen,

F., Lockyer, C.H., Northridge, S., Rogan, E., Walton, M., Vinther, M., 1999. Assessment and reduction of the by-catch of small cetaceans (BY-CARE). Final report to the European Commission on FAIR-CT05-0523.

92 BIM. 2000. Diversification trials with alternative tuna fishing techniques including the use of remote sensing technology. Final report of EU Contract 98/010, Bord Iascaigh Mhara (BIM), Dun Laoghaire, Ireland.

93 Annex L. Report of the Sub-Committee on Small Cetaceans. 2004

Species	***Globicephala melaena* Long-finned pilot whale.**	
Abundance Estimate[94]	East Greenland, Iceland, Jan Mayen, Faroe Islands, & Western Coast of the British Islands	778,000
	Bay of Biscay	80,867
	East of 15°W	12,235 (3,924–38,148)
	West of 15°W	128,080 (45,241–362,640)
Fisheries	Pilot whales are commonly killed in gillnet, purse seines, trawl, and longline fisheries	
Estimated Annual Mortality	An estimated 50-100 pilot whales are killed in gillnets off the coast of France[95] One was reported drowned in a lobster creel line in Orkney in 1984, 1 in a purse seine off Scotland in 1986, three were reported in set gillnets off Cornwall (2 released alive), and there have been further unconfirmed reports of captures in purse seines off Cornwall and even a possible record of one in a demersal trawl in the same area.[96]	
	In 1996 and 1998 respectively, the Irish driftnet fishery for albacore caught 8 and 59 pilot whales.[97]	
	In 1999, bycatch in the Irish experimental pelagic pair trawl fishery for albacore off western Ireland and the southern Bay of Biscay resulted in the capture of eight long-finned pilot whales.[98]	
	From 2000 to 2003, French report between 1 – 2 pilot whales incidentally caught each year in French fisheries in the Atlantic.[99]	

Species	***Lagenorhynchus albirostris* White-beaked dolphin**	
Abundance Estimate[100]	North Sea	7,856

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94 Buckland ST, Cattanach KL, Hobbs RC, 1993b. Abundance estimates of Pacific white-sided dolphin, Northern right whale dolphin, Dall's porpoise and Northern fur seal in the North Pacific, 1987-1990. International North Pacific Fisheries Commission Bulletin:387-407.

95 International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15

96 Northridge, S.P., and P.S. Hammond, 1999. Estimation of porpoise mortality in UK gill and tangle net fisheries in the North Sea and west of Scotland. Paper presented to the Scientific Committee of the International Whaling Commission, Grenada, May 1999. SC/51/SM42.

97 Harwood, J., Andersen, L.W., Berggren, P., Carlström, J., Kinze, C.C., McGlade, J., Metuzals, K., Larsen,

F., Lockyer, C.H., Northridge, S., Rogan, E., Walton, M., Vinther, M., 1999. Assessment and reduction of the by-catch of small cetaceans (BY-CARE). Final report to the European Commission on FAIR-CT05-0523.

98 BIM. 2000. Diversification trials with alternative tuna fishing techniques including the use of remote sensing technology. Final report of EU Contract 98/010, Bord Iascaigh Mhara (BIM), Dun Laoghaire, Ireland.

99 Annex L. Report of the Sub-Committee on Small Cetaceans. 2004

100 Øien N, 1993. Abundance of killer whales (Orcinus orca) in waters off Norway. Reykjavik, Iceland, (unpublished).

Fisheries	White-beaked dolphins are caught in mid-water herring trawls and salmon driftnet fisheries
Estimated Annual Mortality	There is an unknown mortality of white-beaked dolphins off the Yorkshire coast (northeast England) every summer when Dutch midwater herring trawlers operate in that region.[101] There are also unconfirmed reports that this species is caught in Irish salmon driftnet fisheries.

AREA 31 WESTERN CENTRAL ATLANTIC

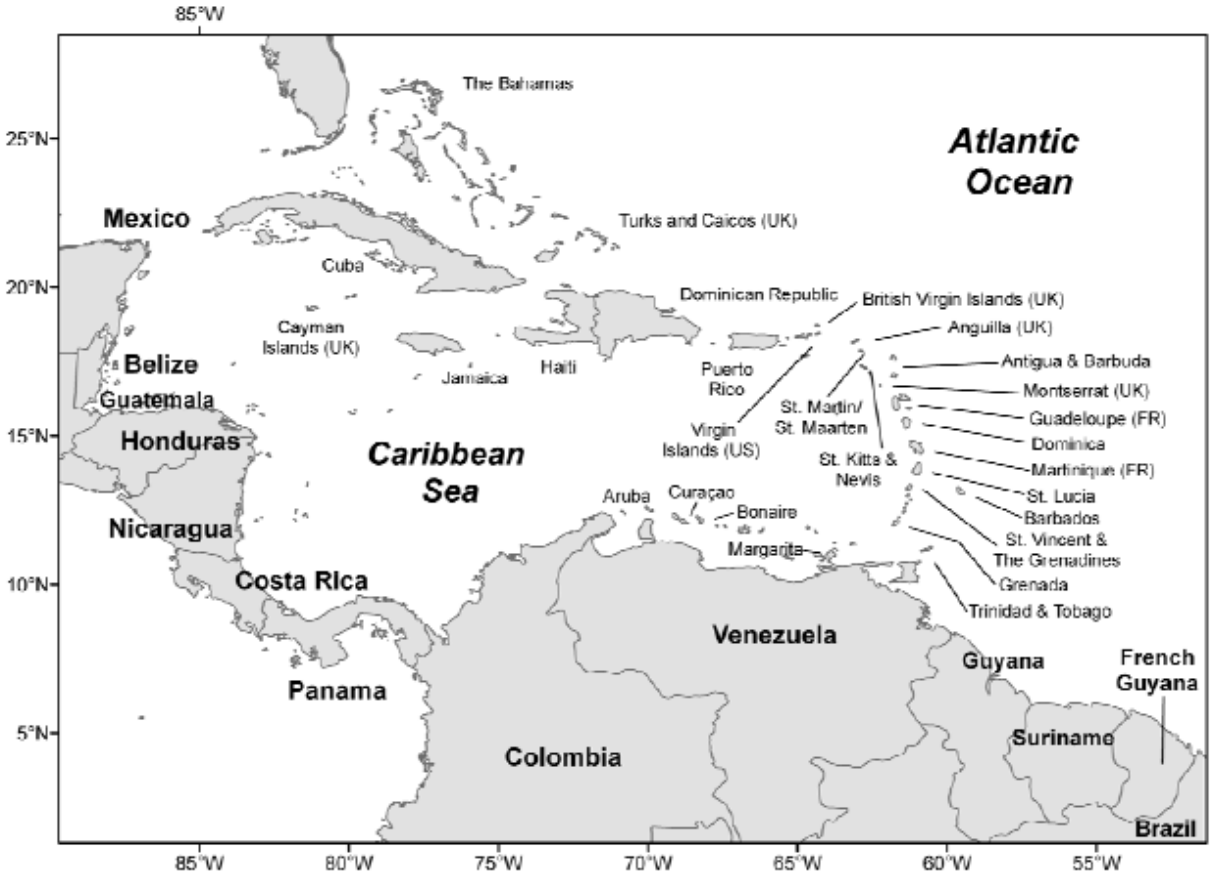

Fig. 2 Detailed map of the Caribbean Sea

Species	***Kogia breviceps* Pygmy sperm whale**
Abundance Estimate	No Abundance Estimate
Fisheries	Entanglement mortality has been reported in Colombia and Puerto Rico. There was the capture of one individual taken in a coastal gillnet fishery in the Gulf of Morrosquillo, Colombia, in 1988

[101] Northridge, S.P., and P.S. Hammond, 1999. Estimation of porpoise mortality in UK gill and tangle net fisheries in the North Sea and west of Scotland. Paper presented to the Scientific Committee of the International Whaling Commission, Grenada, May 1999. SC/51/SM42.

Estimated Annual Mortality	No Estimate of Mortality

Species	***Sotalia fluviatilis* Tucuxi**	
Abundance Estimate	Cananéia estuary of Brazil	156-380
	No Abundance Estimate for Any Other Region	
Fisheries	Dolphins are frequently entangled in fishing gear, especially coastal gillnets, in Brazil, and their flesh is used as bait in shark fisheries. Bycatch of tucuxis has been reported in gillnets in the Gulf of Venezuela. Tucuxi are also captured in shrimp and fish traps and seine nets. Tucuxi are also incidentally captured in gillnets in French Guiana, and in a gillnet fishery in the mouth of the Sinu river, Colombia.	
Estimated Annual Mortality	Dozens of tucuxis may be killed per year in Rio de Janeiro state based on strandings records collected at Atafona	
	An estimated 938 animals were taken in drift nets from the port of Arapiranga during the summer of 1996 and a further 125 taken during the winter.[102]	

Species	***Pseudorca crassidens* False killer whale.**
Abundance Estimate	No Abundance Estimate
Fisheries	These whales are caught in coastal gillnets off southern and southeastern Brazil. They also interact with longline fisheries in southern Brazil.
Estimated Annual Mortality	No Estimate of Mortality

Species	***Orcinus orca* Killer whale**
Abundance Estimate	No Abundance Estimate
Fisheries	A killer whale drowned in a driftnet in Trinidad waters of the Gulf of Paria. Killer whales interact with longline fisheries for swordfish, tuna and sharks off Brazil and some hooking and entanglement are known to occur.
Estimated Annual Mortality	No Estimate of Mortality

Species	***Globicephala macrorhynchus* Short-finned pilot whale.**
Abundance Estimate	No Abundance Estimate
Fisheries	Pilot whales interact with longline fisheries off Brazil
Estimated Annual Mortality	No Estimate of Mortality

[102] IWC (2000)Annex K: Report of the Sub-Committee on small cetaceans, IWC, Cambridge, 2000

Species	***Peponocephala electra* Melon-headed whale**	
Abundance Estimate	No Abundance Estimate	
Fisheries	A melon-headed whale that stranded at Los Roques, Venezuela had net marks on its body.	
Estimated Annual Mortality	No Estimate of Mortality	

Species	***Tursiops truncatus* Bottlenose dolphin**	
Abundance Estimate	Margarita Islands off northern Venezuela	50
	Gandoca-Manzanillo Wildlife Refuge, Costa Rica	82
	Bocas del Toro, Panama	50
Fisheries	Bottlenose dolphins have been entangled in both gillnet and trawl fisheries in Honduras, Colombia, French Guiana, Trinidad, and Venezuela. There is evidence of bycatch of bottlenose dolphins in gillnets along much of the Brazilian coastline, where it is common for people to use dolphin meat as shark bait. Scientists have reported a possibly large incidental capture of small cetaceans, in the Brazilian gillnet fishery off of French Guiana that included bottlenose dolphins.[103] A bottlenose dolphin was captured in a gillnet in a Colombian coastal fishery. Other gillnet fisheries in Mexico, for example may also be expected to impact bottlenose dolphins in this area.	
Estimated Annual Mortality	No Estimate of Mortality	

Species	***Grampus griseus* Risso's dolphin.**	
Abundance Estimate	No Abundance Estimate	
Fisheries	Risso's dolphins are entangled and interact with longline fisheries in deep offshore waters of southern Brazil and with trawl and gillnet fisheries in Colombia	
Estimated Annual Mortality	No Estimate of Mortality	

Species	***Stenella coeruleoalba* Stripped dolphin.**	
Abundance Estimate	No Abundance Estimate	
Fisheries	Bycatch has been reported in coastal gillnet fisheries in Brazil	
Estimated Annual	No Estimate of Mortality	

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[103] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A. and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans.* IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp

Mortality

Species	***Stenella longirostris* Spinner dolphin.**	
Abundance Estimate	Fernando de Noronha Archipelago	700 (photo id)
Fisheries	Spinner dolphins interact with driftnet fisheries off southern Brazil	
Estimated Annual Mortality	No Estimate of Mortality	

Species	***Stenella frontalis* Atlantic spotted dolphin.**	
Abundance Estimate	No Abundance Estimate--considered abundant	
Fisheries	Spotted dolphins are incidentally captured in gillnets throughout much of its range off Brazil, Venezuela and Colombia-- particularly high bycatch occurs in coastal gillnets in southern Brazil.	
Estimated Annual Mortality	No Estimate of Mortality	

Species	***Delphinus delphis* Common dolphin.**	
Abundance Estimate	No Abundance Estimate	
Fisheries	Common dolphins may be regularly caught in northeastern Venezuela and in coastal gillnets and driftnets in southern and southeastern Brazil	
Estimated Annual Mortality	No Estimate of Mortality	

Species	***Sousa teuszii* Atlantic humpback dolphin**	
Abundance Estimate[104]	Dakhla Bay	Considered small in size
	Parc National du Banc d' Arguin in Mauritania.[105]	Considered small in size
	Saloum delta, Senegal[106]	100

[104] Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Jallow, A.O., Ndiaye, E., Samba Ould Bilal, A.O. and Bamy, I. L. 2004. Distribution, status and biology of the Atlantic humpback dolphin Sousa teuszii (Kükenthal, 1892). Aquatic Mammals 30: 56-83.

[105] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A. and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans.* IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp

[106] Van Waerebeek, K., Ndiaye, E., Djiba, A., Diallo, M., Murphy, P., Jallow, A., Camara, A., Ndiaye, P., and Tous, P. 2000. A survey of the conservation status of cetaceans in Senegal, The Gambia and Guinea-Bissau. Report to UNEP/CMS Secretariat, Bonn, Germany. 80pp.

	Canal do Geba-Bijagos[107]	Considered the largest stock, perhaps < a thousand animals
	South Guinea[108]	Unknown
	Cameroon	Unknown
	Gaboon Estuaries	Unknown
	Angola	Considered small
Fisheries	Atlantic humpback dolphins are caught in beach seines and shark nets in Senegal. Artisanal fisheries are diversifying and expanding rapidly in Dakhla Bay, southern Morocco/Western Sahara. Interactions with fisheries, possible depletion of food resources (through fisheries), competitive interactions with bottlenose dolphins, and population fragmentation may all be contributing to wipe out S. teuszii from Dakhla Bay and perhaps throughout southern Morocco.[109]	
Estimated Annual Mortality	No Estimate of Mortality In 1996, Senegal's Saloum Delta three carcasses, found together on a remote island, had rope tied around their tail stocks.	

AREA 37 MEDITERRANEAN AND BLACK SEA

Abundance estimates for the western Mediterranean basin are were obtained in 1991-1992. Although dated, it is an improvement over the southern and eastern parts of the Mediterranean where abundance estimates are completely lacking. Other species known to occur in this area, but for which information on abundance estimates and fishery interactions are sparse include:

- *Pseudorca crassidens* False killer whale.
  Di Natale refers to 2 false killer whales taken by longlines, in the Tyrrhenian Sea off the Calabrian coast.[110]
- *Megaptera novaeangliae* Humpback whale
  There are four instances of humpback whale bycatch: (1) 1992, Gulf of Gabes, Tunisia; (2) 1993, Cavalaire, France; (3) 2004 Corfu Island, Greece; and (4) Siracusa, Sicily, Italy, (released alive).[111]

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[107] Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Drammeh, F., Jallow, A., Ndiaye, E. and Samba Ould Bilal, A.O. 2001a. Conservation efforts and field research on cetaceans in Senegal and The Gambia. Report to UNEP/CMS Secretariat, Bonn, Germany.

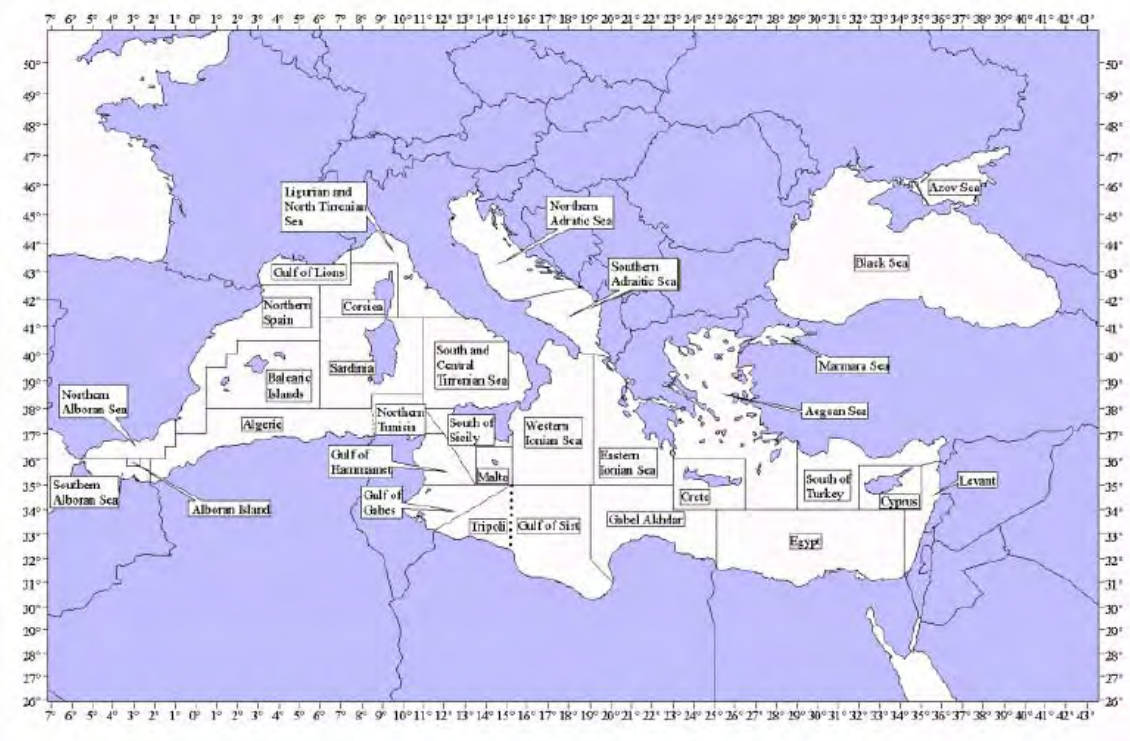
[108] Although the species' range may have been continuous historically, gaps in distribution are increasingly apparent. Ironically, although the species was discovered in the Cameroon Estuary in 1892, its presence in the northern Gulf of Guinea, a coastline of more than 2,000 km, has not been confirmed since then. Van Waerebeek, K., Barnett, L., Camara, A., Cham, A., Diallo, M., Djiba, A., Drammeh, F., Jallow, A., Ndiaye, E. and Samba Ould Bilal, A.O. 2001. Conservation efforts and field research on cetaceans in Senegal and The Gambia. Report to UNEP/CMS Secretariat, Bonn, Germany.

[109] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A. and Notarbartolo di Sciara, Giuseppe (compilers). (2003). Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans. IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp

[110] Di Natale A., Mangano A. 1983. Killer whale, *Orcinus orca* (Linnaeus) and false killer whale, *Pseudorca crassidens* Owen, in the Italian seas. Rapports de la Commission Internationale de la Mer Méditerranée 28(5):181-182.

[111] Reeves R., Notarbartolo di Sciara G. 2006. The status and distribution of cetaceans in the Black Sea and Mediterranean Sea. IUCN Centre for Mediterranean Cooperation, Malaga, Spain 137pp.

- *Steno bredanensis* Rough-toothed dolphin
  There are two instances of bycatch involving rough-toothed dolphins: (1) 2002, Atlit shore, Israel, juvenile stranded after being bycaught; (2) 2003, Carmel Beach, Haifa, Israel, calf entangled in gillnet.



Species	***Globicephala melaena* Longfinned pilot whale**		
Abundance Estimate	Strait of Gibraltar	260 – 270	
Fisheries	Uncertain		
Estimated Annual Mortality	Between 1978 and 1982, 26 pilot whales were caught in fishing and other gear in the western Mediterranean, at least 3 of them in tuna nets.[112] Pilot whales are caught in the swordfish driftnet fishery--7% of animals recorded by Notobartolo di Sciara were pilot whales.		

Species	***Balaenoptera acutorostrata* Minke whale.**		
Abundance Estimate	No Abundance Estimate		
Fisheries	Minke whales are caught in driftnets.		
Estimated Annual Mortality	1978-1981	Italian seas	2 different records of incidental capture in driftnets, involving 4 whales[113]

[112] Northridge S. P. 1984. World review of interactions between marine mammals and fisheries. Fisheries Technical paper 251. Food and Agriculture Organization of the United Nations, Rome. 191 pp.

[113] Di Natale A., Mangano A. 1981. Report of the progress of Project Cetacea. VI. July 1978 – October 1981. Memorie di biologia marina e di oceanografia. N. 5. Vol. 11. 49 pp.

1998	Near Giens Peninsula, France	Standed after being caught in a net[114]
1998	Toulon Region, France	Bycaught whale[115]
2000	Akko, Israel	Calf found entangled in net[116]
2002-2003	Al Hoceima, Morocco	Adult bycaught in pelagic driftnet[117]
2004	Haifa, Israel	Calf found entangled in net[118]

Species	***Ziphius cavirostris* Cuvier's beaked whale.**
Abundance Estimate	No Abundance Estimate
Fisheries	Cuvier's beaked whales are occasionally incidentally caught in driftnets and longlines in the Mediterranean Sea.
Estimated Annual Mortality	The Spanish Mediterranean longlining fleet entangled (and released alive) only one unidentified beaked whale out of 798 sets.[119] In Italy, 13 whales were bycaught between 1986 and 1997.[120]

Species	***Physeter macrocephalus* Sperm whale.**
Abundance Estimate	No Abundance Estimate, but likely in the hundreds of thousands and declining
Fisheries	Sperm whales are caught in the high-seas swordfish driftnet fishery.
Estimated Annual Mortality	Since the mid-1980s, entanglement in high seas swordfish driftnets has caused and continues to cause considerable mortality.[121] The number of sperm whales found dead or entangled from 1971 to 2004 in Spain,

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[114]Robineau D. 2005. Cétacés de France. Féderation Française des Sociétés de Sciences Naturelles, Paris. 646 pp.

[115]Macé M., Bompar J.-M., Fabre J.-L., Bourcaud-Baralon C., Petit C. 1999. The minke whale, *Balaenoptera acutorostrata*, a new candidate for Mediterranean endemic species? European Research on Cetaceans 13:369.

[116] Scheinin A., Kerem D., Goffman O., Spanier E. 2004. Rare occurrences of cetaceans along the Israeli Mediterranean coast. FINS 1(1):19.

[117] Tudela S., Kai Kai A., Maynou F., El Andalosi M., Guglielmi P. 2004. Driftnet fishing and biodiversity conservation: the case study of the large-scale Moroccan driftnet fleet operating in the Alborán Sea (SW Mediterranean). Biological Conservation 121:65-78.

[118] Scheinin A., Kerem D., Goffman O., Spanier E. 2004. Rare occurrences of cetaceans along the Israeli Mediterranean coast. FINS 1(1):19.

[119] Valeiras J., Camiñas J. A. 2001. Captura accidental de mamíferos marinos en las pesquerías españolas de palangre de pez espada y túnidos en el Mediterráneo. II Simposium de la Sociedad Española de Cetáceos. SEC. Noviembre, Valsain, Segovia.

[120] Centro Studi Cetacei. 1998. Cetacei spiaggiati lungo le coste italiane. XII. Rendiconto 1997. Atti. Soc. Ital. Sci. Nat. Museo civ. Stor. Nat. Milano, 139(II): 213-226.

[121] International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15:1-72. See also: Pace D.S., Miragliuolo A., Mussi B. 2005. Behaviour of a nursery group of entangled sperm whales (*Physeter macrocephalus*) off Capo Palinuro (Southern Tyrrhenian Sea, Italy). Abstracts, 19Th Annual Conference of the European Cetacean Society, La Rochelle, France, 2-7 April 2005:69.

France and Italy (combined) was 229.[122]

The large majority of the strandings in Italy and Mediterranean Spain were caused by entanglement in driftnets, as evident from the presence of net fragments or characteristic marks on the whales' bodies[123] From 1986 to 1990, 56 sperm whales stranded due to entanglement.[124]

Despite international and national regulations banning driftnets from the Mediterranean, illegal or quasi-legal driftnetting continues in the western Mediterranean (e.g., in France, Italy, and Morocco) and in the eastern basin (e.g., Greece and Turkey), continuing to threaten the species' survival in the region.

Species	***Tursiops truncatus* Bottlenose dolphin.**	
Abundance Estimate[125]	No Abundance Estimate—may be in the low 10,000s	
	Probably declining, reduced by 30% over the last 60 yrs.	
	Strait of Gibraltar	258 (CV 0.08) (226 – 316)
	Alboran Sea (Spain)	584 (CV 0.28) (278-744)
	Almeria (Spain)	279 (CV 0.28) (146–461)
	Asinara Island National Park (Italy)	22 (CV 0.26) (22–27)
	Balearic Islands & Catalonia (Spain)	7,654 (CV 0.47) (1,608-15,766)
	Balearic Islands (Spain)	1,030 (CV 0.35) (415-1,849)
	Alboran sea and Murcia	1288
	Gulf of Vera (Spain)	256 (CV 0.31) (188–592)
	Valencia (Spain)	1,333 (CV 0.31) (739-2,407)
	Ionian Sea	48
	Amvrakikos Gulf	152 (136-186)
	Central Adriatic Sea (Kornati & Murtar Sea, Croatia)	14
	North-eastern Adriatic Sea (Kvarneric, Croatia)	120

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[122] International Whaling Commission. 1994. Report of the workshop on mortality of cetaceans in passive fishing nets and traps. Rep. Int. Whal. Commn. (Spec. Iss.) 15:1-72. See also: Pace D.S., Miragliuolo A., Mussi B. 2005. Behaviour of a nursery group of entangled sperm whales (*Physeter macrocephalus*) off Capo Palinuro (Southern Tyrrhenian Sea, Italy). Abstracts, 19Th Annual Conference of the European Cetacean Society, La Rochelle, France, 2-7 April 2005:69.

[123] Lazaro F., Martin V. 1999. Sperm whales and drifting nets in the Mediterranean Sea: the example of the Balearic Islands. In: European Research on Cetaceans - 13. Proc. 13th Ann. Conf. ECS, Valencia, 20-24 April, 1999, pp. 118.

[124] Cagnolaro L., Notarbartolo di Sciara G. 1992. Research activities and conservation status of cetaceans in Italy. Boll. Mus. Ist. Biol. Genova, 56-57:53-85.

[125] Reeves R., Notarbartolo di Sciara G. 2006. The status and distribution of cetaceans in the Black Sea and Mediterranean Sea. IUCN Centre for Mediterranean Cooperation, Malaga, Spain 137pp.

	North Adriatic Sea (Gulf of Trieste, Slovenia)	47
Fisheries	Bottlenose dolphins are incidentally caught in trammel, set gillnets, and drift gillnets	
Estimated Annual Mortality	In some Mediterranean areas the incidental mortality rates are probably unsustainable.[126]	
	Bycatch in trawl nets is relatively uncommon in most Mediterranean areas; but high mortality in bottom trawls has been reported from the coast of Israel.[127]	
	Dolphins die incidentally in purse seines and longlines, but the relative importance of mortality from these gear types on Tursiops at the basin level is probably low.	
	In 1991, 30 bottlenose dolphins were caught by artisanal gear and trawlers in the Balearic area.[128]	
Species	***Tursiops truncatus ponticus*** **Black Sea Bottlenose dolphin.**	
Abundance Estimate[129]	No Abundance Estimate—may be in the low 10,000s	
	Probably declining, reduced by 30% over the last 60 yrs.	
	Turkish Straits System	495 (203–1,197)
	(Bosphorus, Marmara Sea and Dardanelles)	468 (184–1,186)
	Kerch Strait	76 (30–192)
		88 (31–243)
		127 (67–238)
	NW, N and NE Black Sea within Ukrainian and Russian territorial waters	4,193 (2,527–6,956)
	NE shelf area of the Black Sea	823 (329–2,057)
Fisheries	*T. t. ponticus* are captured in bottom-set gillnets for turbot (*Psetta maeotica*), spiny dogfish (*Squalus acanthias*), sturgeon (*Acipenser* spp.) and sole (*Solea* spp.), purse seines for mullet (Mugil spp. and Lisa spp.) and anchovy (*Engraulis encrasicolus ponticus*), trammel nets and trap nets. Bottom-set gillnets take significant numbers, especially during the turbot fishing season between April and June.	
Estimated Annual	Although *T. t. ponticus* constituted no more than 3% of the totals in the reports from Black Sea countries during the 1990s, at present, incidental	

126 Silvani L., Raich J., Aguilar A. 1992. Bottlenose dolphins, Tursiops truncatus, interacting with fisheries in the Balearic Islands, Spain. European Research on Cetaceans 6:32–34.

127 Goffman O., Kerem D., Spanier E. 1995. Dolphin interactions with fishing-trawlers off the Mediterranean coast of Israel. Abstract. 11th Biennial Conference on the Biology of Marine Mammals, Orlando, FL. 14-18 December 1995.

128 Silvani, L., Raich, J. and Aguilar, A. 1992. Bottle-nosed dolphins, Tursiops truncatus, interacting with local fisheries in the Balearic Islands, Spain. European Research on Cetaceans: 32-33.

129 Reeves R., Notarbartolo di Sciara G. 2006. The status and distribution of cetaceans in the Black Sea and Mediterranean Sea. IUCN Centre for Mediterranean Cooperation, Malaga, Spain 137pp.

Mortality	mortality in fishing gear is probably one of the main threats to *T. t. ponticus*.[130] At least 200-300 bottlenose dolphins were incidentally killed in Turkish fisheries each year.[131] The estimated annual mortality of *T. t. ponticus* in gillnet fisheries in the Mediterranean is 110 to 455.[132]
Species	***Grampus griseus* Risso's dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	Risso's dolphins are caught in longlines and gillnets in Spain and Italy.
Estimated Annual Mortality	In the Mediterranean Sea, Risso's dolphins are among the cetacean species frequently entangled in fishing gear--catches in longlines (two individuals), set nets (in France) and driftnets in Italy.[133]
Species	***Stenella coeruleoalba* Striped dolphin**
Abundance Estimate[134]	Alboran Sea 14,736 (6,923 – 31,366)[135]
	Western Mediterranean 117, 880 (68,379-214,800)
	Corso-Ligurian basin 25,614 (15,377 – 42, 685)
	No Abundance Estimate for the Eastern Mediterranean
	Population trend is uncertain
Fisheries	Striped dolphins are caught in the pelagic driftnet fishery
Estimated Annual Mortality	Italian, Greek and Moroccan pelagic drift fishing vessels have high levels of incidental mortality.
	In 1993 and 1994, the Swordfish driftnet fishery in the Eastern Gibraltar Straits captured 366 (268 – 464) and 286 (283 – 340) striped and common dolphins[136]
	The Spanish driftnet fishery in the Alborán Sea reportedly killed 145-183 striped dolphins per season in the early 1990s, this fishery was halted in

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130 Birkun A. Jr. 2002b. Interaction between cetaceans and fisheries: Black Sea. Pp. 98-107 in: G. Notarbartolo di Sciara (Ed.), Cetaceans of the Mediterranean and Black Seas: State of knowledge and conservation strategies. ACCOBAMS Secretariat, Monaco, 219pp.

131 Öztürk B. (Comp.) 1999. *Black Sea Biological Diversity: Turkey*. United Nations Publ., New York. 144 pp.

132 Perrin WF, Donovan GP, and Barlow J (1994). Gillnets and Cetaceans. Report of the International Whaling Commission Special Issue 15. 629pp.

133 Notarbartolo di Sciara G. 1990. A note on the cetacean incidental catch in the Italian driftnet swordfish fishery, 1986-1988. Rep. Int. Whal. Commn 40:459.

134 Forcada J., Aguilar A., Hammond P.S., Pastor X., Aguilar R. 1994. Distribution and numbers of striped dolphins in the western Mediterranean Sea after the 1990 epizootic outbreak. Mar. Mammal Sci. 10(2):137-50.

135 Forcada, J. and Hammond, P.S. 1998. Geographical variation in abundance of striped and common dolphins of the western Mediterranean. Journal of Sea Research 39: 313-325.

136 Silvani, L., Gazo, M. and Aguilar, A. 1999. Spanish driftnet fishing and incidental catches in the western Mediterranean. Biological Conservation 90: 79 - 85

	1995.[137] Moroccan driftnet vessels kill more than 3,600 dolphins (striped and common, combined) in the Alborán Sea per year.[138] The Italian drift net (spadare) fishery is estimated to have killed thousands of striped dolphins per year through the early 1990s (1149 in 1990 and 1363 in 1991).[139] The Italian driftnet fishery in the Ligurian Sea has been banned since 1992, but illegal fishing may still contribute to striped dolphin fishery mortality in Italian waters. In 2000, the French thonaille drift net fishery killed 326 (180-472) striped dolphins.[140] In 1994, the Spanish pelagic purse seine fishery off the SE Spanish Mediterranean coast had a bycatch of 300 striped dolphins.[141] There are also reports of (but no estimates) widespread and significant striped dolphin mortality in at least pelagic purse seines, longlines, trawl, harpoon fishery and gillnets.[142]
Species	***Delphinus delphis* Common dolphin.**
Abundance Estimate	Alboran Sea 14,736 (6,923 – 31,366)[143]
Fisheries	Common dolphins appear to be regularly taken as bycatch in driftnets
Estimated Annual Mortality	Approximately 165 to 145 common dolphins were caught in 1993 and 1994 in the swordfish driftnet fishery representing 1.2% of the estimated population. Since then Spanish driftnetting has been banned but the Moroccan driftnetting effort increased from 200 to 400 vessels.[144]

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[137] Silvani L., Gazo M., Aguilar A. 1999. Spanish driftnet fishing and incidental catches in the western Mediterranean. Biol. Conserv. 90:79-85.

[138] Tudela S., Kai Kai A., Maynou F., El Andalossi M., Guglielmi P. 2005. Driftnet fishing and biodiversity conservation: the case study of the large-scale Moroccan driftnet fleet operating in the Alboran Sea (SW Mediterranean). Biol. Conserv. 121:65-78.

[139] Di Natale A. 1995. Driftnets impact on protected species: observers data from the Italian fleet and proposal for a model to assess the number of cetaceans in the by-catch. Col. Vol. Sci. Pap. ICCAT 44(1):255-263. See also: Di Natale A., Notarbartolo di Sciara G. 1994. A review of the passive fishing nets and trap fisheries in the Mediterranean Sea and of the cetacean bycatch. Rep. int. Whal. Commn (Special Issue) 15:189-202.

[140] Imbert, G., Gaertner, J.-C. and Laubier, L. 2001b. Prevention a l'aide de repulsifs acoustiques des captures de dauphins par les thonailles. 10e Conference International sur les cetaces Mediterranee de la RIMMO. Juan-les Pins 16-18 nov. 2001 (Abstract)

[141] Silvani, L., Gazo, M. and Aguilar, A. 1999. Spanish driftnet fishing and incidental catches in the western Mediterranean. Biological Conservation 90: 79 - 85

[142] Di Natale A. 1995. Driftnets impact on protected species: observers data from the Italian fleet and proposal for a model to assess the number of cetaceans in the by-catch. Col. Vol. Sci. Pap. ICCAT 44(1):255-263. See also: Di Natale A., Notarbartolo di Sciara G. 1994. A review of the passive fishing nets and trap fisheries in the Mediterranean Sea and of the cetacean bycatch. Rep. int. Whal. Commn (Special Issue) 15:189-202.

[143] Forcada, J. and Hammond, P.S. 1998. Geographical variation in abundance of striped and common dolphins of the western Mediterranean. Journal of Sea Research 39: 313-325.

[144] Di Natale A. 1995. Driftnets impact on protected species: observers data from the Italian fleet and proposal for a model to assess the number of cetaceans in the by-catch. Col. Vol. Sci. Pap. ICCAT 44(1):255-263. See also: Di Natale

	No other estimate of mortality exist for other parts of the Mediterranean	
Species	***Phocoena phocoena* Harbor porpoise**	
Abundance Estimate[145]	No Total Abundance Estimate—at least several thousands maybe 10,000-12,000 Probably declining	
	Azov Sea in total	2,922 (1,333–6,403)
	Kerch Strait	54 (12–245)
	NW, N and NE Black Sea within Ukrainian and Russian territorial waters	1,215 (492–3,002)
	SE Black Sea within Georgian territorial waters	3,565 (2,071–6,137)
	Central Black Sea beyond territorial waters of Ukraine and Turkey	8,240 (1,714–39,605)
Fisheries	Almost all (>99%) of the porpoises are caught in bottom-set gillnets for turbot (*Psetta maeotica*), spiny dogfish (*Squalus acanthias*) and sturgeon (*Acipenser* spp.). The peak occurs from April–June during the turbot season in the Azov Sea and Kerch Strait and throughout the shelf area of the Black Sea.	
Estimated Annual Mortality	At present, incidental mortality in fishing nets is the most serious threat to harbor porpoise, with the majority (95%) of recorded cetacean entanglements being porpoises. Mortality estimates are not available; however, available data indicate that the annual level of harbor porpoise bycatch may be in the thousands.[146]	

A., Notarbartolo di Sciara G. 1994. A review of the passive fishing nets and trap fisheries in the Mediterranean Sea and of the cetacean bycatch. Rep. int. Whal. Commn (Special Issue) 15:189-202.

[145]Birkun A. Jr., Glazov D., Krivokhizhin S., Mukhametov L. 2002. Distribution and abundance of cetaceans in the Sea of Azov and Kerch Strait: Results of aerial survey (July 2001). P.73 *in*: Abstr. 16th Annual Conf. of the European Cetacean Society (Liege, 7-11 April 2002). See also: Birkun A., Jr., Glazov D., Krivokhizhin S., Nazarenko E., Mukhametov L. 2003. Species composition and abundance estimates of cetaceans in the Kerch Strait and adjacent areas of the Black and Azov Seas: The second series of aerial surveys (August 2002). Pp.271-272 *in*: Abstr. 17th Annual Conf. of the European Cetacean Society (Las Palmas de Gran Canaria, 9-13 March 2003).

[146] Commercial hunting of Black Sea cetaceans, including harbour porpoises, was banned in 1966 in the former USSR (present Georgia, Russia and Ukraine), Bulgaria and Romania, and in 1983 in Turkey. The riparian states assumed international obligations to protect Black Sea cetaceans as contracting parties of the Convention on Biological Diversity (CBD), Convention on the Conservation of Migratory Species of Wild Animals (CMS), Convention on the Conservation of European Wildlife and Natural Habitats (Berne Convention), Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, Appendix II), and the Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS). The harbor porpoise, *P. phocoena*, is mentioned in Annex II of the EC Directive No.92/43/EEC on the conservation of natural habitats of wild fauna and flora. In 1996, the Ministers of Environment of Black Sea countries adopted cetacean conservation and research measures within the framework of the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea (paragraph 62). The harbor porpoise is included as Data Deficient in the regional Black Sea Red Data Book (1999). However, in 2002 it was listed as Endangered in the Provisional List of Species of the Black Sea Importance, an annex to the Black Sea Biodiversity and Landscape Conservation Protocol of the Bucharest Convention.

AREA 41 SOUTHWEST ATLANTIC

In the southwest Atlantic, the problem of marine mammal bycatch has not been addressed by fisheries management authorities. A complicating factor in some countries is that cetaceans taken incidentally are frequently used for human food, oil, and bait and in fact the distinction between incidental and direct catch has been blurred. In many of these nations (especially Brazil), information is still almost entirely lacking on the scale and species composition of the bycatches, fishery characteristics, and fleet dynamics.

Species	***Sotalia fluviatilis* Tucuxi**	
Abundance Estimate	Cananéia estuary of Brazil	156-380
	No Abundance Estimate For Any Other Region	
Fisheries	Tucuxi are reported to become entangled in beach seines and, more frequently, in set gillnets and driftnets throughout their range. These dolphins are frequently entangled in fishing gear, especially coastal gillnets, in Brazil, and their flesh is used as bait in shark fisheries. Bycatch of tucuxis has been reported in gillnets in the Gulf of Venezuela. Tucuxi are captured in shrimp and fish traps and seine nets. Tucuxi are also incidentally captured in gillnets in French Guiana, and in a gillnet fishery in the mouth of the Sinu river, Colombia.	
Estimated Annual Mortality	Dozens of tucuxis may be killed per year in Rio de Janeiro state based on strandings records collected at Atafona	
	An estimated 938 animals were caught in drift nets from the port of Arapiranga during the summer of 1996 and an additional 125 caught during the winter.[147] In 1999, the IWC estimated 141 tucuxis were incidentally caught in fisheries.[148]	

Species	***Globicephala melas* Long finned pilot whale**
Abundance Estimate	No Abundance Estimate
Fisheries	Pilot whales are entangled in longline, driftnet fisheries, and purse seines
Estimated Annual Mortality	The pelagic shark driftnet fishery off southern Brazil incidentally caught 15 long-finned pilot whales in 1995 and 1997.[149]
	Between 1980 and 1985, 6 pilot whales were entangled taken on longlines in Brazilian waters.[150]

Species ***Lagenorhynchus obscurus* Dusky dolphin.**

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[147] IWC (2000)Annex K: Report of the Sub-Committee on small cetaceans, IWC, Cambridge, 2000

[148] IWC (2003) Annex K: Report of the Sub-Committee on small cetaceans, IWC, Cambridge, 2003

[149] Zerbini, A.N. and Kotas, J.E. 1998. A note on cetacean bycatch in pelagic driftnetting off southern Brazil. *Report of the International Whaling Commission* 48, 519–524.

[150] Zerbini, A.N. and Kotas, J.E. 1998. A note on cetacean bycatch in pelagic driftnetting off southern Brazil. *Report of the International Whaling Commission* 48, 519–524.

Abundance Estimate	Patagonian coast[151]	7,252
	Punta Ninfas and Cabo Blanco, Argentina	6,628
Fisheries	Dusky dolphins are entangled in mid-water trawls for shrimp, squid, and hake, driftnet fisheries, longline fisheries, and purse seines	
Estimated Annual Mortality	Mid-water trawls for shrimp, squid, and hake off the Patagonian coast incidentally caught between 442-560 dusky dolphin in 1984. From 1992 to 1994, 70 to 200 dusky dolphins were incidentally killed in Patagonian trawl fisheries--the number decreased to 36 in 1994.[152] The catch was 70% mature or pregnant females and in the mid-1980s the bycatch represented 8% of the present population estimate.[153]	
	Dusky dolphins are caught in a purse seine fishery off the Argentine coast near Necochea; 50–100 dusky and common dolphins per year may be killed. An unknown number also becomes entangled in a similar purse seine fishery at Mar del Plata.[154]	

Species	**Lagenorhynchus australis Peale's dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	Peale's dolphins are caught in mid-water trawls and coastal gillnets
Estimated Annual Mortality	Peale's dolphins have been caught in set nets in Tierra del Fuego, but the overall numbers involved are unknown.[155]
	Peale's dolphins have been harpooned for crab bait in Argentina.

Species	***Delphinus delphis* Common dolphin.**
Abundance Estimate	No Abundance Estimate
Fisheries	Common dolphins are caught in mid-water trawls, coastal gillnets, and purse seines
Estimated Annual Mortality	Common dolphins are caught with dusky dolphins, at a combined rate of about 50–100 a year in a purse seine fishery off Necochea, Argentina and in mid-water trawls on the Patagonia shelf.[156]

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[151] Dans SL, Crespo EA, Garcia NA, Reyes LM, Pedraza SN, Alonso MK (1997) Incidental mortality of patagonian dusky dolphins in mid-water trawling: Retrospective effects from the early 1980s. *Report of the International Whaling Commission* 47, 699–703.

[152] Crespo EA., Pedraza SN, Dans SL, Alonso MK, Reyes LM., García NA, Coscarella M, and Schiavini ACM. (1997) Direct and Indirect Effects of the Highseas Fisheries on the Marine Mammal Populations in the Northern and Central Patagonian Coast. J. Northw. Atl. Fish. Sci., Vol. 22: 189–207

[153] Dans SL, Crespo EA, Garcia NA, Reyes LM, Pedraza SN, Alonso MK (1997) Incidental mortality of patagonian dusky dolphins in mid-water trawling: Retrospective effects from the early 1980s. *Report of the International Whaling Commission* 47, 699–703

[154] Crespo, E.A., Corcuera, J.F., and López Cazorla, A. 1994. Interactions between marine mammals and fisheries in some fishing areas of Argentina. *Report of the International Whaling Commission* (Special Issue) 15, 269–281.

[155] Crespo, E.A., Corcuera, J.F., and López Cazorla, A. 1994. Interactions between marine mammals and fisheries in some fishing areas of Argentina. *Report of the International Whaling Commission* (Special Issue) 15, 269–281.

[156] Id.

Species	***Cephalorhynchus commersonii* Commerson's dolphin**
Abundance Estimate	Recent aerial surveys suggest that there are approximately 21,000 Commerson's dolphins along the entire coast, with 7,000 between 42-48ºS and 14,000 in Tierra del Fuego.[157]
Fisheries	Commerson's dolphins are caught in mid-water trawls (in Chubut, Tierra del Fuego and Peninsula Valdez) and coastal gillnets.
Estimated Annual Mortality	Total bycatch estimates are not available, but 5-30 Commerson's dolphins die each year in nets set perpendicular to shore in eastern Tierra del Fuego; this fishery type also captures dolphins in the Argentinean provinces north of Tierra del Fuego and in the eastern strait of Megellan.[158] From 1992 to 1994, the average annual mortality of Commerson's dolphins in mid-water trawls was 25-170 animals.[159] In the 1999/2000, fishing season in the region of La Angelina and Ria Gallegos, Argentinean artisanal setnet fisheries killed 179 (141 – 212).[160] Commerson's dolphins are also used as crab bait.

Species	***Phocoena spinipinnis* Burmeister's porpoise**
Abundance Estimate	No Abundance Estimate
Fisheries	Burmeister's porpoise are caught in coastal or shark gill net fisheries
Estimated Annual Mortality	Total bycatch estimates are not available, but about 10–15 Burmeister's porpoises are reported killed annually in shark nets set at around 50m off Necochea. Some are also killed in set nets in Tierra del Fuego, and in coastal gillnets around Buenos Aires. In Uruguay, eight Burmeister's porpoises were drowned in shark gillnets since 1974.[161]

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[157] The South American form of Commerson's dolphin is endemic to Patagonia in waters between 42ºS and 55ºS; its actual distribution is restricted to particular areas within that range. Pedraza, S.N., A.C.M. Schiavini, E.A. Crespo, S.L. Dans, and M.A. Coscarella. In review. Abundance of Commerson´s dolphins (Cephalorhynchus commersonii) in the coasts of Patagonia (Argentina). Journal of Cetacean Research and Management.

[158] Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.Crespo EA., Pedraza SN, Dans SL, Alonso MK, Reyes LM., García NA, Coscarella M, and Schiavini ACM. (1997) Direct and Indirect Effects of the Highseas Fisheries on the Marine Mammal Populations in the Northern and Central Patagonian Coast. J. Northw. Atl. Fish. Sci., Vol. 22: 189–207

[159] Crespo EA., Pedraza SN, Dans SL, Alonso MK, Reyes LM., García NA, Coscarella M, and Schiavini ACM. (1997) Direct and Indirect Effects of the Highseas Fisheries on the Marine Mammal Populations in the Northern and Central Patagonian Coast. J. Northw. Atl. Fish. Sci., Vol. 22: 189–207 See also: Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.

[160] Iniguez MA, Hevia M, Gasparrou C, Tomsin AL and Secchi ER. (2003) Preliminary estimate of incidental mortality of Commerson's dolphin (*Cephalorhynchus commersonii*) in an artisanal setnet fishery in La Angelina beach and Ria Gallego, Santa Cruz, Argentina. LAJAM 2(2) 87-94. See also: Annex H, Small Cetacean Subcommittee (2004)

[161] Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.Crespo EA., Pedraza SN, Dans SL, Alonso MK, Reyes LM., García NA, Coscarella M, and Schiavini ACM. (1997) Direct and Indirect Effects of the Highseas Fisheries on the Marine Mammal Populations in the Northern and Central Patagonian Coast. J. Northw. Atl. Fish. Sci., Vol. 22: 189–207

Species	***Australophocoena dioptrica* Spectacled porpoise.**		
Abundance Estimate	No Abundance Estimate		
Fisheries	Spectacled porpoise are caught in coastal or shark gill net fisheries		
Estimated Annual Mortality	Total bycatch estimates are not available, but at least 34 animals were incidentally killed between 1975 and 1990 in coastal gill nets set in Tierra del Fuego.[162] There is also mortality in bottom and mid-water trawls off the coast of Chubut, Argentina.		

Species	***Inia geoffrensis* Boto**		
Abundance Estimate	No Abundance Estimate		
Fisheries	Lampara seine nets and gillnets are most frequently responsible for incidental captures of Boto.		
Estimated Annual Mortality	Total bycatch estimates are not available or known, but are thought to have increased with increased fishing effort.		

Species	***Pontoporia blainvillei* Franciscana.**		
Abundance Estimate[163]	FMA I	No Abundance Estimate	Total annual bycatch = 110
	FMA II	No Abundance Estimate	Total annual bycatch = 375
	FMA III	42,078 (33,047 – 53,542)[164]	Total annual bycatch = 1374 (694-2215)
	FMA IV	34,131 (16,360-74,397)	Total annual bycatch = 651 (398-1097)
Fisheries	The franciscana is caught in fairly large numbers in gillnets set for sharks along most of its coastal range.		
Estimated Annual Mortality	Between 2.1 – 10.8 % of the population is removed each year by the fishery. The total estimated mortality throughout the range could be in the order of 1,500-2,000 animals per year. Most bycaught animals are juveniles with an average age of one year and 64% of the individuals		

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[162] Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.Crespo EA., Pedraza SN, Dans SL, Alonso MK, Reyes LM., García NA, Coscarella M, and Schiavini ACM. (1997) Direct and Indirect Effects of the Highseas Fisheries on the Marine Mammal Populations in the Northern and Central Patagonian Coast. J. Northw. Atl. Fish. Sci., Vol. 22: 189–207

[163] The IWC has divided, for management purposes, franciscana population into four Franciscana Management Units (FMUs) according to ecological, morphological, and genetic information. At least three populations have been differentiated genetically (FMU 1, 2, and 3-4). Levels of bycatch mortality are generally high throughout the franciscana's range. Removal rates, estimated by dividing the mean bycatch by the mean abundance, have ranged from 1.6% for FMU 4 to 3.3% for FMU 3. Secchi, E. R., Danilewicz, D. and Ott P. H. 2004. Applying the phylogeographic concept to identify franciscanas dolphin stocks: implications to meet management objectives. Journal of Cetacean Research and Management 5:61-68.

[164] Secchi, E.R., Ott, P.H., Crespo, E.A., Kinas, P.G., Pedraza, S.N., and Bordino, P. 2001. A first estimate of franciscana (*Pontoporia blainvillei*) abundance off southern Brazil. *Journal of Cetacean Research and Management* **3**, 95–100.

were under three years.[165]

Uruguay gillnet fisheries incidentally killed 235 franciscana in 1992-93 and 28 in 1998.[166]

In Rio Grande do Sul and Buenos Aires fisheries, an estimated 700 and 500[167] franciscana are captured each year.[168] Incidental mortality of franciscana in coastal gillnet fisheries in northern Buenos Aires, Argentina from September to April, during a four-year period from 2000 – 2004 was 312 dolphins—seventy-one percent of these bycaught franciscanas were female and most (56%) were immature.[169]

In 2000, Brazilian fisheries killed 1496 franciscana.[170]

In a small-scale survey of fishers operating from the post of Rio Grande, logbook data obtained from 9 – 10% of the fleet, estimated the total number of dolphins taken as bycatch by the entire fleet to be 946 dolphins (CI 467 – 1525) in 1999 and 719 (CI 248 – 1413) in 2000. This data was further extrapolated to all of the fishing area, giving a total estimated bycatch of 1106 (578 – 1915) in 1999 and 992 (475 – 1832) in 2000.[171]

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165 Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

166 The reason for the decline is a decline in fish stocks and the fisheries that use nets with larger mesh (32-34 and 20-22 mm) have reduced their effort and nets with small mesh are being used instead. Also Uruguayan legislation protecting franciscana (Law 9481 and Decrees 26, 1/78, 586/79 and 565/81 are being enforced.

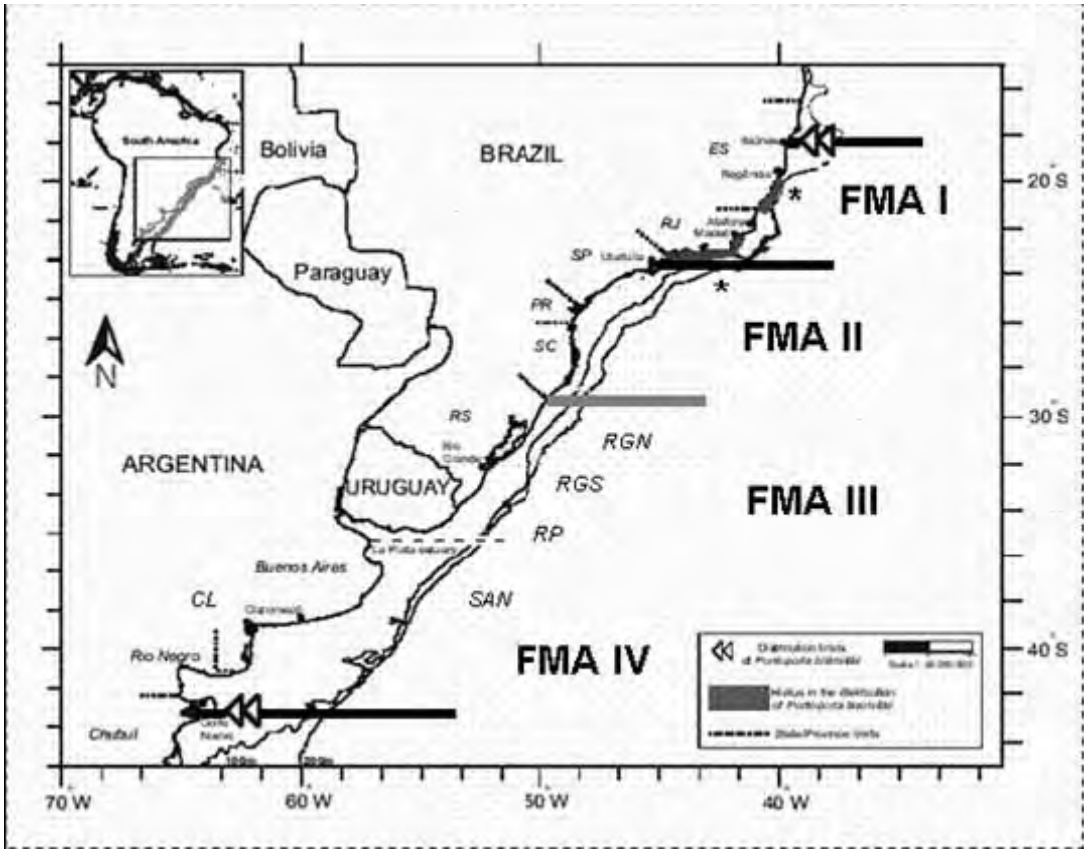
167 From 2000 to 2003 Argentinean fisheries killed between 160 to 893 animals annually.

168 Crespo EA (2002) Franciscana—*Potoporia blainvillei* In: Encyclopedia of marine mammals (Perrin WF, Wursig B, Thewissen JGM eds) Academic Press, San Diego, pp482-487

169 Annex H, Small Cetacean Subcommittee (2004)

170 Annex H, Small Cetacean Subcommittee (2004) Figures composed as follows: >850 (55) Caught in Southern Brazil – Gillnet. (It is only a rough estimate based on extrapolation. For the whole fleet. Data from only nine boats from a fleet of about 140-150) + 646 (48) from Rio Grande, southern Rio Grande do Sul.

171 Annex H, Small Cetacean Subcommittee (2004)

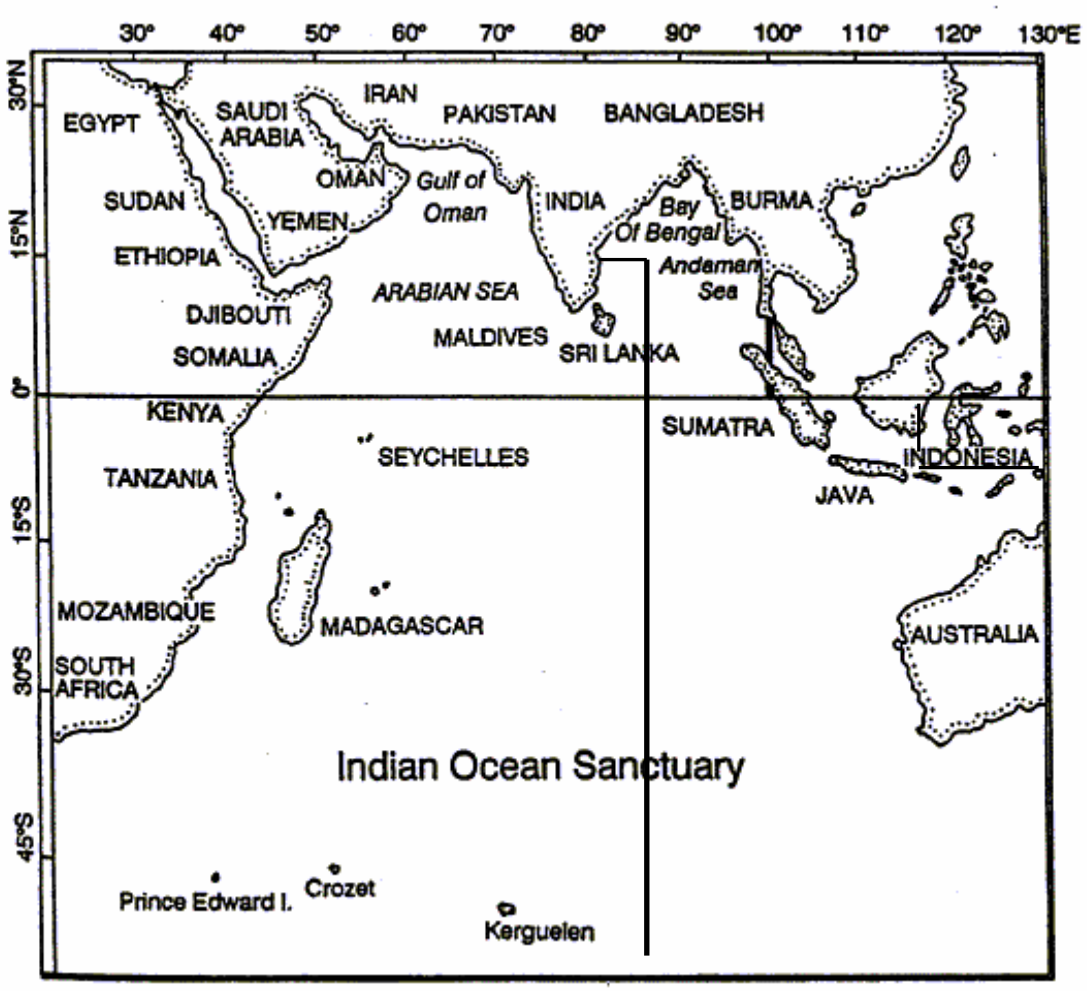


AREA 47 SOUTHEAST ATLANTIC

Species	***Cephalorhynchus heavisidii* Heaviside's dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	Heaviside's dolphins are entangled in inshore gillnets off South Africa and Namibia. There are unconfirmed reports of animals taken in bottom trawl fisheries and beach seine nets
Estimated Annual Mortality	The estimated total kills of dolphins in 7,013 sets of Namibia in 1983 were 67 (C. heavisidii and Lagenorhynchus obscurus combined); whereas 57 were killed in South Africa. Other sources of incidental mortality were set nets close to the shore of Namibia, and a bottom trawl fishery.[172]

[172] Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.

AREA 51 WESTERN INDIAN OCEAN



Species	***Kogia breviceps* Pygmy sperm whale.**
Abundance Estimate	No Abundance Estimate
Fisheries	Pygmy sperm whales are caught in Sri Lankan coastal gillnet and driftnet fisheries
Estimated Annual Mortality	Pygmy sperm whales are one of the major cetacean species caught in the Sri Lankan driftnet fisheries. Up to 6% of the landed catch consists of pygmy sperm whales, the total annual catch for all cetaceans has been estimated at 15,000 to 25,000, and therefore, total annual catches may reach 2,700 animals.[173] Population impact of this catch is unknown. The IWC, in 1994, estimated that more than 80 pygmy sperm whales are

[173] Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

[174] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

killed each year off the coast of Sri Lanka.[174]

Species	***Kogia simus* Dwarf sperm whale.**
Abundance Estimate	No Abundance Estimate
Fisheries	Dwarf sperm whales are caught in Sri Lankan coastal gillnet and driftnet fisheries
Estimated Annual Mortality	Dwarf sperm whales may represent up to 6% of the cetacean bycatch in the Sri Lankan driftnet fisheries. Therefore, total annual catches may reach 2,700 animals.[175] The IWC, in 1994, estimated that more than 230 dwarf sperm whales are killed each year off the coast of Sri Lanka.[176]

Species	***Steno bredanensis* Rough-toothed dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	Rough-toothed dolphins are caught in Sri Lankan coastal gillnet fisheries
Estimated Annual Mortality	This dolphin is taken in the Sri Lankan driftnet fishery in small numbers only, (5 recorded in total) with a maximum of only 2% in one sample, suggesting a catch of perhaps a few hundreds per year.[177] The IWC, in 1994, estimated that more than 50 rough-toothed dolphins are killed each year off the coast of Sri Lanka.[178]

Species	***Sousa plumbea/chinensis* Indian humpback dolphin.**	
Abundance Estimate	No Total Abundance Estimate	
	Plettenberg Bay, South Africa	25[179]
	Natal coast	200[180]
	Zanzibar (Tanzania), East Africa	71 (48-94)[181]

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175 Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

176 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

177 Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

178 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

179 Ross GJB, Heinsohn GE, Cockroft VG 1994. Humpback dolphins-*Souza chinensis* (Osbeck, 1765), Souza plumbea (G. Cuvier, 1829) and Souza teuszii (Kukenthal, 1892). In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 5: The first book of dolphins. Academic Press, London, pp 23-42.

180 Ross GJB, Heinsohn GE, Cockroft VG 1994. Humpback dolphins-*Souza chinensis* (Osbeck, 1765), Souza plumbea (G. Cuvier, 1829) and Souza teuszii (Kukenthal, 1892). In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 5: The first book of dolphins. Academic Press, London, pp 23-42.

181 Stensland, E. 2004. Behavioural ecology of Indo-Pacific bottlenose and humpback dolphins. Doctoral thesis, Stockholm University, Department of Zoology. ISBN: 91-7265-837-X.

	South Eastern Cape coast of South Africa	466[182]
	Bazaruto Archipelago, Mozambique	60[183]
	Indus Delta	500[184]
Fisheries	Indian humpback dolphins are caught in Sri Lankan coastal gillnet and driftnet fisheries, shark nets in Natal, Indian ocean coastal gillnets, and gillnets in offshore waters of Pakistan.	
Estimated Annual Mortality	Entanglements in gillnets have been reported from Djibouti, the Arabian Gulf, Indus delta and the south-west coast of India. This species also becomes entangled in Indian shark and catfish gillnet fisheries along the east coast of India. Between 1980 and 1988, 67 humpback dolphins died in shark nets to protect bathing beaches along the Natal coast, South Africa—or about 7-8 animals per year.[185] 2.2 animals per year are captured in the Calicut gillnet fishery. Hump-back dolphins are commonly entangled in coastal driftnet fisheries for seerfish and tunas on the Indian west coast, and in set nets and driftnets. The IWC, in 1994, estimated that more than 100 hump-back dolphins died each year in fisheries off the Sri Lankan coast[186] and more than 7.5 hump-back dolphins died annually in fisheries off the Indian Ocean coast of Africa.[187]	
Species	***Peponocephala electra* Melon-headed whale.**	
Abundance Estimate	No Abundance Estimate	
Fisheries	Melon-headed whales are caught in Sri Lankan coastal gillnet and driftnet fisheries	
Estimated Annual Mortality	Three melon-headed whales were caught in the Sri Lankan driftnet fishery[188] The IWC, in 1994, estimated that less than 10 melon-headed whales were caught annually in fisheries in the northern Indian Ocean.[189]	

182 Karczmarski, L., Winter, P.E.D., Cockcroft, V.G., and McLachlan, A. 1999. Population analyses of Indo-Pacific humpback dolphins Sousa chinensis in Algoa Bay, Eastern Cape, South Africa. Marine Mammal Science 15, 1115–1123.

183 Ross GJB, Heinsohn GE, Cockroft VG 1994. Humpback dolphins-Souza chinensis (Osbeck, 1765), Souza plumbea (G. Cuvier, 1829) and Souza teuszii (Kukenthal, 1892). In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 5: The first book of dolphins. Academic Press, London, pp 23-42.

184 Ross GJB, Heinsohn GE, Cockroft VG 1994. Humpback dolphins-Souza chinensis (Osbeck, 1765), Souza plumbea (G. Cuvier, 1829) and Souza teuszii (Kukenthal, 1892). In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 5: The first book of dolphins. Academic Press, London, pp 23-42.

185Jefferson, T.A. and Karczmarski, L. 2001. Sousa chinensis. Mammalian Species (American Society of Mammalogists) 655, 9pp. See also. Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. South African Journal of Wildlife Research 20(2), 44–51.

186 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

187 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

188 Leatherwood, S. and Reeves, R.R. (eds.). 1989. Marine mammal research and conservation in Sri Lanka 1985–1986. UNEP Marine Mammal Technical Report 1, Nairobi, Kenya.

189 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

Species	***Feresa attenuata* Pygmy killer whale.**
Abundance Estimate	No Abundance Estimate
Fisheries	Pygmy killer whales are caught in Sri Lankan coastal gillnet and driftnet fisheries
Estimated Annual Mortality	Although they comprise less than 2% of all cetaceans caught in gillnet fisheries in Trincomalee, Sri Lanka and in villages on the southwest coast of Sri Lanka, fishery mortality may be 300-900 animals annually.[190] The IWC, in 1994, estimated that less than 170 pygmy killer whales were killed annually in fisheries off the coast of Sri Lanka.[191]

Species	***Pseudorca crassidens* False killer whale.**
Abundance Estimate	No Abundance Estimate
Fisheries	False killer whales are caught in Sri Lankan coastal gillnet and driftnet fisheries, shark nets in Natal, and Indian ocean coastal gillnets
Estimated Annual Mortality	Between 1980 and 1988, 1 false killer whale died in shark nets to protect bathing beaches along the Natal coast, South Africa.[192] Catches in the Sri Lankan fishery included false killer whales representing up to 6% of one sample.[193] The IWC, in 1994, estimated that more than 125 false killer whales were killed annually in fisheries off the coast of Sri Lanka.[194]

Species	***Lagenodelphis hosei* Fraser's dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	Fraser's dolphins are caught in Sri Lankan coastal gillnet and driftnet fisheries, shark nets in Natal, and Indian ocean coastal gillnets
Estimated Annual Mortality	Between 1980 and 1988, 2 Fraser's dolphins died in shark nets to protect bathing beaches along the Natal coast, South Africa.[195]

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190 Ross GJB, Leatherwood S 1994. Pygmy killer whale—Feresa attenuata. In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds) Vol. 5: The first book of dolphins. Academic Press, London, pp 387-404.

191 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

192 Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. South African Journal of Wildlife Research 20(2), 44–51.

193 Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

194 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

195 Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. South African Journal of Wildlife *Research* 20(2), 44–51.

196 Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

197 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

	One Fraser's dolphin was caught in the Sri Lankan driftnet fishery[196]	
	The IWC, in 1994, estimated that more than 10 Fraser's dolphins were killed annually in fisheries off the coast of Sri Lanka.[197]	
Species	***Tursiops truncatus* Bottlenose dolphin**	
Abundance Estimate	No Total Abundance Estimate	
	Zanzibar (Tanzaniz), East Africa	161 (144-177)[198]
	Indian Ocean coast, South Africa, south of Natal	250
	Indian Ocean coast, South Africa, north of Natal	1,000
Fisheries	Bottlenose dolphins are caught in Sri Lankan coastal gillnet and driftnet fisheries, shark nets in Natal, Indian ocean coastal gillnets, gillnets in Madagascar, and there are unquantified entanglements in medium and large mesh gillnets in offshore waters of Pakistan.	
Estimated Annual Mortality	Between 1980 and 1988, 271 bottlenose dolphins died in shark nets to protect bathers.[199] Scientists suggested that current catch rates may approach 5% of the local population and therefore may threaten it.[200]	
	Catches in India are reported quite frequently, and formed 33% of the total catch of cetaceans recorded in the gillnet fishery at Calicut.[201] Bottlenose dolphins are one of the commonly caught dolphins in seerfish and tuna driftnet fisheries on the west coast of India, and in coastal gillnet fisheries for pomfrets and other species too. In Sri Lanka, this species was found to consist of between 5 and 25% of the total cetacean catch in four different surveys amounting to 1,250 to 10,000 animals.[202]	
	Although national legislation prohibits the capture of cetaceans, which were formerly taken with harpoons[203] an estimated 200-300 bottlenose	

198 Stensland, E. 2004. Behavioural ecology of Indo-Pacific bottlenose and humpback dolphins. Doctoral thesis, Stockholm University, Department of Zoology. ISBN: 91-7265-837-X.

199 Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. *South African Journal of Wildlife Research* 20(2), 44–51.

200 Peddemors, V.M., Cockcroft, V.G., and Wilson, R.B. 1991. Incidental dolphin mortality in the Natal shark nets: a preliminary report on prevention measures. Pp.129–137 *in: Cetaceans and Cetacean Research in the Indian Ocean Sanctuary* (eds. S. Leatherwood and G.P. Donovan). UNEP Marine Mammal Technical Report No. 3. Nairobi, Kenya.

201 Mohan, R.S.L. 1994. Review of gillnet fisheries and cetacean by-catches in the northeastern Indian Ocean. *Report of the International Whaling Commission* (Special Issue) 15, 329–346.

202 Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp. See also Mohan, R.S.L. 1994. Review of gillnet fisheries and cetacean by-catches in the northeastern Indian Ocean. *Report of the International Whaling Commission* (Special Issue) 15, 329–346.

203 Leatherwood, S. 1986. *Whales, Dolphins and Porpoises of the Indian Ocean Sanctuary. A Catalogue of Available Information.* Hubbs Marine Research Centre Technical Report No. 87-197. San Diego: Hubbs Marine Research Center. 207pp.

204 De Lestang, J.N. 1993. Status of marine mammals in the eastern African region. Report to UNEP; *Regional* Seas Reports and studies series.

205 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

	dolphins are still killed annually by the Seychelles schooner fleet of some 20 vessels fishing at the edge of the Mahe Plateau and the outlying islands of the Seychelles group[204] The IWC, in 1994, estimated that more than 500 bottlenose dolphins were caught in fisheries off the coast of Sri Lanka, 20-23 were killed in fisheries off the Indian Ocean coast of South Africa south of Natal, and 11-14 were killed in fisheries off the Indian Ocean coast of South Africa north of Natal.[205]
Species	***Grampus griseus* Risso's dolphin.**
Abundance Estimate	5,500 to 13,000[206]
Fisheries	Risso's dolphins are caught in Sri Lankan coastal gillnet and driftnet fisheries
Estimated Annual Mortality	In Sri Lanka, Risso's dolphins are the second most commonly bycaught cetacean in fisheries, providing fish and meat for human consumption and fish bait--stocks may be adversely affected. Risso's dolphins are caught frequently in the Sri Lankan fishery--between 6% and 16% of the total cetacean catch–or roughly 1,300 dolphins.[207] The IWC, in 1994, estimated that more than 1,300 Risso's dolphins were killed in fisheries off the coast of Sri Lanka.[208]
Species	***Stenella longirostris* Spinner dolphin.**
Abundance Estimate	No Abundance Estimate
Fisheries	Spinner dolphins are caught in Sri Lankan coastal gillnet and driftnet fisheries. This species is caught in Pakistani offshore deepwater gillnet fisheries and is commonly entangled in coastal driftnet fisheries for seerfish and tunas on the west coast of India, and is also entangled in other gillnet fisheries for sharks, pomfrets and other species.
Estimated Annual Mortality	Spinner dolphins are the most frequently caught species in the Sri Lankan fishery, where they formed between 33 and 47% of the total cetacean catch in for different surveys, or roughly 7,050-11,750 dolphins per year.[209]

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[206] Kruse S, Caldwell DK, Caldwell MC 1999. Risso's dolphin- *Grampus griseus* (G Cuvier, 1812) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp183-212

[207] Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

[208] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

[209] Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

[210] Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. *South African Journal of Wildlife Research* 20(2), 44–51.

[211] Mohan, R.S.L. 1994. Review of gillnet fisheries and cetacean by-catches in the northeastern Indian Ocean. *Report of the International Whaling Commission* (Special Issue) 15, 329–346.

	A single animal is reported from the Natal shark nets,[210] while in India, spinner dolphins made up more than 50% of the cetacean catch in the gillnet fishery.[211] The IWC, in 1994, estimated that more than 4,000 spinner dolphins were entangled in fisheries off the coast of Sri Lanka.[212]
Species	***Stenella coeruleoalba* Striped dolphin.**
Abundance Estimate	No Abundance Estimate
Fisheries	Striped dolphins are entangled in Sri Lankan coastal gillnet and driftnet fisheries, shark nets in Australian, Indian ocean coastal gillnets, and unquantified catches in the offshore gillnet fisheries of Pakistan.
Estimated Annual Mortality	Between 1980 and 1988, 3 dolphins were entangled in the Natal shark nets to protect bathing beaches along the Natal coast, South Africa [213] Striped dolphins are frequently entangled in the Sri Lankan driftnet fishery where between 6 and 11% of all cetaceans landed were found to be this species—900 to 2,750[214] The IWC, in 1994, estimated that more than 700 striped dolphins were killed in fisheries off the coast of Sri Lanka.[215]
Species	***Stenella attenuata* Pantropical spotted dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	Spotted dolphins are entangled in Sri Lankan coastal gillnet and driftnet fisheries
Estimated Annual Mortality	Up to 27% of all cetaceans landed in Sri Lanka are spotted dolphins, suggesting a total annual catch between 4,050 and 6,750.[216] The IWC, in 1994, estimated that more than 1,500 spotted dolphins were killed in fisheries in the Northern Indian Ocean.[217]
Species	***Delphinus delphis* Common dolphin.**
Abundance Estimate	No Abundance Estimate

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[212] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

[213] Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. *South African Journal of Wildlife Research* 20(2), 44–51.

[214] Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

[215] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

[216] Dayaratne, P. and de Silva J 1990. Drift gillnet fishery in Sri Lanka. Document TWS/90/19 presented at the Expert Consultation on Stock Assessment of Tuna in the Indian Ocean. Bangkok. 2-6 July 1990 8pp.

[217] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

Fisheries	Common dolphins are entangled in Sri Lankan coastal gillnet and driftnet fisheries and Indian ocean coastal gillnets. Common dolphins also become entangled in driftnets and bottom set gillnets for pomfrets and other species in Indian.
Estimated Annual Mortality	Common dolphins form around 8% of the total cetacean catches in the Calicut gillnet fishery (14 were recorded in 5 years).[218] The IWC, in 1994, estimated that more than 1,000 common dolphins were killed in fisheries in the Southwestern Indian Ocean, and 33 were entangled in fisheries the Indian Ocean coast of South Africa.[219]

Species	***Neophocaena phocaenoides* Finless porpoise.**
Abundance Estimate	No Abundance Estimate
Fisheries	Finless porpoise are entangled in Sri Lankan coastal gillnet and driftnet fisheries, shark nets in Australian, and Indian ocean coastal gillnets. This species is commonly caught in seerfish and tuna driftnet fisheries throughout the west coast of India. Finless porpoises have been caught in a shrimp trawl in Pakistan in 1989, entangled in beach seines and stake nets for shrimp, and entangled in small and medium mesh finfish gillnets in shallow inshore waters of Pakistan.
Estimated Annual Mortality	No Estimate of Mortality

AREA 57 EASTERN INDIAN OCEAN

Species	***Platanista gangetica* Ganges river dolphin.**
Abundance Estimate	600-700[220]
Fisheries	Ganges river dolphins are entangled in gillnets. The dolphin was deliberately killed for its meat and oil, but that may have decreased.[221]
Estimated Annual Mortality	No Estimate of Mortality

Species	***Sousa plumbea/chinensis* Indian humpback dolphin.**
Abundance Estimate	No Abundance Estimate-may be declining in Australian waters
Fisheries	Humpback dolphins are entangled in coastal gillnet and driftnet fisheries, gillnets set for sharks This species also becomes entangled in Indian

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[218] Mohan, R.S.L. 1994. Review of gillnet fisheries and cetacean by-catches in the northeastern Indian Ocean. *Report of the International Whaling Commission* (Special Issue) **15**, 329–346.

[219] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

[220] Reeves RR, Chaudhry AA. 1998. Status of the Indus River dolphin *Platanista minor*. Oryx 32: 35-44.

[221] Dolphin meat, intestines, and oil are used as fish attractant in the Ganges and Brahmaputra rivers of India and Bangladesh. In the Brahmaputra River, fishermen trail bound pieces of dolphin body parts alongside small boats while sprinkling the water with a mixture of oil and minced dolphin flesh. Small unbaited hooks are used to catch the fish as they come to the surface within the oil slick

	shark and catfish gillnet fisheries along the east coast of India.
Estimated Annual Mortality	No Estimate of Mortality

Species	***Orcaella brevirostris* Irrawaddy (snubfin) river dolphin**
Abundance Estimate	No Total Abundance Estimate
	Chilka Lake, India 20-30
Fisheries	Irrawaddy dolphins are incidentally captured in driftnet fishing nets in Bangladesh and India.
Estimated Annual Mortality	No Estimate of Mortality

Species	***Tursiops truncatus* Bottlenose dolphin**
Abundance Estimate	No Total Abundance Estimate
	south-eastern Shark Bay[222] 400
	Cockburn Sound, Western Australia[223] 150
Fisheries	Bottlenose dolphins are entangled in shark nets in Australia, in anti-predator nets set around tuna feedlots in Port Lincoln, South Australia, and in shark and catfish gillnet fisheries off the east coast off India.
Estimated Annual Mortality	No Estimate of Mortality

Species	***Stenella longirostris* Spinner dolphin.**
Abundance Estimate	No Abundance Estimates
Fisheries	Spinner dolphins are entangled in coastal gillnet and driftnet fisheries in the eastern Indian Ocean and shark and catfish gillnet fisheries in Indian waters.
Estimated Annual Mortality	No Estimate of Mortality

Species	***Delphinus delphis* Common dolphin.**
Abundance Estimate	No Abundance Estimate
Fisheries	Common dolphins are entangled in Indian ocean coastal gillnets and Indian catfish and shark gillnet fisheries.

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[222] Ross, GJB. 2006 Review of the conservation status of Australia' smaller whales and dolphins. Australian Government http://www.deh.gov.au/coasts/publications/pubs/conservation-smaller-whales-dolphins.pdf

[223] Ross, GJB. 2006 Review of the conservation status of Australia' smaller whales and dolphins. Australian Government http://www.deh.gov.au/coasts/publications/pubs/conservation-smaller-whales-dolphins.pdf

Estimated Annual Mortality	No Estimate of Mortality

Species	***Neophocaena phocaenoides* Finless porpoise.**
Abundance Estimate	No Abundance Estimate
Fisheries	Finless porpoise are caught in Indian ocean coastal gillnets for shark and catfish and other coastal gillnet fisheries.
Estimated Annual Mortality	No Estimate of Mortality

AREA 61 NORTHWEST PACIFIC

Species	***Berardius bairdii* Baird's beaked whale.**	
Abundance Estimate[224]	Japanese Pacific coast	5,029/1.0%
	Sea of Japan	1,260/0.6%
	Okhotsk Sea	660/0.3%
Fisheries	Baird's beaked whales have been caught in Japanese salmon driftnets and trap fisheries	
Estimated Annual Mortality	Historically, Japan's coastal whaling stations killed up to 40 Baird's beaked whales per year--now the industry operates with a quota of 8 for the Sea of Japan, 2 for the southern Okhotsk Sea and 52 for the Pacific coasts.[225].	
	Over a 5 year period (1986 to 1990), at least 2 Baird's beaked whales were incidentally killed in Japanese trap nets.	
	From 1998 to 2003, Japan reported killing 62 Baird's beaked whales each year in directed hunts.[226]	
	In 1999, 2001, and 2002, Korea reported killing 1 Baird's beaked whales each year in gillnet fisheries in the East sea.[227]	

Species	***Ziphius cavirostris* Cuvier's beaked whale.**
Abundance Estimate	No Abundance Estimate
Fisheries	Cuvier's beaked whales are caught in purse seine and gillnets fisheries

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[224] Katsuya T. 2002. Giant beaked whales. In: Encyclopedia of marine mammals (Perrin WF, Wursig, B, Thewissen JGM, eds.) Academic Press, San Diego, pp. 519-522.

[225] Katsuya T. 2002. Giant beaked whales. In: Encyclopedia of marine mammals (Perrin WF, Wursig, B, Thewissen JGM, eds.) Academic Press, San Diego, pp. 519-522

[226] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[227] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

Estimated Annual Mortality	In 1985 and 1986, two Cuvier's beaked whales were incidentally captured off the coast of Japan.

Species	***Pseudorca crassidens* False killer whale.**
Abundance Estimate	Coastal waters of China and Japan 16,000[228]
Fisheries	False killer whales are caught in trawl, gillnet and stow gear and are occasionally killed in Japan for food.[229]
Estimated Annual Mortality	In 1988, two false killer whales were caught in Japanese trap nets.[230] Chinese coastal fisheries may capture hundreds of false killer whales. From 1998 to 2002, Japan reported killing 45, 5, 8, 26, and 7 false killer whales in directed hunts.[231] In 2000 and 2002, Korea reported killing 1 false killer whale in gillnet fisheries in the East sea.[232]

Species	***Globicephala macrorhynchus* Short-finned pilot whale.**
Abundance Estimate	Northern form of short-finned pilot whales 5,300[233] Southern form of short-finned pilot whales 53,000[234]
Fisheries	Short-finned pilot whales are caught in Japanese gillnet fisheries and are occasionally harvested in Japan for food.[235]
Estimated Annual	From 1984 to 1988, pilot whales were killed in gillnets, primarily Japanese driftnets, at a rate of approximately 4 per year, and at a slightly

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228 Odell DK, McClune KM 1999. *Pseudorca crassidens* (Owen, 1846) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp213-244

229 The largest documented fisheries interaction is in the waters around Iki Island, Japan, where over 900 false killer whales were killed in drive fisheries from 1965 to 1980 in an attempt to reduce interactions with the yellowtail fishery. Odell DK, McClune KM 1999. *Pseudorca crassidens* (Owen, 1846) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp213-244

230 Odell DK, McClune KM 1999. *Pseudorca crassidens* (Owen, 1846) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp213-244

231 IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

232 IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

233 Bernard HJ, Reilly B. 1999. Pilot whales *Globicephala* Lesson, 1928. In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp245-280

234 Bernard HJ, Reilly B. 1999. Pilot whales *Globicephala* Lesson, 1928. In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp245-280

235 In 1982, the Japanese drive fishery at Taiji expanded and harpooning of the northern form was resumed off Sanriku and Hokkaido. Between 1982 and 1985, 1,755 whales of the southern form were killed, and 519 of the northern form were taken during this same period. From 1985 to 1989, Japan took a total of 2,326 short-finned pilot whales. The drive fishery in Japan and the harpoon fishery continue today. In 1997, Japan recorded a catch of 347 short-finned pilot whales. Olson PA, Reilly SB 2002. Pilot whales—*Globicephala melas* and *G. macrorhynchus*. In: Encyclopedia of marine mammals (Perrin WF, Wursig, B, Thewissen JGM, eds.) Academic Press, San Diego, pp. 898-903.

Mortality	lower rate in trap nets.[236] Between 350 and 750 pilot whales die annually in passive nets and traps set by the Japanese fishery.[237] From 1998 to 2002, Japan reported killing 229, 394, 304, 342, 176 short-finned pilot whales each year in directed hunts.[238]
Species	***Steno bredanensis* Rough-toothed dolphin.**
Abundance Estimate	No Abundance Estimate
Fisheries	Rough-tooth dolphins are caught in driftnet, purse seine and gillnet fisheries and are killed in drive fisheries at Okonawa in the Ryukyus and in the home islands of Japan.[239]
Estimated Annual Mortality	One rough-toothed dolphin was killed in an unspecified Japanese fishery in 1985.
Species	***Lagenorhynchus obliquidens* Pacific white-sided dolphin.**
Abundance Estimate	No Abundance Estimate
Fisheries	White-sided dolphins were caught in gillnet fisheries, longlines and trawls. Japanese drive and harpoon fisheries kill hundreds or even thousands of Pacific white-sided dolphins.[240]
Estimated Annual Mortality	In 1989, the estimated total bycatch for the Japanese squid driftnet fishery was approximately 6,100; in 1990, the total estimate for all driftnet fisheries combined was 5,759.[241] In January 1993, a United Nations moratorium on these high seas driftnet fisheries went into effect.

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[236] Olson PA, Reilly SB 2002. Pilot whales—*Globicephala melas* and *G. macrorhynchus*. In: Encyclopedia of marine mammals (Perrin WF, Wursig, B, Thewissen JGM, eds.) Academic Press, San Diego, pp. 898-903.

[237] Bernard HJ, Reilly B. 1999. Pilot whales *Globicephala* Lesson, 1928. In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp245-280

[238] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[239] From 1976 – 1981, 23 rough-tooth dolphins were captured in Okinawa. Miyazaki N. Perrin WF 1994. Rough-tooth dolphin *Steno bredanensis* (Lesson, 1828). In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp245-280

[240] Jefferson TA, Leatherwood S, Webber MA 1993. FAO Species identification guide. Marine Mammals of the world. UNEP/FAO, Rome, 320pp

[241] Hobbs RC, Jones LL 1993. Impacts of high seas driftnet fisheries on marine mamma populations in the North Pacific. Int North Pacific Fish Comm Bulletin 53: 409-434.

[242] Brownell RL, Walker WA, Forney KA 1999. Pacific white-sided dolphin—*Lagenorhynchus obliquidens*. In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp57-84

[243] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[244] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

	Smaller catches of white-sided dolphins are reported in the Japanese land-based salmon driftnet fishery and in seine, set nets, and trap nets around Japan.[242]
	From 1998 to 2002, Japan reported incidentally killing approximately one white-sided dolphin per year—no directed hunts were reported.[243]
	From 1998 to 2003, Korea reported killing 7, 3, 4, 41, 53, and 18 Pacific white-sided dolphins each year in gillnets, set nets, trap nets and longline fisheries in the East sea.[244]
Species	***Tursiops truncatus* Bottlenose dolphin**
Abundance Estimate	Northwest Pacific 316,935[245]
Fisheries	Bottlenose dolphins are killed in drive fisheries in Taiwan and Japan for human consumption and bait.[246]
Estimated Annual Mortality	Incidental catches in Chinese fisheries reach several hundred per year.
	Incidental catches of bottlenose dolphins are roughly 6 per year in Japanese fisheries
	From 1998 to 2002, Japan reported killing 245, 658, 1,426, 247, and 729 bottlenose dolphins year in directed hunts—no incidental mortality was reported.[247]
	From 2000 to 2003, Korea reported killing 12, 3, 4, and 1, bottlenose dolphins each year in gillnets, set nets, trawl and purse-seine fisheries in the East and South Sea.[248]
Species	***Grampus griseus* Risso's dolphin**
Abundance Estimate	105,000
Fisheries	In Japan, Risso's dolphins are killed for food and fertilizer in set nets and as a limited catch in the small-type whaling industry.[249]
Estimated Annual Mortality	Incidental catches in Chinese fisheries reach several hundred per year.
	About 2 Risso's dolphins per year are reported killed in fishing gear in

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[245] Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

[246] The Japanese drive fishery off Iki Island and the Kii Peninsula takes several hundred bottlenose dolphins annually. Reported catches in Japanese drive fisheries of bottlenose dolphins were 230 in 1986; 1,813 in 1987; and 828 for 1988. Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

[247] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[248] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[249]Kruse S, Caldwell DK, Caldwell MC 1999. Risso's dolphin- *Grampus griseus* (G Cuvier, 1812) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp183-212

	Japan. From 1998 to 2002, Japan reported killing 442, 489, 506, 474, and 386 Risso's dolphins each year in directed hunts—one Risso's dolphin was incidentally take in 2001 and 2002.[250]
	From 1998 to 2003, Korea reported killing 7, 2, 20, 25, 2, and 2 Risso's dolphins each year in gillnets, set nets, trap nets and longline fisheries in the East Sea.[251]
Species	**Stenella longirostris Spinner dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	In Japan, spinner dolphins were killed in drive fisheries in Japan.[252]
Estimated Annual Mortality	Eleven dolphins were killed in Japanese gillnets in 1985--no spinner dolphins were reported caught between 1998 and 2003.[253]

Species	***Stenella coeruleoalba* Striped dolphin**	
Abundance Estimate[254]	Japanese Pacific coast	821,000
	20° and 30° N	7,000
	30° and 40° N	350,000
	Near-shore Japanese waters	2,300
Fisheries	The Japanese have both drive and hand-harpoon fisheries for striped dolphins at several locations that date back to 1868-1912.[255] Striped dolphins are caught in driftnets, (presumably the Japanese large mesh or squid driftnet fisheries), trap nets and other types of gear.	
Estimated Annual Mortality	From 1998 to 2002, Japan reported killing 449, 596, 300, 484, and 642 striped dolphins a year in directed hunts—no incidental mortality was reported.[256]	

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[250] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[251] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[252] Kruse S, Caldwell DK, Caldwell MC 1999. Risso's dolphin- *Grampus griseus* (G Cuvier, 1812) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp183-212

[253] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[254] Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

[255] The catches were voluntarily reduced beginning in 19812 and have since varied between 358 (in 1987) and 4,883 (1981), averaging 2,830 during the period 1981-89. Between 1989-1993, the average catch has dropped to 1,028. Scientists report that the Japanese multispecies dolphin fisheries now receive an annual quota of 725. Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages at 289.

[256] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

Species	***Stenella attenuata* Pantropical spotted dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	Spotted dolphins are caught in coastal gillnet and driftnet fisheries
Estimated Annual Mortality	From 1998 to 2002, Japan reported killing 460, 38, 39, 10, and 418 spotted dolphins a year in directed hunts—one incidental mortality was reported in 2002.[257] No other mortality estimates are available.

Species	***Delphinus delphis* Common dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	In Japan, common dolphins were caught in gillnet fisheries in Japan.
Estimated Annual Mortality	Common dolphins are reported killed by Japanese vessels at a rate of approximately 20 per year, mainly in gillnets (IWC 1986–90). Catches are known to occur at a higher rate than this in the squid driftnet fishery, so presumably not all are reported. No common dolphins were reported taken by Japan between 1998 and 2003.[258] From 1998 to 2003, Korea reported killing 17, 25, 29, 62, 76, and 113 common dolphins each year in gillnets, set nets, trap nets, driftnet, and purse seine fisheries in the East Sea.[259]

Species	***Lissodelphis borealis* Northern right whale dolphin.**
Abundance Estimate	North Pacific 400,000
Fisheries	In Japan and Russia, northern right whale dolphins are caught in purse-seine operations and in salmon drift-net operations.
Estimated Annual Mortality	In the 1980s, the estimated total bycatch for the Japanese, Taiwanese, and South Korean squid driftnet fishery was approximately 15,000-24,000 per year and this mortality is considered to have depleted the population to 24-73% of its pre-exploitation size.[260] In January 1993, a United Nations moratorium on these high seas

[257] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[258] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[259] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[260] Mangel M. 1993. Effects of high seas driftnet fisheries on the northern right whale dolphin *Lissodelphis borealis*. Ecol App 3: 221-229

[261] Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

[262] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

	driftnet fisheries went into effect.	
	The total reported bycatch of northern right whale dolphins by Japan in 1987 was 261 individuals.[261]	
	Reports of northern right whale dolphin accidental mortalities have increased since 1984, notably in gillnet fisheries, from 8 to 268 in 1988. About 2 more per year are reported caught in trapnet fisheries, but no northern right whale dolphins were reported bycaught between 1998 and 2003.[262]	
Species	***Phocoenoides dalli* Dall's porpoise**.[263]	
Abundance Estimate[264]	North Pacific and Bering Sea	1,186,000[265]
	Western North Pacific	141,800
	Off Japan (.50% truei-type)	104,000
	Sea of Okhotsk (all three stocks)	2,150
Fisheries	The Japanese have both drive and hand-harpoon fisheries for Dall's porpoise at several locations that date back to 1868-1912.[266] Dall's porpoise are caught in driftnets, (presumably the Japanese large mesh or squid driftnet fisheries), trap nets and other types of gear.	
Estimated Annual Mortality	Large numbers of Dall's porpoises were killed incidentally in salmon (north-western North Pacific and Bering Sea) and squid (central North Pacific and adjacent seas) driftnet fisheries, starting as long ago as the 1950s. Bycatches were in the thousands if not tens of thousands in the years prior to the United Nations ban on high-seas driftnet fishing came into effect at the end of 1992.[267]	
	In addition, a large-scale hand-harpoon hunt for Dall's porpoises has existed in Japanese waters for many decades.	
	During the 1980s, this hunt intensified reportedly to compensate for the shortage of whale meat (due to the IWC whaling moratorium) and the reduced catch of striped dolphins (due to depletion from over-exploitation; see above). Between 1986 and 1989, approximately 11,500	

263 Two subspecies are recognized based on geographical variation in color patterns. *Dalli*-type animals (*P. d. dalli*) predominate in most of the species' range, except in a limited area of the western Pacific (between approximately 35°N and 54°N) where *truei*-type animals (*P. d. truei*) are more common. As many as eleven stocks have been proposed, each centered on what are thought to be major calving grounds

264 Houck WJ, Jefferson TA 1999. Dall's porpoise—*Phocoenoides dalli* (True, 1885) In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp443-472

265 Buckland ST, Cattanach KL, Hobbs RC 1993. Abundance estimates of Pacific white-sided dolphin, northern right whale dolphin, Dall's porpoise and northern fur seal in the North Pacific, 1987-1990. Int North Pacific Fish Comm Bull 53: 387-407.

266 The catches were voluntarily reduced beginning in 19812 and have since varied between 358 (in 1987) and 4,883 (1981), averaging 2,830 during the period 1981-89. Between 1989-1993, the average catch has dropped to 1,028. Scientists report that the Japanese multispecies dolphin fisheries now receive an annual quota of 725. Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages at 289.

267 IWC. 1992. Report of the scientific committee. *Report of the International Whaling Commission* 42, 51–270.

Dall's porpoises were removed each year by hunting from two stocks centered in the Okhotsk Sea.[268] In 1989, the Japanese government established regulations for the hand-harpoon hunt, as a result reported catch levels decreased to fewer than 11,500 in 1992.[269] Thereafter, the quota was increased to 17,700 per year, and the reported catch reached above 18,000 in 1997.[270] The IWC has expressed concerns that this level may not be sustainable by populations in the western Pacific and adjacent seas.

Large numbers of Dall's porpoises die in driftnets within national waters of Japan and Russia, where the UN ban on driftnets does not apply. For the period 1993 to 1999, the estimated bycatch in the Japanese salmon driftnet fishery operating in the Russian EEZ totaled close to 12,000 and ranged from 643–3149 on an annual basis.[271]

The Bering Sea population is estimated to have been reduced to somewhere between 78% and 94% of its pre-exploitation size, and the Western Pacific population to between 66% and 91% of its original size. In 1994, the IWC estimated that 741-4,187 animals were killed each year in the Western North Pacific.[272]

From 1998 to 2002, Japan reported killing 11,385, 14,807, 16,171, 16,650, and 15,949 Dall's porpoise a year in directed hunts, two and 169 incidental deaths were reported in 1998 and 1999 respectively. [273]

In 2001 and 2002, Korea reported killing 2 and 1 Dall's porpoise respectively in gillnets, set net, and driftnet fisheries in the East Sea.[274]

Species	***Phocoena phocoena* Harbor porpoise.**
Abundance Estimate	No Abundance Estimate
Fisheries	In Japan and Russia, harbor porpoises are caught in trap and gillnet fisheries.
Estimated Annual Mortality	Harbor porpoises are reported killed in Japanese trap net fisheries, at a rate of approximately 20–30 per year, and in 1988, 71 were also reported bycaught in gillnets.

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[268] A total of 10,534 Dall's porpoise were taken in 1986, 13,406 in 1987, and 39,000 in 1988 from a population of approximately 105,000. IWC. 1991. Report of the scientific committee. *Report of the International Whaling Commission* 41, 51–219.

[269] IWC. 1994. Report of the scientific committee. *Report of the International Whaling Commission* 44, 41–201.

[270] IWC. 1999. Planning workshop to develop a research program to investigate pollutant cause-effect relationships in cetaceans – "Pollution 2000+." *Journal of Cetacean Research and Management* (Special Issue) 1, 55–72.

[271] IWC. 2002c. Report of the standing sub-committee on small cetaceans. *Journal of Cetacean Research and Management* 4 (Supplement), 325–338.

[272] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 25

[273] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[274] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

	Harbor porpoises are also caught in the salmon driftnet fishery at a much lower rate than Dall's porpoise, possibly in the tens of animals per year. One harbor porpoise was incidentally killed in 2001 and 2 were incidentally killed in 2002.[275]	
Species	***Neophocaena phocaenoides* Finless porpoise**	
Abundance Estimate[276]	Yangtze	2,700
	Inland Sea of Japan	4,900/1.7%
	Ariake/Tachibana Bay	3,100
	Omura Bay	200
Fisheries	The Japanese hunted finless porpoises in the East China Sea. The species is sold for human consumption in Korea.[277] Finless porpoises are entangled in a variety of nets in Japan.	
Estimated Annual Mortality	From 1985 to 1992, 114 finless porpoises were incidentally killed off the coast of western and north-eastern Kyushu, including part of the western inland sea of Japan: 84 were incidentally killed by fisheries—bottom gillnets killed 58; surface gillnets killed 17; trap nets killed 7; trawl nets killed 1 and drifting ghost nets killed 1.[278] Finless porpoises were incidentally captured most frequently in the coastal waters of China—totaling about 2,132 individuals in trawl, gillnet, and stow nets.[279] In 1994, the IWC estimated that 10-20 animals were killed each year in the Yangtze. [280] From 1998 to 2002, 6, 1, 20, 8, and 8 finless porpoises were incidentally taken in Japanese fisheries.[281] From 1998, 1999, 2001 to 2003, Korea reported killing 2, 14, 7, 14, and 82 finless porpoises in gillnets and set net fisheries the East, South, and	

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[275] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[276] Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

[277] Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages at 289.

[278] Kasuy T. 1999. Finless porpoise--*Neophocaena phocoenoides* (G Cuvier, 1829). In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol. 6: The second book of dolphins and porpoises, pp411-442

[279] Yang G. Zhou K, Xu X, Leatherwood S. 1999. A survey on the incidental catches of small cetaceans in coastal waters of China. Yingyong Shengtai Xuebao 10: 713-716

[280] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 25

[281] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[282] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

Yellow Sea.[282]

Species	***Lipotes vexillifer* Baiji**	
Abundance Estimate[283]	Yangtze	13-100 with the annual rate of population decline at 10%
Fisheries	Baiji are incidentally killed in longline fisheries—electric fishing	
Estimated Annual Mortality	45.5% of known Baiji deaths have been caused by accidental catches on longlines which are intensively used in the winter throughout much of the Baiji's range. Interactions with fisheries appear to be a major threat to the survival of this species.	

AREA 67 NORTHEAST PACIFIC

The Northeast Pacific includes cetaceans within the US EEZ, since the focus of this report is international bycatch, and the assessment and mitigation of bycatch in the United States is governed under the MMPA, the description for this area will focus only on international bycatch of shared cetacean stocks.

Species	***Eschrichtius robustus* Gray whale.**	
Abundance Estimate	Eastern North Pacific Stock	18,813 (CV = 0.07)[284]
Fisheries	Gray whales are caught in purse seine, gillnets, and pot fisheries.	
Estimated Annual Mortality	From 1999 to 2003, the mean annual mortality of gray whales in AK salmon purse seines, pot fisheries, CA white seabass gillnet fishery was >0.5, >1.2, and >0.2 animals respectively.[285] During that same period more than 3.6 gray whales died each year in unknown gillnet fisheries.[286] Since there are no Canadian observer programs, few data concerning the mortality of gray whales incidental to Canadian commercial fisheries are available. Data regarding the level of gray whale mortality related to commercial fisheries in Canadian waters, though thought to be small, are not readily available or reliable which results in an underestimate of the annual mortality for this stock. The estimated minimum annual mortality rate incidental to US commercial fisheries is 6.7 animals.[287]	

Species	***Balaenoptera acutorostrata* Minke whale.**	
Abundance Estimate	Alaska Stock	No Available Estimate

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283 Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

284 Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 153

285 Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 171,172

286 Id.

287 Id.

Fisheries	Fisheries include purse seine, gillnets, and pot fisheries
Estimated Annual Mortality	In 1989, one minke whale mortality (extrapolated to 2 mortalities) was observed in the Bering Sea/Gulf of Alaska joint-venture groundfish trawl fishery, the predecessor to the current Alaska groundfish trawl fishery. The Bering Sea/Aleutian Islands groundfish trawl fishery incurred one mortality of a minke whale in 2000; this extrapolates to an estimated 2 minke whale mortalities for that year. The total estimated mortality and serious injury incurred by this stock as a result of interactions with commercial fisheries is 0.32 (CV = 0.61).[288] Since there are no Canadian observer programs, few data concerning the mortality of minke whales incidental to Canadian commercial fisheries are available.

Species	***Megaptera novaeangliae* Humpback whale.**	
Abundance Estimate	Western North Pacific	394 (CV = 0.08)[289]
	Central North Pacific	4,004 (CV = 0.095)[290]
	CNP—Southeast Alaska	961 (CV = 0.12)

Fisheries	Humpback whales are caught in purse seines, trawl, gillnet, and pot fisheries. Between 2000 and 2004, there were incidental serious injuries and mortalities of Western North Pacific humpback whales in Bering Sea/Aleutian Islands Pollock trawl and Bering Sea/Aleutian Islands sablefish pot fisheries. In the Central North Pacific, in 1994, the incidental entanglment of a humpback whale was reported in the Southeast Alaska salmon purse seine fishery. Another humpback whale is known to have been incidentally entangled in this fishery in 1989. In 1996, a humpback whale was reported entangled and trailing gear as a result of interacting with the Southeast Alaska drift gillnet fishery. This whale is presumed to have died. Together, these two mortalities result in an annual mortality rate of 0.4 (0.2 + 0.2) humpback whales based on self-reported fisheries information.
Estimated Annual Mortality	There were 33 reports of human-related mortalities or injuries to humpback whales from the Central North Pacific stock from 2001 to 2005. Of these, there were 24 incidents which involved commercial fishing gear, and 13 of those incidents involved serious injuries or mortalities. This estimate is considered a minimum because not all entangled animals strand and not all stranded animals are found, reported, or cause of death determined.[291] Average annual mortality from

288 Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 206

289 Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 178

290 Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 187

291 Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 189

	observed fisheries was 0.20 humpbacks from the Western North Pacific stock.[292]	
	The estimated fishery-related minimum mortality and serious injury rate incidental to US commercial fisheries for the northern portion of the stock is 2.0 humpback whales per year, based on observer data from Alaska (0.20), stranding records from Alaska (1.8) The estimated minimum mortality and serious injury rate incidental to the commercial fisheries in Southeast Alaska is 1.0 humpback whales per year, based on stranding records from Alaska (1.0).[293]	
Species	***Delphinapterus leucas* White whale.**	
Abundance Estimate[294]	Beaufort Sea Stock	39,258 (CV = 0.229)
	Eastern Chuckchi Sea Stock	3,710
	Eastern Bering Sea Stock	18,142 (CV = 0.24)
	Bristol Bay Stock	1,888 (CV = .20)
	Cook Inlet Stock	357 (CV = 0.107)
Fisheries	Fisher self-reports in the Bristol Bay salmon set gillnet and drift gillnet fisheries, from 1990 to 2000, recorded 1 mortality in both 1990 and 1991 from these fisheries. Larger fishery-related mortalities resulting from these fisheries have been recorded in the past. During the summer of 1983 the Alaska Department of Fish and Game documented 12 beluga whale mortalities in Bristol Bay related to drift and set gillnet fishing.[295]	
Estimated Annual Mortality	No Estimates Available for Beaufort Sea Stock, Eastern Chuckchi Sea Stock, Eastern Bering Sea Stock, Cook Inlet Stock	
Species	***Orcinus orca* Killer whale.**	
Abundance Estimate[296]	Alaska Resident stock (includes Southeast AK, Prince William Sound, & Western AK)	1,123
	Eastern North Pacific Northern Resident Stock	216

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[292] Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 180 Note, however, that the stock identification is uncertain and the mortality may have involved a whale from the central North Pacific stock f humpback whales. Thus, this mortality is assigned to both the central and western stocks.

[293] Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p at 194

[294] Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 6

[295] Frost, K. J., L. F. Lowry, and R. R. Nelson. 1984. Belukha whale studies in Bristol Bay, Alaska. Pp. 187-200 *In* Proceedings of the workshop on biological interactions among marine mammals and commercial fisheries in the Southeastern Bering Sea. Oct. 18-21, 1983, Anchorage AK. Alaska Sea Grant Rep. 84-1.

[296] Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 6

	Gulf of Alaska, Aleutian Islands and Bering Sea Transient Stock	314
	West Coast Transient Stock	314
Fisheries	Although only small numbers of killer whales are caught in Bering Sea fisheries and there are no observed mortalities or serious injuries in the Gulf of Alaska, there are other interactions between the whales and the fisheries. Interactions between killer whales and longline vessels have been well documented.[297] Data collected from the Japan/U. S. cooperative longline research surveys operating in the Bering Sea indicate that interactions may be increasing and expanding into the Aleutian Islands region.[298] Since 1990, there have been no reported fishery-related standings of killer whales in Canadian waters and there are not reliable estimates of mortality in Canadian fisheries.	
Estimated Annual Mortality	The mean annual (total) mortality rate for all US fisheries for 1999-03 was 2.5 (CV = 0.37). The estimated minimum mortality rate incidental to the Bering Sea-Aleutian Islands (BSAI) flatfish trawl, BSAI Pollock trawl, BSAI Greenland turbot longline, and the BSAI Pacific cod longline is 2.3 animals per year, based exclusively on observer data.[299] The mean annual mortality rate incidental to U.S. commercial fisheries for the west coast transient stock is zero.[300]	

Species	***Lagenorhynchus obliquidens* Pacific white-sided dolphin.**	
Abundance Estimate	Central North Pacific	26,880[301]
Fisheries	White-sided dolphins are caught in gillnet fisheries, longlines and trawls	
Estimated Annual Mortality	Between 1978 and 1991, thousands of Pacific white-sided dolphins were incidentally killed each year in high seas fisheries. Pacific white-sided	

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297 Dahlheim, M. E. 1988. Killer whale (*Orcinus orca*) depredation on longline catches of sablefish (*Anoplopoma fimbria*) in Alaskan waters. NWAFC Processed Report 88-14, 31 pp. (available upon request -Alaska Fisheries Science Center, 7600 Sand Point Way NE, Seattle, WA 98115). See also Yano, K., and M. E. Dahlheim. 1995. Killer whale, *Orcinus orca*, depredation on longline catches of bottomfish in the southeastern Bering Sea and adjacent waters. Fish. Bull., U.S. 93:355-372.

298 Yano, K., and M. E. Dahlheim. 1995. Killer whale, *Orcinus orca*, depredation on longline catches of bottomfish in the southeastern Bering Sea and adjacent waters. Fish. Bull., U.S. 93:355-372. Killer whale predation on sablefish catch has been fairly consistent since 1988, and has occurred mainly east of 170° W in the eastern Bering Sea, and to a lesser extent in the northeast Aleutians. Sigler, M.F., C. R. Lunsford, J. T. Fujioka, and S. A. Lowe. 2002. Alaska Sablefish Assessment for 2003. In: Stock Assessment and Fishery Evaluation Report for the Groundfish Fisheries of the Bering Sea/Aleutian Islands Regions. North Pac. Fish. Mgmt. Council, Anchorage, AK, Section 5:229-294.

299 Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 91 As the animals which were taken incidental to commercial fisheries have not been identified genetically, it is not possible to determine whether they belonged to the Eastern North Pacific Alaska Resident or the Gulf of Alaska, Aleutian Islands, and Bering Sea Transient killer whale stock. Accordingly, these same mortalities are also reported for the Gulf of Alaska, Aleutian Islands, and Bering Sea Transient stock.

300 Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 113

301 Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 117

302 Note that no observers have been assigned to several of the gillnet fisheries that are known to interact with this

dolphins were frequently caught in the high seas squid driftnet fishery. Results from the 1989 Joint Observer Program indicated an observed catch rate on a sample of vessels which, if extrapolated, suggest a total catch of approximately 10,000 animals or more. The impact of this level of catch on the population is unknown. However, these fisheries have not operated in the central North Pacific since 1991.

There were no serious injuries or mortalities incidental to observed U.S. commercial fisheries from 2000-04.[302]

Species	***Phocoenoides dalli* Dall's porpoise.**	
Abundance Estimate	Central North Pacific	83,400 (CV = 0.1)[303]
Fisheries	Dall's porpoise were taken from gillnet fisheries, longlines and trawls	
Estimated Annual Mortality	From 1997-2001, the mean annual (total) mortality of Dall's porpoise was 5.4 (CV = 0.18) for the Bering Sea groundfish trawl fishery, 0.3 (CV = 0.61) for the Gulf of Alaska groundfish trawl fishery, and 0.2 (CV = N/A) for the Bering Sea groundfish longline fishery. In 1990, in the Alaska Peninsula and Aleutian Island salmon driftnet fishery, one Dall's porpoise mortality was observed which extrapolated to an annual (total) incidental mortality of 28 Dall's porpoise. Combining the estimates from the Bering Sea and Gulf of Alaska fisheries presented above (5.4 + 0.3 + 0.2 =5.9) with the estimate from the Alaska Peninsula and Aleutian Island salmon drift gillnet fishery (28) results in an estimated annual incidental kill of 33.9 porpoise per year from the Alaska stock.[304]	

Large numbers of Dall's porpoises were killed incidentally in salmon (north-western North Pacific and Bering Sea) and squid (central North Pacific and adjacent seas) driftnet fisheries, starting as long ago as the 1950s. Bycatches were in the thousands if not tens of thousands in some years before the United Nations ban on high-seas driftnet fishing came into effect at the end of 1992.[305]

Species	***Phocoena phocoena* Harbour porpoise.**	
Abundance Estimate	Southeast Alaska	17,076 (CV = 0.265)[306]
	Gulf of Alaska	41,854 (CV=0.224)[307]

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stock, making the estimated mortality unreliable.

[303] Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 135

[304] Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 136

[305] IWC. 1992. Report of the scientific committee. *Report of the International Whaling Commission* **42**, 51–270. at 212, 213.

[306] Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 137

[307] Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 141

	Bering Sea	66,078 (CV = 0.232)[308]
Fisheries	Harbor porpoise have been caught in gillnet fisheries	
Estimated Annual Mortality	During the period between 1990 and 1998, fisher self-reports from the Southeast Alaska salmon drift gillnet fishery resulted in an annual mean of 3.25 mortalities from interactions with commercial fishing gear. No mortalities from the Southeast Alaska stock of harbor porpoise incidental to commercial groundfish fisheries have been observed. Observers also monitored the Prince William Sound salmon drift gillnet fishery in 1990 and 1991, recording 1 mortality in 1990 and 3 mortalities in 1991. These mortalities extrapolated to 8 (95% CI 1-23) and 32 (95% CI 3-103) kills for the entire fishery, resulting in a mean kill of 20 (CV = 0.60) animals per year for 1990 and 1991. Logbook reports from Prince William Sound salmon drift gillnet fishery detail 6, 5, 6, and 1harbor porpoise mortalities in 1990, 1991, 1992, and 1993, respectively. The extrapolated (estimated) observer mortality accounts for these mortalities. In 1999 and 2000, observers were placed on the Cook Inlet salmon set and drift gillnet vessels, one harbor porpoise mortality was observed in 2000--the mortality extrapolates to an estimated mortality level of 31.2 for that year, and an average of 15.6 per year when averaged over the two years of observer data.[309] In 2002, observers were placed on Kodiak Island set gillnet vessels. Two harbor porpoise mortalities were observed in this fishery. These mortalities extrapolate to an estimated mortality of 32.2 animals per year. Therefore, the estimated minimum annual mortality incidental to commercial fisheries is 68.[310] One harbor porpoise mortality was observed in 2001 in the Bering Sea/Aleutian Islands flatfish trawl. The mean annual (total) mortality resulting from observed mortalities was 0.35 (CV = 0.65).[311] During the period from 1981 to 1987, 7 harbor porpoise mortalities have resulted from gillnet entanglement in the area from Nome to Unalakleet, 3 were reported near Kotzebue from 1989 to 1990, and some take of harbor porpoise is likely in the Bristol Bay gillnet fisheries (Barlow et al. 1994). A similar set gillnet fishery conducted by subsistence fishers incidentally took 6 harbor porpoise in 1991 near Point Barrow, Alaska. When averaged over the period from 1981 to 1990, the resulting annual mortality attributable to subsistence gillnets is 1.4 porpoise ((7 + 3 + 6)/11 = 1.4).[312]	

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308 Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 146

309Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 142

310 Id.

311 Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 142

312 Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 132

AREA 71 WESTERN CENTRAL PACIFIC

Species	***Sousa chinensis* Indopacific humpback dolphin**	
Abundance Estimate	Moreton Bay, Brisbane Aus	119-163
	Central Section Great Barrier Reef	200
Fisheries	Humpback dolphins are incidentally captured in inshore gillnets set across rivers and estuaries to catch barramundi and other fish; the are also captured in offshore driftnet fisheries.	
Estimated Annual Mortality	Shark nets killed 18 humpback dolphins between 1968 and 2001, 11 of which were from nets at Townsville and Cairns [313]	
	One animal was reported in a Taiwanese driftnet fishery for Spanish mackerel, tunas and sharks operating off northern Australia between 1974 and 1986.[314]	
	The IWC, in 1994, estimated that more than 100 humpback dolphins are killed in this area.[315]	

Species	***Pseudorca crassidens* False killer whale**	
Abundance Estimate	No Abundance Estimate	
Fisheries	False killer whales are incidentally captured in Taiwanese pelagic gillnet fisheries in Australian territorial waters off northern Australia; Current threats include culling to protect finfish fisheries off western Japan. False killer whales are also incidentally captured in tuna purse-seine and other net and long-line fisheries elsewhere in Pacific Ocean including possible entanglement in driftnets lost or discarded in international waters.	
Estimated Annual Mortality	A single animal was reported in the Taiwanese driftnet fishery off Northern Australia.[316]	
	The IWC, in 1994, estimated that more than 11 false killer whales are incidentally killed in this area.[317]	

Species	***Tursiops aduncus* Bottlenose dolphin**

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313 Parra, G.J., Corkeron, P.J. and Marsh, H. (2002). The Indo-Pacific Indo-Pacific Humpbacked dolphin, *Sousa chinensis* (Osbeck, 1765) in Australian waters: a summary of current knowledge and recommendations for their conservation. 54th Annual Meeting of the International Whaling Commission, Shimonoseki, Japan, May 2002, SC/54/SM27.

314 Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the* International Whaling Commission. 37: 363-367.

315 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

316 Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the* International Whaling Commission. 37: 363-367.

317 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

Abundance Estimate[318]	Moreton Bay, Brisbane Aus	334
	inshore waters off North Stradbroke Is	321
	open coastal waters off North Stradbroke Is.	700-1000
Fisheries	Bottlenose dolphins are incidentally captured, (possibly substantial) in the Taiwanese gillnet fishery and shark nets to protect bathers. Bottlenose dolphins are also caught in driftnet fisheries in Malabuhan, Siaton, and Negros Island.	
Estimated Annual Mortality	From 1974 to 1986, the Taiwanese gillnet fishery in the Arafura Sea and Timor Seas, northern Australia, incidentally caught an estimated 8400 *T. aduncus,* which comprised 60% of the total dolphin bycatch.[319] The annual mortality perhaps exceeded 2000 animals—severely impacting local populations. As a result the fishery was closed in 1986.	
	The IWC, in 1994, estimated that more than 1700 bottlenose dolphins are incidentally killed in this area.[320]	

Species	***Stenella longirostris* Spinner dolphin**	
Abundance Estimate[321]	Southern part of the Sulu Sea northeastern Malaysian waters	4,000
	Eastern Sulu Sea	30,000
Fisheries	Spinner dolphins are incidentally caught in gillnet fisheries, purse seine fisheries and driftnet fisheries in Malabuhan, Siaton, and Negros Island, and shark nets in Queensland. A small cetacean fishery kills some spinner Dolphins in the Solomon Islands, and they are incidentally killed in Thailand by shrimp trawls.[322]	
Estimated Annual Mortality	Commercial and municipal purse seine fisheries based in the Philippines annually caught an estimated 1,500-2,000 and 2,000 to 3,000 dolphins respectively, including spinner dolphins.[323]	
	Spinner dolphins comprised 35% of the identified cetaceans in the catch of the Taiwanese driftnet fishery in Northern Australian waters, suggesting a total mortality of at least 4900 spinner dolphins over 54	

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318 Ross, GJB. 2006 Review of the conservation status of Australia' smaller whales and dolphins. Australian Government http://www.deh.gov.au/coasts/publications/pubs/conservation-smaller-whales-dolphins.pdf

319 Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the* International Whaling Commission. 37: 363-367.

320 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

321 Dolar ML 1999. Abundance, distribution and feeding ecology of small cetacean in the Eastern Sulu Sea and Tanon Strait, Philippines. PhD Thesis, U of Cal, San Diego, USA

322 Bannister, J.L., Kemper, C.M. and Warneke, R.M. (1996). *The Action Plan for Australian Cetaceans*. Australian Nature Conservation Agency: Canberra vii 242 pp.

323 Dolar, M.L.L. 1994. Incidental takes of small cetaceans in fisheries in Palawan, central Visayas and northern Mindanao in the Philippines. *Report of the International Whaling Commission* (Special Issue) **15**, 355–363.

324 Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the* International Whaling Commission. 37: 363-367.

325 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

	months between 1974 and 1986.[324] Total annual mortality for spinner dolphins numbered around 1000 and 20 dolphins in the purse seine and driftnet fisheries respectively. The IWC, in 1994, estimated that more than 1000 spinner dolphins are incidentally killed in this area.[325]
Species	***Stenella attenuata* Pantropical spotted dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	Spotted dolphins are incidentally captured in northern Australian fisheries; in Taiwanese gillnet fisheries, purse–seine fisheries in the Philippines, and in nets set to capture sharks for the protection of bathers.
Estimated Annual Mortality	From 1974 to 1986, the Taiwanese gillnet fishery in the Arafura Sea and Timor Sea, operating within (northern)Australia's Economic Exclusion Zone (EEZ), incidentally killed an estimated 560 *S. attenuate,* which comprised 4% of the total dolphin bycatch from that gillnet fishery.[326] Directed fisheries and incidental catch kill large numbers of spotted dolphin in the Philippines, where they used for human consumption. Spotted dolphins were caught in purse seine fisheries and a smaller driftnet fishery (for clupeids and needlefish) in the Visayan Sea in the Philippines. Total annual spotted dolphins mortality was <1000 animals in these three fisheries.[327] Spotted dolphins are caught in inshore shark nets in low numbers in Qld and NSW. There is also a drive fishery which operates in the Solomon Is. where Pantropical dolphins are the preferred catch. The IWC, in 1994, estimated that more than 130 spotted dolphins are incidentally or directly killed in this area.[328]
Species	***Lagenodelphis hosei* Fraser's dolphin.**
	Eastern Sulu Sea 8,700
Fisheries	Fraser's dolphins are caught in two purse seine fisheries and a small driftnet fishery in the Visayan Sea in the Philippines.
Estimated Annual Mortality	Fraser's dolphins are incidentally captured in gillnet fisheries in the Philippines (second most frequently caught species there); they are also killed in harpoon fisheries in Indonesia and Taiwan They may also be incidentally and illegally captured within Australian

[326] Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the* International Whaling Commission. 37: 363-367.

[327] Dolar, M.L.L. 1994. Incidental takes of small cetaceans in fisheries in Palawan, central Visayas and northern Mindanao in the Philippines. *Report of the International Whaling Commission* (Special Issue) 15, 355–363

[328] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 27

[329] Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the* International Whaling Commission. 37: 363-367.

	waters in northern Australia and entangled in driftnets set outside Australian Territorial Waters.[329]	
Species	***Orcaella brevirostris* Irrawaddy (snubfin) dolphin**	
Abundance Estimate	No Total Abundance Estimate	
	Mahakam River, Indonesia	34-50[330]
	Semayang Lake	100-150[331]
	Malampaya Sound in Palawan, Philippines	77[332]
	North Queensland, Australia	38-46[333]
	Gulf of Carpentaria (Blue Mud Bay)	1,000[334]
	Mekong River	69
Fisheries	Irrawaddy dolphins are incidentally captured in northern Australian fisheries, in barramundi nets, for which little data on take is available, and in nets set to capture sharks for the protection of bathers.	
Estimated Annual Mortality	From 1997-1999 an average of three dolphins died per year from gillnet entanglements, representing between 6 and 8.8 percent of the population.[335]	
	In the Mekong River from 2001-2003, an average of four deaths per year were attributed to gillnet entanglement representing 5.8% of a population estimated to number only 69 individuals.[336]	
	In Songkhla Lake, from 1990-2003, at least 15 Irrawaddy dolphins were killed accidentally in gillnets from a population that may number as few as 8-15 individuals.[337]	

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330 Kreb, D. 2002. Density and abundance estimates of the Irrawaddy dolphin, *Orcaella brevirostris*, in the Mahakam River of East Kalimantan, Indonesia: a comparison of survey techniques. *Raffles Bulletin of Zoology*, Supplement, 85–95.

331 Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

332 Dolar, M.L.L., Perrin, W.F., Gaudiano, J.P., Yaptinchay, A.A.S.P., and Tan, J.M.L. 2002. Preliminary report on a small estuarine population of Irrawaddy dolphins *Orcaella brevirostris* in the Philippines. *Raffles Bulletin of Zoology,* Supplement, 155–160.

333 Freeland WJ, Bayliss P. 1989. The Irrawaddy River dolphin (*Orcaella brevirostris*) in coastal waters of the Northern Territory, Australia: Distribution, abundance and seasonal changes. Mammalia 53: 49-58

334 Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

335 Kreb, D. 2002. Density and abundance estimates of the Irrawaddy dolphin, *Orcaella brevirostris*, in the Mahakam River of East Kalimantan, Indonesia: a comparison of survey techniques. *Raffles Bulletin of Zoology*, Supplement, 85–95.

336 Beasley, I., Chooruk, S., and Piwpong, N. 2002. The status of the Irrawaddy dolphin, *Orcaella brevirostris*, in Songkhla Lake, southern Thailand, Raffles Bulletin of Zoology, Supplement 10: 75-83.

337 Beasley, I., Chooruk, S., and Piwpong, N. 2002. The status of the Irrawaddy dolphin, *Orcaella brevirostris*, in Songkhla Lake, southern Thailand, Raffles Bulletin of Zoology, Supplement 10: 75-83.

338 Harwood, M. B. and Hembree, E.D. (1987). Incidental catch of small cetaceans in the offshore gillnet fishery in northern Australian waters: 1981-1985. *Report of the* International Whaling Commission. 37: 363-367.

Two dolphins were caught by the Taiwanese net fishery in the early 1980s.[338]

AREA 77 EASTERN CENTRAL PACIFIC

The Eastern Central Pacific includes cetaceans within the US EEZ, since the focus of this report is international bycatch, and the assessment and mitigation of bycatch in the United States is governed under the MMPA, the description for this area will focus only on international bycatch of shared cetacean stocks.

Species	***Eschrichtius robustus* Grey whale.**	
Abundance Estimate	Eastern North Pacific Stock	18,813 (CV = 0.07)[339]
Fisheries	Gray whales are incidentally caught in purse seine, gillnets, and pot fisheries.	
Estimated Annual Mortality	From 1999 to 2003, the mean annual mortality of gray whales in AK salmon purse seines, pot fisheries, CA white seabass gillnet fishery was >0.5, >1.2, and >0.2 animals respectively.[340] During that same period more than 3.6 gray whales died annually in unknown gillnet fisheries.[341] Since there are no Mexican observer programs, few data concerning the mortality of gray whales incidental to Mexican commercial fisheries are available. Data regarding the level of gray whale mortality related to commercial fisheries in Mexican waters is thought to be small. The estimated minimum annual mortality incidental to US commercial fisheries is 6.7 animals.[342]	

Species	***Megaptera novaeangliae* Humpback whales**	
Abundance Estimate	Eastern North Pacific Stock	1,391 (CV = 0.22)[343]
Fisheries	Humpback whales are incidentally caught in purse seine, gillnet, and pot fisheries.	
Estimated Annual Mortality	Numbers killed in international shark and swordfish driftnet fisheries are unknown, but, in view of the size of the population in this area (1000+ animals), any increase in driftnetting could cause a problem.	

Species	***Pseudorca crassidens* False killer whale.**

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339 Angliss, R. P., and R. B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 153

340 Angliss, R. P., and R. B. Outlaw. 2006. Alaska marine mammal stock assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-161, 250 p. at 171,172

341 Id.

342 Id.

343 Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 167

Abundance Estimate	Hawaiian Stock	236 (CV = 1.13)[344]
	Eastern Tropical Pacific	47,921 (CV = 0.29)[345]
Fisheries	False killer whales are captured in longlines and troll fisheries.	
Estimated Annual Mortality	Average 5-yr estimates of annual mortality and serious injury for 2000-2004 are 6.8 (CV = 0.36) false killer whales outside of U.S. EEZs, 4.2 (CV = 0.43) within the Hawaiian Islands EEZ, and 1.8 (CV = 0.53) within the EEZ of Palmyra Atoll.[346]	
	Total estimated annual mortality and serious injury for all U.S. EEZs combined averaged 6.0 (CV = 0.35) between 2000 and 2004.[347]	
	No estimates of mortality are available for international fisheries. This mortality may not be sustainable.	

Species	***Steno bredanensis* Rough-toothed dolphin.**	
Abundance Estimate	Hawaiian Stock	19,904 (CV = 0.52)[348]
	Eastern Tropical Pacific	47,921 (CV = 0.29)[349]
Fisheries	Rough-toothed dolphins are captured in gillnet fisheries, purse seine fisheries, longlines, and trawls.	
Estimated Annual Mortality	Rough-toothed dolphins are taken in small number in the tuna purse seine fishery—21 were estimated killed during the period 1970-75 and 36 died in a single net haul in 1982. However, in recent years the mortality has been significantly less, in 1998, 1999, and 2001 there was no mortality and in 2000 and 2002, 27 and 5 rough-tooted dolphins died in the ETP purse-seine fishery.[350]	

Species	***Globicephala macrorhynchus* Short-finned pilot whale.**	
Abundance Estimate	California/Oregon/Washington Stock	304 (CV = 1.02)[351]

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[344] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 228

[345] Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

[346] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 229

[347] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 229

[348] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 196

[349] Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

[350] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[351] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 135

	Hawaiian Stock	8,846 (CV = 0.49)
	Eastern Tropical Pacific	160,000
Fisheries	Pilot whales are caught in gillnet fisheries, purse seine fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture Pilot whales.	
Estimated Annual Mortality	The average 5-yr estimates of annual mortality and serious injury for 2000-2004 are 3.6 (CV = 0.69) short-finned pilot whales outside of the U.S. EEZs, and 0.6 (CV = 1.00) within the U.S. EEZ of Johnston Atoll.[352]	
	Pilot whales are also caught in small numbers in the tuna purse seine fishery, one was captured in 2000 and 2002.[353]	
	No estimates of mortality are available for international fleets	
Species	***Grampus griseus* Risso's dolphin.**	
Abundance Estimate	California/Oregon/Washington Stock	16,066 (CV = 0.28)[354]
	Hawaiian Stock	2,351 (CV = 0.65)[355]
	Eastern Tropical Pacific	76,595 (CV = 0.21)[356]
Fisheries	Risso's dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture Risso's dolphins	
Estimated Annual Mortality	Rarely entangled in the tuna purse seine fishery in the eastern tropical Pacific. The last reported mortality in the tuna purse seine fishery was of 3 Risso's dolphins in 1999.[357]	
	Average 5-yr estimates of annual mortality and serious injury for 1998-2002 in the Hawaiian-based longline fleet are 8.2 (CV = 0.66) Risso's dolphins outside of U.S. EEZs, and none within the Hawaiian Islands EEZ.[358] No estimates of mortality are available for other international longline fleets.	

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352 Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p.

353 IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

354 Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 91

355 Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 199

356 Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

357 IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

358 Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 200

Species	***Lagenorhynchus obliquidens* Pacific white-sided dolphin.**	
Abundance Estimate	California/Oregon/Washington Stock	59,274 (CV = 0.50)[359]
	North Pacific	931,000[360]
Fisheries	Pacific white-sided dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture Pacific white-sided dolphins	
Estimated Annual Mortality	Pacific white-side dolphins are rarely capture in the tuna purse seine fishery in the eastern tropical Pacific because most of the fishing takes place south of the range of these dolphins; there have been no reported entanglements in this fishery from 1999 though 2003.[361] No other estimates of mortality are available.	

Species	***Lagenodelphis hosei* Fraser's dolphin.**	
Abundance Estimate	Hawaiian Stock	16,836 (CV = 1.11)[362]
	Eastern Tropical Pacific	289,500 [363]
Fisheries	Fraser's dolphins are captured in gillnet fisheries, purse seine fisheries, longlines pot fisheries, and trawls.	
Estimated Annual Mortality	Fraser's dolphins are captured in small number in the tuna purse seine fishery; however, from 1999 to 2003 there have been no reported entanglements in this fishery.[364] In 2005, one dolphin was captured;[365] but no other estimates of mortality are available.	

Species	***Tursiops truncatus* Bottlenose dolphin**	
Abundance Estimates	Eastern Tropical Pacific	277,568 (CV = 0.25)[366]

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[359] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 87

[360] Buckland ST, Cattanach KL, Hobbs RC 1993. Abundance estimates of Pacific white-sided dolphin, northern right whale dolphin, Dall's porpoise and northern fur seal in the North Pacific, 1987-1990. Int North Pacific Fish Comm Bull 53: 387-407.

[361] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[362] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 219

[363] Gerrodette, T, Wade, PR. 1991. Monitoring Trends in Dolphin Abundance in the Eastern Tropical Pacific Analysis of 1989 data. (IWC SC/42/SM-42). Rep Int Whal Comm 41:511-515

[364] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[365] Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

[366] Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

	Hawaiian Stock	3,263 (CV = 0.60)[367]
Fisheries	Bottlenose dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture bottlenose dolphins.	
Estimated Annual Mortality	Bottlenose dolphins are rarely caught in the tuna purse seine fishery in the eastern tropical Pacific. From 1998 to 2003 there were 29, 9, 4, 1, 10, and 4 deaths of bottlenose dolphins in this fishery.[368] In 2005, 7 bottlenose dolphins were incidentally killed in the tuna purse seine fishery.[369]	
	Average 5-yr estimates of annual mortality and serious injury for 1998-2002 in the Hawaiian-based longline fleet are 5.8 (CV = 1.00) bottlenose dolphins outside of U.S. EEZs, and none within U.S. EEZs.[370] No other estimates of mortality are available.	

Species	***Stenella longirostris* Spinner dolphin.**		
Abundance Estimate	Hawaiian Stock	2,805 (CV = 0.66)[371]	2005 Mortality 0
	Eastern spinner dolphin	616,662 (CV = 0.22) [372]	274/<0.04%
	Whitebelly spinner dolphin	441,711 (CV = 0.45) [373]	115/0.03%
Fisheries	Spinner dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls.		
Estimated Annual Mortality	See estimates above. In the eastern tropical Pacific, spinner dolphins have been incidentally killed in international tuna purse seine fisheries since the late 1950's. Between 1996 and 2005, annual fishing mortality of eastern spinner dolphins ranged between 224 and 469 animals, with an average of 356.[374]		

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[367] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 204

[368] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[369] Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

[370] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 204

[371] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 212

[372] Estimates for offshore spotted dolphins include mortalities of coastal spotted dolphins

[373] Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

[374] Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

[375] Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

	Between 1996 and 2005, annual fishing mortality of whitebelly spinner dolphins ranged between 115 and 498 animals, with an average of 271.[375]		
Species	***Stenella coeruleoalba* Striped dolphin.**		
Abundance Estimate	California/Oregon/Washington Stock	13,934 (CV = 0.53)[376]	
	Hawaiian Stock	10,385 (CV = 0.48)[377]	
	Eastern Tropical Pacific	1,470,854 (CV = 0.15)[378]	
Fisheries	Striped dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture Striped dolphins		
Estimated Annual Mortality	Striped dolphins are captured in the tuna purse seine fishery in the eastern tropical Pacific. From 1998 to 2003 there were 24, 5, 11, 3, 2, and 11 deaths of striped dolphins in this fishery.[379] In 2005, 15 striped dolphins were incidentally killed in the tuna purse seine fishery.[380]		
Species	***Stenella attenuata* Spotted dolphin.**		
Abundance Estimate	Hawaiian Stock	10,260 (CV = 0.41)[381]	2005 Mortality 0.8
	Northeastern offshore spotted	736, 737 (CV = 0.15) [382]	271/<0.03%
	Western/southern offshore spotted dolphin	627,863 (CV = 0.31)[383]	99/0.01%
	Coastal spotted dolphins	149,393 (CV = .027) [384]	3/<0.01%

[376] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 103

[377] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 216

[378] Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

[379] IWC. 2003. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 5 (Suppl.) See also IWC. 2004. Report of the Scientific Committee, Annex K. J. Cetacean Res. Manage. 6 (Suppl.)

[380] Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

[381] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 208

[382] Estimates for offshore spotted dolphins include mortalities of coastal spotted dolphins

[383] Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

[384] Gerrodette, T, Watters, G, Forcada J. 2005. Preliminary Estimates of 2003 Dolphin Abundance in the Eastern Tropical Pacific NOAA Tech. Memo. NMFSSWFSC-LJ-05-05. 27p at 14

Fisheries	Spotted dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls.		
Estimated Annual Mortality	See estimates above. In the eastern tropical Pacific, spotted dolphins have been incidentally killed in international tuna purse seine fisheries since the late 1950's. Between 1996 and 2005, annual fishing mortality of northeastern spotted dolphins ranged between 260 and 818 animals, with an average of 435.[385] Between 1996 and 2005, annual fishing mortality of western/southern spotted dolphins ranged between 99 and 1,044 animals, with an average of 383.[386]		
Species	***Delphinus delphis* Short-Beaked Common dolphin**		
Abundance Estimate	California/Oregon/Washington Stock	449,846 (CV = 0.25)[387]	2005 Mortality N/A
	Long-Beaked Common Dolphin	43,360 (CV = 0.72)	N/A
	Northern Common Dolphins	449,464[388]	114/<0.01%
	Southern Common Dolphins	1,525,207[389]	154/0.01%
	Central Common Dolphins	577,048[390]	57/<0.01%
Fisheries	Common dolphins are entangled in gillnet fisheries, purse seine fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture common dolphins		
Estimated Annual Mortality	See estimates above. In the eastern tropical Pacific, 'northern common dolphins' have been incidentally killed in international tuna purse seine fisheries since the late 1950's. Between 1996 and 2005, annual fishing mortality of northern common dolphins (potentially including both short-beaked and long-beaked common dolphins) ranged between 9 and 261 animals, with an average of 105.[391] Although it is unclear whether these animals are part of the same population as short-beaked common dolphins found off California, they are managed separately--specifically		

385 Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

386 Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

387 Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 108

388 Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

389 Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

390 Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

391 Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

392 Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

393 Report of the International Dolphin Conservation Program. 2006. MOP-15-05 REV

	for the management of dolphins involved in eastern tropical Pacific tuna fisheries. Between 1996 and 2005, annual fishing mortality of central common dolphins ranged between 51 and 223 animals, with an average of 125.[392] Between 1996 and 2005, annual fishing mortality of southern common dolphins ranged between 1 and 222 animals, with an average of 66.[393]
Species	***Phocoena sinus* Vaquita.**
Abundance Estimate	567[394]
Fisheries	Vaquita are incidentally killed in coastal gillnet fisheries totoaba, sharks, rays, mackerels, croaker, and shrimp and shrimp trawls.
Estimated Annual Mortality	143 Vaquita were killed in various fishing operations between March 1985 and January 1994 with an annual incidental mortality of 35. From January 1993 to January 1995, the total estimated incidental mortality caused by the fleet of El Golfo de Santa Clara was 39 vaquitas per year, which is over 17% of the most recent estimate of population size.[395]
Species	***Phocoenoides dalli* Dall's porpoise.**
Abundance Estimate	California/Oregon/Washington Stock 449,846 (CV = 0.25)[396]
Fisheries	Dall's porpoise are entangled in gillnet fisheries, longlines and trawls. Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may capture Dall's porpoise.
Estimated Annual Mortality	No Estimates of Mortality

[394] Jaramillo Legorreta AM, Rojas Bracho L. Gerrodette T. 1999. A new abundance estimate for vaquitas: First step for recovery. Mar Mamm Sci 15: 957-973. In 1986-1993, line-transect boat surveys yielded an estimate of 503; in 1986-1989, aerial surveys yielded 885, 1991 aerial surveys yielded 572 animals, and 224 from a ship survey in 1993.

[395] Vidal O, Brownell RL, Findley LT 1999. Vaquita—Phocoena sinus Norris and McFarland, 1958. In: Handbook of Marine Mammals (Ridgway SH, Harrison SR, eds.) Vol 6: The second book of dolphins and porpoises, pp 357-378

[396] Carretta, JV, Forney, KA, Muto, MM, Barlow, J, Baker J, Hanson B, and Lowry MS. 2005. U.S. Pacific Marine Mammal Stock Assessments, 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFSSWFSC-388, 317 p. at 82

AREA 81 SOUTHWEST PACIFIC

Species	***Hyperoodon ampullatus* Southern bottlenose whale.**	
Abundance Estimate	South of the Antarctic Convergence	599,300[397]
Fisheries	Southern bottlenose whales are entangled in driftnets in the Tasman Sea	
Estimated Annual Mortality	No Estimates of Mortality	

Species	***Delphinus delphis* Common dolphin**
Abundance Estimate	No Abundance Estimate--considered numerous
Fisheries	Common dolphins are entangled in New Zealand trawl fisheries. Common dolphins may also be captured in the albacore driftnet fishery in the Tasman Sea
Estimated Annual Mortality	In New Zealand, In 1994, 1996, and 1997 fisheries incidentally captured 9, 2, and 4 common dolphins respectively.[398]

Species	***Lagenorhynchus obscurus* Dusky dolphin**
Abundance Estimate	12,000 to 20,000
Fisheries	Unknown numbers of dusky dolphins are caught in set nets in New Zealand.
Estimated Annual Mortality	Current catches in set nets appear to have decreased from those of the 1970s and 1980s but are estimated at one port to be 100-200 animals per year.[399] In New Zealand, in 1996 and 1997, fisheries incidentally captured 1 dusky dolphin each year.[400]

Species	***Cephalorhynchus hectori.* Hector's dolphin**[401]	
Abundance	South Island—east coast[403]	1900

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397 Kasamatsu, F. and Joyce, G.G. 1995. Current status of odontocetes in the Antarctic. *Antarctic Science* 7, 365–379.

398 Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 223

399 Jefferson TA, Leatherwood S, Webber MA 1993. FAO Species identification guide. Marine Mammals of the world. UNEP/FAO, Rome, 320pp

400 Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 223

401 Considered Endangered under the IUCN Red List

402 Slooten, E., Dawson, S., and Rayment, W. 2002. Quantifying abundance of Hector's dolphins between Farewell Spit and Milford Sound. Published Client Report on Contract 3076, funded by Conservation Services Levy. Department of Conservation, Wellington, New Zealand. http://csl.doc.govt.nz/ dsis35.pdf.

Estimate[402]	South Island—west coast	5400
Fisheries	Hector's dolphins are caught in coastal gillnets. While there are no quantitative estimates, several dolphins are killed each year in recreational gillnets, and there are at least occasional catches in trawl nets.[404]	
Estimated Annual Mortality	In the mid-1980s an average of 57 Hector's dolphins were caught each year in gillnets in the Canterbury region. Between 1984 and 1988, incidental captures around the Banks Peninsula amounted to at least 223. In 1997-1998, the estimated bycatch by commercial gillnetting vessels north and south of Banks Peninsula was 16 Hector's dolphins (CV 39%).[405] In New Zealand, in 1994 and 1997 fisheries incidentally captured 8 and 2 Hector's dolphins respectively.[406]	

Species	**Cephalorhynchus hectori maui** Maui's dolphin[407]	
Abundance Estimate	Critically endangered	100-150
Fisheries	Set net fishing poses a major threat to Maui's dolphins. A significant number of Maui's dolphins have been caught and killed in gill nets since 1987 when the New Zealand Department of Conservation began investigating dolphin deaths. In the early 2000s over a 20 month period, six Maui's dolphins showed signs of having been entangled in nets.	
Estimated Annual Mortality	No estimates of mortality are available, but New Zealand has banned set netting along part of the North Island west coast and the Manukau Harbor entrance.	

Species	***Orcaella brevirostris* Irrawaddy (snubfin) river dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	Irrawaddy dolphins are incidentally captured in driftnet fisheries and shark nets to protect bathers.
Estimated Annual Mortality	In the Townsville area alone, 41 Irrawaddy (Snubfin) dolphins were caught in shark nets between 1968 and 1990; this number is almost certainly an underestimate, for another 55 unidentified "dolphins" or "porpoises" were caught in the nets in the same period, some of which are likely to be *Orcaella*.[408]

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403 In 1989 the New Zealand government created the Banks Peninsula Marine Mammal Sanctuary off the east coast of the South Island.

404 Baird, S.J. and Bradford, E. 2000. Estimation of Hector's dolphin bycatch from inshore fisheries, 1997/98 fishing year. Published Client Report on Contract 3024, Conservation Services Levy. Available: www.doc.govt.nz/cons/scires/csl.pdf.

405 Baird, S.J. and Bradford, E. 2000. Estimation of Hector's dolphin bycatch from inshore fisheries, 1997/98 fishing year. Published Client Report on Contract 3024, Conservation Services Levy. Available: www.doc.govt.nz/cons/scires/csl.pdf.

406 Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 223

407 Formerly known at North Island Hector's dolphin

408Parra, G.J., Corkeron, P.J. and Marsh, H. (2002). The Indo-Pacific Indo-Pacific Humpbacked dolphin, *Sousa*

AREA 87 SOUTHEAST PACIFIC

Species	***Mesoplodon peruvianus* Peruvian beaked whale**
Abundance Estimate	No Abundance Estimate
Fisheries	Peruvian beaked whales are entangled in the driftnet fishery for sharks off Peru[409]
Estimated Annual Mortality	Ten Peruvian beaked whales have been recorded, at least 9 of which appear to have been captured in the Peruvian coastal driftnet fishery. [410] No Estimates of Mortality

Species	***Physeter macrocephalus* Sperm whale**
Abundance Estimate	Eastern Tropical Pacific and Ecuadorian EEZ 1,179
Fisheries	Sperm whales may be entangled in swordfish driftnets in Chile. Off north-central Chile, sperm whales are known to be attracted to longliners, reportedly to scavenge the targeted Patagonian toothfish (*Dissostichus eleginoides*), and fishermen shoot at them and use other means of deterrence.[411]
Estimated Annual Mortality	Between 1987 and October of 1994, twenty strandings of sperm whales were recorded along the Ecuadorian coast, 11 cases involved interactions with fishing gear amounting to 1.4 whales per year;[412] however, no mortality estimates are available.

Species	***Kogia breviceps* Pygmy sperm whale**
Abundance Estimate	No Abundance Estimate
Fisheries	There is a report a specimen from Peru which had apparently been captured by fishermen.[413]
Estimated Annual Mortality	No Estimates of Mortality

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chinensis (Osbeck, 1765) in Australian waters: a summary of current knowledge and recommendations for their conservation. 54th Annual Meeting of the International Whaling Commission, Shimonoseki, Japan, May 2002, SC/54/SM27.

[409]Jefferson TA, Leatherwood S, Webber MA 1993. FAO Species identification guide. Marine Mammals of the world. UNEP/FAO, Rome, 320pp

[410]Jefferson TA, Leatherwood S, Webber MA 1993. FAO Species identification guide. Marine Mammals of the world. UNEP/FAO, Rome, 320pp

[411] Reeves, Randall R., Smith, Brian D., Crespo, Enrique A. and Notarbartolo di Sciara, Giuseppe (compilers). (2003). *Dolphins, Whales and Porpoises: 2002–2010 Conservation Action Plan for the World's Cetaceans.* IUCN/SSC Cetacean Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. ix + 139pp. at 69

[412] Haase B and Felix F. 1994. A note on the incidental catches of sperm whales (Physeter macrocephalus) in Ecuador. Report of the International Whaling Commission (Special Issue) 15:481-483.

[413] Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

Species	***Feresa attenuata* Pygmy killer whale.**
Abundance Estimate	No Abundance Estimate
Fisheries	A pygmy killer whale was killed in Peruvian coastal gillnets.[414]
Estimated Annual Mortality	No Estimates of Mortality

Species	***Globicephala macrorhynchus* Short finned pilot whale**
Abundance Estimate	No Abundance Estimate
Fisheries	Short finned pilot whales are caught in gillnet and driftnet fisheries.
Estimated Annual Mortality	During the 1990s, the IWC estimated that less than 10 pilot whales died each year in coastal Peruvian fisheries.[415] At least 5 pilot whales have died in driftnets in Peru in 1988/89.[416] No total estimates of mortality are available.

Species	***Lagenorhynchus obscurus* Dusky dolphin**
Abundance Estimate	No Abundance Estimate (Off the Peruvian coast, the Dusky dolphin is the third most abundant cetacean species.)[417]
Fisheries	Dusky dolphins are taken in Peruvian coastal gillnets.
Estimated Annual Mortality	In 1988 and 1989, 1,725 and 1,893 dusky dolphins were landed at the port of Pucusana, Peru.[418] In 87 days during January-August 1994, 722 cetaceans were captured in multi-filament gillnets and landed at Cerro Azul, central Peru, of those 82.7% or 597 were dusky dolphins.[419]

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[414] Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

[415] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 26

[416] Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

[417] Sanchez R, Aroas Schreiber M, Onton K 1998. Sightings of cetaceans in Peruvian sea and its relation with the main pelagic resources. Cruise RV Humboldt 9803-05 from Tumbes to Tacna. Inf Inst Mar Peru 135: 163-179

[418] Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

[419] The total kill estimate for a seven-month period, stratitied by month, was 1,567 cetaceans. Peruvian fisheries both directed and incidental have killed thousands each year since 1985. In 1991-1993 period, an estimated 7000 animals per year were captured. Circumstantial evidence suggests that, after 1994, increasing enforcement reduced directed takes and illegal trade in meat, but also hampered monitoring.

[420] Van Waerebeek K and Reyes, JC 1994 Post-ban small cetaceans takes off Peru: a review. Report of the International Whaling Commission (Special Issue) 15:503-519.

[421] Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 223

	Between 1990 and 1993, Peruvian fisheries landed 3,144 dusky dolphins at the major ports of Puscana, Cerro Azul, San Andres, and Ancon.[420] In 1994, Peruvian fisheries incidentally killed 1,272 dusky dolphins.[421] In conclusion, during the 1990s, the IWC estimated that more than 1,800 dusky dolphins died each year in coastal Peruvian fisheries.[422]
	Between November 1991 and June 1998, 510 dusky dolphins were landed at the port of San Juan, Peru—most of those animals were captured in 1992 in surface driftnets for cojinova. Capture rates were lower in 1995-1998 when fishers were using fixed bottom-setting gillnets.[423]
	Data collected at 16 other ports showed high levels of dolphin and porpoise mortality persisted in coastal Peru at least until August 1994 when an unimplemented 1990 ban on small cetacean exploitation was renewed.
	In 2000 and 2001 reported catches of dusky dolphins were 12 and 2 respectively.[424] The lack of an abundance estimate precludes any assessment of population level impacts.[425]
Species	***Lagenorhynchus australis* Peale's dolphin**
Abundance Estimate	No Abundance Estimate (Off the Falkland Islands and Chile coast, the Peale's dolphin is the most abundant cetacean species.[426] There has been a marked decrease in the number of sightings in areas of the extreme south where crab fishing takes place.[427]
Fisheries	Peale's dolphins are entangled in nets off the coast of Chile and in Peruvian coastal gillnets.
Estimated Annual Mortality	Dolphins in Beagle Channel, the Magallanes, and southern Tierra del Fuego have been harpooned for crab bait since the 1970s. The scale of this killing was great enough to cause reduced abundance by the late 1980s. However, recent evidence suggests that this exploitation has declined and that some recovery may be occurring.[428] Information on

[422] Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 26

[423] Majluf P, Babcock EA, Riveros JC, Schreiber MA, and Alderete W. Catch and Bycatch of Sea Birds and Marine Mammal in the small-scale fishery of Punta San Juan, Peru

[424] Report of the Scientific Committee. Annex L Report of the Standing Sub-Committee on Small Cetaceans 2004. J Cetacean Res. Manage. 6 Suppl.

[425]Van Waerebeek, K., Van Bressem, M.-F., Félix, F., Alfaro-Shigueto, J., García-Godos, A., Chávez-Lisambart, L., Ontón, K., Montes, D., and Bello, R. 1997. Mortality of dolphins and porpoises in coastal fisheries off Peru and southern Ecuador in 1994. *Biological Conservation* 81, 43–49.

[426] Sanchez R, Aroas Schreiber M, Onton K 1998. Sightings of cetaceans in Peruvian sea and its relation with the main pelagic resources. Cruise RV Humboldt 9803-05 from Tumbes to Tacna. Inf Inst Mar Peru 135: 163-179

[427] Goodall, R.N.P., Norris, K.S., Schevill, W.E., Fraga, F., Praderi, R., Iñiguez Jr., M.A., and de Haro, J.C. 1997b. Review and update on the biology of Peale's dolphin, *Lagenorhynchus australis*. *Report of the International Whaling Commission* 47, 777–796.

[428] Goodall, R.N.P., Norris, K.S., Schevill, W.E., Fraga, F., Praderi, R., Iñiguez Jr., M.A., and de Haro, J.C. 1997b. Review and update on the biology of Peale's dolphin, *Lagenorhynchus australis*. *Report of the International Whaling Commission* 47, 777–796.

	population structure and the extent to which Peale's dolphins may still be used as crab bait is unknown. No estimates of total incidental mortality are available, however, the scale of Peale's dolphins entanglement in nearshore gillnets is not considered large.[429]
Species	***Tursiops truncatus* Bottlenose dolphin**
Abundance Estimate	No Abundance Estimate
Fisheries	In Peru, coastal fisheries kill *Tursiops* for human consumption, using gillnets, purse seines, and harpoons.[430]
Estimated Annual Mortality	Bottlenose dolphins are entangled in gillnets in Peru; catches at Pucusana were estimated to total 30 in 1987.[431] In 1988 and 1989, 18 and 31 bottlenose dolphins were landed at the port of Pucusana, Peru.[432] Between 1990 and 1993, Peruvian fisheries landed 120 bottlenose dolphins at the major ports of Puscana, Cerro Azul, San Andres, and Ancon.[433] In 1994, Peruvian fisheries incidentally captured 42 bottlenose dolphins.[434] Between November 1991 and June 1998, 75 bottlenose dolphins were landed at the port of San Juan, Peru—most of those animals were captured in 1992 in surface driftnets for cojinova. Capture rates were lower in 1995-1998 when fishers were using fixed bottom-setting gillnets.[435] In 1994, Ecuadorian fisheries incidentally killed 227 bottlenose dolphins.[436]

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[429] There is also concern that the proliferation of salmon-culture facilities in southern Chile, especially along the indented coastline of Chiloé Island, is having a negative effect on Peale's dolphins. Morton, A.B. and Symonds, H.K. 2002. Displacement of *Orcinus orca* (L.) by high amplitude sound in British Columbia, Canada. *ICES Journal of Marine Science* 59, 71–80.

[430] Although direct killing has noticeably decreased since dolphin hunting was banned by law in 1996, around a thousand dolphins and other small whales are still falling victim annually to fishermen to supply bait meat for the shark fishery. Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages

[431] Van Waerebeek, K., Reyes, J.C., Read, A.J., and McKinnon, J.S. 1990. Preliminary observations of bottlenose dolphins from the Pacific coast of South America. Pp.143–154 *in: The Bottlenose Dolphin* (eds. S. Leatherwood and R.R. Reeves). Academic Press, San Diego.

[432] Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

[433] Van Waerebeek K and Reyes, JC 1994 Post-ban small cetaceans takes off Peru: a review. Report of the International Whaling Commission (Special Issue) 15:503-519.

[434] Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 223

[435] Majluf P, Babcock EA, Riveros JC, Schreiber MA, and Alderete W. Catch and Bycatch of Sea Birds and Marine Mammal in the small-scale fishery of Punta San Juan, Peru

[436] Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 221

[437] Report of the Scientific Committee. Annex L Report of the Standing Sub-Committee on Small Cetaceans 2004. J Cetacean Res. Manage. 6 Suppl.

	In 2000 and 2001 reported catches of bottlenose dolphins were 6 and 1 respectively.[437] No estimates of total incidental mortality are available.
Species	***Grampus griseus* Risso's dolphin.**
Abundance Estimate	No Abundance Estimate
Fisheries	Risso's dolphins are entangled in coastal gillnets.
Estimated Annual Mortality	At least one animal was landed at Pucusana in Peru.[438] No Estimates of Mortality
Species	***Lissodelphis peronii* Southern right whale dolphin.**
Abundance Estimate	No Abundance Estimate--considered very common off Chile
Fisheries	Southern right whale dolphins are incidentally caught in driftnets off Peru and Chile. They are infrequently caught off the coasts of Peru and Chile where they are used for human consumption and crab bait.[439]
Estimated Annual Mortality	During the 1990s, the IWC estimated that more than 5 southern right whale dolphins died each year off the Pacific coast of South America.[440] No Estimates of Mortality
Species	***Delphinus delphis* Common dolphin.**
Abundance Estimate	No Abundance Estimate
Fisheries	Common dolphins are incidentally caught in coastal gillnets off Peru and Chile.
Estimated Annual Mortality	The estimated catches of common dolphins in coastal driftnets in Peru, were 264 in 1987, 155 in 1988 and 57 in 1989.[441] During the 1990s, the IWC estimated that 50 to 150 common dolphins died each year in coastal Peruvian fisheries.[442] Between 1990 and1993, Peruvian fisheries landed 1087 common dolphins at the major ports of Puscana, Cerro Azul, San Andres, and Ancon.[443]

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438 Van Waerebeek, K., Reyes, J.C., Read, A.J., and McKinnon, J.S. 1990. Preliminary observations of bottlenose dolphins from the Pacific coast of South America. Pp.143–154 *in: The Bottlenose Dolphin* (eds. S. Leatherwood and R.R. Reeves). Academic Press, San Diego.

439 Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.

440 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 26

441 Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

442 Report of the International Whaling Commission 1994 (Special Issue) Gillnets and Cetaceans. 15:629 pp at 25

443Van Waerebeek K and Reyes, JC 1994 Post-ban small cetaceans takes off Peru: a review. Report of the International Whaling Commission (Special Issue) 15:503-519.

Species	***Cephalorhynchus eutropia* Chilean dolphin.**
Abundance Estimate	No Abundance Estimate available--total population appears to be very small (low thousands at most).
Fisheries	The crab bait fishery in southern Chile and a variety of other fisheries (particularly coastal gillnet fisheries) are potentially serious threats. Some shooting and harpooning also occurs, and the dolphins are used for bait or human consumption. The species' status is uncertain. In addition to the mortality caused by entanglement and hunting, Chilean dolphins may now be excluded by salmon aquaculture operations from some of the bays and fiords that they traditionally inhabited.[444]
Estimated Annual Mortality	In 1989, 51 Chilean dolphins were caught in Chilean bottom set gillnets. At Queule, near Valdivia, Chilean dolphins account for 45.8% of the dolphins caught in gillnets, translating into a catch of 65-70 animals at this port.[445] No estimates of total incidental mortality are available.

Species	***Cephalorhynchus commersonii* Commerson's dolphin**
Abundance Estimate	No Abundance Estimate--thought to be abundant
Fisheries	Commerson's dolphin are caught in mid-water trawls and coastal gillnets. Commerson's dolphins are also used as crab bait.
Estimated Annual Mortality	No Estimates of Mortality

Species	***Phocoena spinipinnis* Burmeister's porpoise**
Abundance Estimate	No Abundance Estimate
Fisheries	Burmeister's porpoise are frequently killed in set and drift gillnets. Some are killed deliberately in the Peruvian multi-species fishery that employs both gillnets and harpoons to take cetaceans for human consumption[446] and additional animals may be taken at least occasionally for crab bait in southern Chile.[447]
Estimated Annual	Mortality in Peru is estimated at more than 450 animals per year and may be as high as 2,000 animals.[448] In 1988 and 1989, 383 and 331

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444 Claude, M., Oporto, J., Ibáñez, C., Brieva, L., Espinosa P.C., and Arqueros, W.M. 2000. *La ineficiencia de la salmonicultura en chile.* Aspectos sociales, económicos y ambientales. Registro de Problemas Públicos, Informe N° 1.

445 Culik BM (compiler). 2004. Review of Small Cetaceans. Distribution, Behavior, Migration and Threats. UNEP/CMS Secretariat, Bonn, Germany. 343 pages.

446 Van Waerebeek, K. and Reyes, J.C. 1994. Post-ban small cetacean takes off Peru: a review. *Report of the International Whaling Commission* (Special Issue) 15, 503–519.

447 Lescrauwaet, A.-C. and Gibbons, J. 1994. Mortality of small cetaceans and the crab bait fishery in the Magallanes area of Chile since 1980. *Report of the International Whaling Commission* (Special Issue) 15, 485–494.

448 Reyes JC 2002. Burmeister's porpoise. In: Encyclopedia of marine mammals (Perring WF, Wursig B, Thewissen JGM, eds) Academic Press, San Diego pp 177-179

Mortality

Burmeister's porpoise were landed at the port of Pucusana, Peru.[449] Between 1990 and 1993, Peruvian fisheries landed 552 Burmeister's porpoise at the major ports of Puscana, Cerro Azul, San Andres, and Ancon.[450] In 1994, Peruvian fisheries incidentally captured 224 Burmeister's porpoise.[451] In 2000, 2001, and 2003 reported catches of Burmeister's porpoise were 39, 14, and 125 respectively.[452] Scientists consider these levels unsustainable.

In 1989, 57 Burmeister's porpoise were caught in Chilean bottom set gillnets.

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[449] Van Waerebeek K and Reyes, JC 1994 Interactions between small cetaceans and Peruvian Fisheries in 1988/89 and analysis of trends. Report of the International Whaling Commission (Special Issue) 15:481-502.

[450] Van Waerebeek K and Reyes, JC 1994 Post-ban small cetaceans takes off Peru: a review. Report of the International Whaling Commission (Special Issue) 15:503-519.

[451] Report of the Scientific Committee. Annex I Report of the Standing Sub-Committee on Small Cetaceans 1999. J Cetacean Res. Manage. 1 Suppl. at 223

[452] Report of the Scientific Committee. Annex L Report of the Standing Sub-Committee on Small Cetaceans 2004. J Cetacean Res. Manage. 6 Suppl.

APPENDIX B. Parties to International Treaties

Third United Nations Convention on the Law of the Sea, Dec. 10, 1982, 21 I.L.M. 1245. (Entered into force 16 November 1994.) As of June 2007, 155 countries were parties to the Law of the Sea. A chronological list of ratifications of, accessions and successions to the convention is available at http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm#

The Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conversation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks. U.N. Doc. A/Conf./164/37. A list of the 66 nations signatory to the Straddling Stocks Agreement is available at http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm#

Convention on the Conservation of Antarctic Marine Living Resources, 20 May 1980. 33 U.S.T. 3476. The original 12 contracting parties were United Kingdom, South Africa, Belgium, Japan, United States, Norway, France, New Zealand, Russia, Poland, Argentina, and Australia. Additional members are Brazil, Chile, European Community, Germany, India, Italy, Republic of Korea, Namibia, Spain, Sweden, Ukraine, and Uruguay. States Party to the Convention but not Members of the Commission are Bulgaria, Canada, Cook Islands, Finland, Greece, Mauritius, Netherlands, Peru, and Vanuatu.

International Convention for the Conservation of Atlantic Tunas. Done at Rio de Janeiro, 14 May 1966. 20 U.S.T. 2887. Algeria, Angola, Barbados, Brazil, Canada, Cape Verde, China, Cote d'Ivoire, Croatia, Equatorial Guinea, European Community, France (St. Pierre & Miquelon), Gabon, Ghana, Guatamala, Guinea-Conakry, Honduras, Iceland, Japan, Korea (Republic), Libya, Mexico, Morocco, Namibia, Nicaragua, Norway, Panama, Philippines, Russian Federation, Sao Tome and Principe, South Africa, Trinidad and Tobago, Tunisia, Turkey, United Kingdom (Anguilla, Bermuda, St. Helena, Turks and Caicos), United States, Uruguay, Vanuatu, Venezuela.

Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. Done at Honolulu, 5 September 2000. Entered into force 19 June 2004. Nineteen states signed the convention. Australia, Cook Islands, Federated States of Micronesia, Fiji, Republic of Kiribati, Republic of the Marshall Islands, Republic of Nauru, New Zealand, Niue, Papua New Guinea, Independent State of Samoa, Solomon Islands, Kingdom of Tonga and Tuvalu and the United States have ratified it.

Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries. Done at Ottawa 24 October 1978. Senate Executive Treaty Series 96th Cong. 1st Sess. (Entered into force 1 January 1979.) Bulgaria, Canada, Cuba, Denmark, Europe Union (EU), France (in respect of St. Pierre et Miquelon) Iceland, Japan, Korea, Norway, Russia, and the United States. Estonia, Latvia, Lithuania, Poland, Portugal, Spain and Germany were contracting parties, but acceded to the European Union. Romania withdrew from the convention.

Convention on the Conservation and Management of Fishery Resources in the Southeast Atlantic Ocean. Done at Windhoek. 20 April 2001. Entered into force April 2003. Angola, Iceland, Namibia, Norway, Republic of Korea, South Africa, the United Kingdom (on behalf of St. Helena and its dependencies, Tristan Da Cuhna and Ascension Island), the United States and the European Community.

Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea. Done at Washington, D.C. 16 June 1995. Entered into force 8 December 1995. U.S. Treaty Document 103-27. Parties: China, South Korea, Poland, the Russian Federation, and the United States.

International Convention for the Regulation of Whaling, Done at Washington, 2 November 1946. 4

Bevans 248, TIAS 1849. The original signatories to the convention were Argentina, Australia, Brazil, Canada, Chile, Denmark, France, Netherlands, New Zealand, Norway, Peru, Russia, United Kingdom, United States, Union of South Africa. Additional signatories since then are Antigua & Barbuda, Austria, Belgium, Belize, Benin,

Cambodia, Cameroon, China, People's Rep of, Costa Rica, Côte d'Ivoire, Croatia, Cyprus, Czech Republic, Dominica, Ecuador, Finland, Gabon, The Gambia, Germany, Greece, Grenada, Guatemala, Guinea-Bissau, Guinea, Rep of, Hungary, Iceland, India, Ireland, Israel, Italy, Japan, Kenya, Kiribati, Korea, Rep of, Laos, Luxembourg, Mali, Marshall Islands, Rep of Mauritania, Mexico, Monaco, Mongolia, Morocco, Nauru, Nicaragua, Oman, Palau, Panama, Portugal, San Marino, St. Kitts & Nevis, St. Lucia, St. Vincent & The Grenadines, Senegal, Slovak Republic, Slovenia, Solomon Islands, Spain, Suriname, Sweden, Switzerland, Togo, Tuvalu.

Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean. Done at Moscow 11 February 1992. Entered into force 16 February 1993. Senate Treaty Document 102-30, 102nd Cong. 2nd Sess.

Convention on International Trade in Endangered Species of Wild Fauna and Flora (Done at Washington 3 March 1973. Entered into force 1 July 1975. 27 UST 1087, TIAS 8249) A list of 172 contracting parties in order of entry into force is available at http://www.cites.org/eng/disc/parties/chronolo.shtml

Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas ASCOBANS entered into force in 1994. Parties include Albania, Bulgaria, Croatia, Cyprus, France, Georgia, Greece, Italy, Lebanon, Libya, Malta, Monaco, Morocco, Portugal, Romania, Spain, Syria, Tunisia, Ukraine.

Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area. ACCOBAMS entered into force in 2001. Parties are Belgium, Denmark, European Community, Finland, Germany, Netherlands, Poland, Sweden, United Kingdom.

Pacific Salmon Treaty, March 18, 1985, U.S.-Can., 99 Stat. 7. United States and Canada.

The Wellington Convention done at Wellington, New Zealand. 17 May 1991. Parties are Australia, Cook Islands, Federated States of Micronesia, Fiji, France, Kiribati, Marshall Islands, Nauru, New Zealand, Niue, Palau, Samoa, Solomon Islands, Tokelau, Tuvalu, United States, Vanuatu.

Convention on the Conservation of Migratory Species of Wild Animals. Done at Bonn 23 June 1979. 19 ILM 15 (1980).

1952 Agreements on the Exploitation and Conservation of the Maritime Resources of the South Pacific. Done at Santiago, Chile, 18 August 1952. Ecuador, Peru and Chile.

Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America. Done at Port Moresby, 2 April 1987. Entered into force 15 June 1988. TIAS 11100. The Treaty on Fisheries between the Governments of Certain Pacific Island States and the Government of the United States of America is a unique instrument in international fisheries law, being the only multilateral agreement between a distant-water fishing nation, on the one hand, and a group of coastal States, on the other hand, concerning access to the latter’s fisheries zones. Thus, although multilateral in form, the agreement is in many respects bilateral in nature. Consultation is conducted through the South Pacific Forum Fisheries Agency, which has an open membership. As of 2005 members were Australia, Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu and Western Samoa.

Convention for the Conservation of Southern Bluefin Tuna. Done at Canberra, May 1993. Entered into force 20 May 1994 (hereinafter CCSBT). Australia, Japan and New Zealand Taiwan, South Korea. The Philippines was accepted as a formal cooperating non-member in 2004, and parties

continue discussions with Indonesia and South Africa.

Asia Pacific Fisheries Commission. Members include Australia, Bangladesh, Cambodia, China, France, India, Indonesia, Japan, Korea, Malaysia, Myanmar, Nepal, New Zealand, Pakistan, Philippines, Sri Lanka, Thailand, United Kingdom, United States of America, and Vietnam.

The Convention for the Establishment of an Inter-American Tropical Tuna Commission. Done at Washington, 31 May 1949. Entered into force 3 March 1950. 1 UST 230, TIAS 2044. Members are Costa Rica, Ecuador, El Salvador, France, Guatemala, Japan, Mexico, Nicaragua, Panama, Peru, Republic of Korea, United States, Vanuatu and Venezuela. Belize, Canada, China, Cook Islands, the European Union, Honduras and Chinese Taipei are Cooperating Non Parties or Cooperating Fishing Entities.

ICES: Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Netherlands, Norway, Poland, Portugal, Spain, Sweden, United Kingdom, the United States, Russian Federation, Latvia, Lithuania, and Estonia.

PICES: Canada, United States, Japan, People’s Republic of China, Russian Federation, Republic of Korea.

SPC: Australian territory of Papua and the Trust Territory of New Guinea (now Papua New Guinea and Irian Jaya), and Guam and the Trust Territory of the Pacific Islands.

APPENDIX C. Sample Cetacean Bycatch Resolution

RESOLUTION TO ASSESS AND MITIGATE THE IMPACT OF FISHING ON WHALES AND DOLPHINS

The Commission [insert name of the regional fisheries management organization]

In accordance with the Convention [insert the name of the convention under which the rfmo operates]:

Recognizing the ecological and cultural significance of all species of whales and dolphins in the convention area;

Noting the recent international scientific studies indicate that bycatch in commercial fisheries is one of the greatest threats facing whales and dolphins;

Recognizing the need to assess population abundance of and evaluate the incidental mortality of dolphins and whales during fishing operations in the convention area;

Aware that measures to reduce bycatch may require modified or new procedures, technologies, or management measures;

The [insert name of convention] Convention, resolves as follows:

1. Contracting Parties (CPs) [or other appropriate terminology for the Convention or Agreement] should collect, and provide to the Secretariat, all available information on whale and dolphin abundance and stock structure within their waters and within the Convention Area.

2. CPs should collect, and provide to the Secretariat, all available information on interactions with whales and dolphins in fisheries within the Convention Area and urges them to foster collaboration with other CPs in the exchange of information in this area.

3. Each CP should provide all information on its national legislation and international efforts to which it is a party to conserve whales and dolphins.

4. CPs should, as appropriate, individually and collectively, continue to enhance the implementation of their existing whale and dolphin mitigation measures using best available scientific information on mitigation techniques.

5. Beginning in 2008, CPs should provide to the Secretariat a detailing of whale and dolphin population and fishery interaction data (e.g., species identification, fate and condition at

release, relevant biological information and gear configuration), including data collected by their respective national observer programs, in fisheries managed by [Name of the Convention] in the Convention Area and any marine mammal-specific training provided to these observers. This information will be compiled by the Secretariat and reported to the [Name of the Scientific Body or Bycatch Body within the Convention].

6. [Name of the Convention] should cooperate with other regional, subregional and global organizations to share data on whale and dolphin bycatch and to develop and apply compatible bycatch reduction measures as appropriate, given the migration patterns of many species of

7. As the [Name of the Convention] develops its regional observer program and considers improving observer coverage in the Convention Area, existing observer programs should be reviewed to ensure that the appropriate information on whale and dolphin interactions is being collected (e.g. species identification, fate and condition at release, relevant biological information and gear configuration).

8. The Secretariat, in cooperation with the [Name of the Scientific Body or Bycatch Body within the Convention], should develop a centralize bycatch and observer database to obtain better estimates of total catch and mortality of whales and dolphins by fisheries within the Convention Area.

9. The [Name of the Scientific Body or Bycatch Body within the Convention] should develop a program that includes: abundance research and research and development of gear alternatives, promotion of the use of available bycatch mitigation technology, promotion and strengthening of data collection programs to obtain standardized information to develop reliable estimates of the bycatch of whales and dolphins, biological research on whales and dolphins, including the identification of migration routes or other areas of spatial or temporal importance, industry education, development and promotion of safe handling techniques and other techniques to improve whale and dolphin conservation.

10. The [Name of the Scientific Body or Bycatch Body within the Convention] shall take practical steps necessary to improve monitoring and reporting of whales and dolphins interactions in the Convention Area, including the development of data standards and specifications and reporting requirements.

11. [Name of the Convention] will monitor the progress of CPs in applying this resolution and develop relevant strategies for the further consideration of the [Name of the Convention] in 2009. Information produced as a result of this resolution will be provided by the Secretariat to the FAO.

APPENDIX D. Sea Turtle Resolution Adopted at NAFO

Resolution to Reduce Sea Turtle Mortality in NAFO Fishing Operations

Proposal by the United States of America and Japan

Background/Explanatory Memorandum:

At its 26th Annual Symposium on Sea Turtle Biology and Conservation, the members of the International Sea Turtle Society (ISTS) adopted a resolution calling upon the world's regional fisheries management organizations (RFMOs) to urge their members to adopt and implement the FAO "Guidelines to Reduce the Mortality of Sea Turtles in Fishing Operations" (the FAO Guidelines). This ISTS resolution was forwarded to NAFO with a request for action.

It is generally agreed that RFMOs can play a valuable role in support of global adoption and implementation of the FAO Guidelines. Given NAFO's on-going efforts to minimize bycatch and the fledging NAFO initiative on application of ecosystem considerations to the Organization's fisheries management decision-making, NAFO should support global implementation of the FAO Guidelines as appropriate. As the waters of the Convention area include critical foraging habitat for the leatherback turtle (*Dermochelys coriacea*), adoption and implementation of the FAO Guidelines would be both proactive and precautionary.

Thus, it is proposed that, in addition to generally supporting adoption and implementation of the FAO Guidelines, NAFO Contracting Parties should provide information on existing domestic data collection (e.g., species identification, fate and condition at release, relevant biological information, and gear configuration) and/or observer training efforts relating to sea turtle interactions in NAFO-managed fisheries in the NAFO Convention Area.

NAFO should also consider, where appropriate, increasing cooperation both among NAFO Contracting Parties and with other regional, subregional and global organizations, to facilitate sharing of data and development of compatible and appropriate bycatch reduction measures. Such efforts may be enhanced by integration of sea turtle interaction data collection by NAFO observers.

Draft Proposal:

Resolution to Reduce Sea Turtle Mortality in NAFO Fishing Operations

Preamble:

Recognizing the cultural and ecological significance of sea turtles in the Northwest Atlantic Ocean;

Recognizing that the FAO Committee on Fisheries (COFI) endorsed "Guidelines to Reduce Sea Turtle Mortality in Fishing Operations" at its Twenty-sixth Session, held in March 2005, and that these guidelines are directed towards members and non-members of FAO, fishing entities, subregional, regional and global organizations, whether governmental or non-governmental concerned with fisheries management and sustainable use of aquatic ecosystems;

Further recognizing that implementation of these guidelines should be consistent with the Code of Conduct for Responsible Fisheries as well as with the Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem with regard to ecosystem considerations and based on the use of the best available science;

Taking into account the importance placed by the guidelines on research, monitoring, the sharing of information, and public education on sea turtles;

The Contracting Parties of NAFO resolve as follows:

1. NAFO Contracting Parties (CPs) should, as appropriate, individually and collectively implement the FAO "Guidelines to Reduce Sea Turtle Mortality in Fishing Operations" (the Guidelines) to reduce the incidental catch of sea turtles and ensure the safe handling of all turtles that are captured.

2. NAFO CPs should continue to enhance the implementation of their existing turtle mitigation measures using best available scientific information on mitigation techniques.

3. NAFO should encourage CPs to collect, and provide to the NAFO Secretariat, all available information on interactions with sea turtles in fisheries managed by NAFO in the NAFO Convention Area and urges them to foster collaboration with other CPs in the exchange of information in this area.

4. NAFO should cooperate with other regional, subregional and global organizations to share data on sea turtle bycatch and to develop and apply compatible bycatch reduction measures as appropriate.

5. Beginning in 2007, CPs should provide to the NAFO Secretariat a detailing of sea turtle fishery interaction data (e.g., species identification, fate and condition at release, relevant biological information and gear configuration), including data collected by their respective national observer programs, in fisheries managed by NAFO in the NAFO Convention Area and any sea turtle-specific training provided to these observers. This information will be compiled by the NAFO Secretariat and reported to the Scientific Council and to the Fisheries Commission.

6. The Fisheries Commission should monitor the progress of CPs in applying this resolution and develop relevant strategies for the further consideration of the Commission in 2008. Information produced as a result of this resolution will be provided by the NAFO Secretariat to the FAO.

APPENDIX E. National Oceans Protection Act of 2005 (S. 1224)

National Oceans Protection Act of 2005 (Introduced in Senate)

Subtitle C--Cetacean and Sea Turtle Conservation

SEC. 331. SHORT TITLE.

This subtitle may be cited as the `Cetacean and Sea Turtle Conservation Act of 2005'.

SEC. 332. PURPOSES.

The purposes of this subtitle are--

(1) to restore and perpetuate healthy populations of cetaceans and sea turtles by reducing bycatch of cetaceans and sea turtles to sustainable levels through the development of bilateral and multilateral efforts among the United States and other fishing nations;

(2) to increase the technical capacity, financial resources, and political will necessary to reduce bycatch of cetaceans and sea turtles to sustainable levels globally;

(3) to promote international standards and guidelines to reduce bycatch of cetaceans and sea turtles; and

(4) to authorize financial resources for the purposes described in paragraphs (1) through (3).

SEC. 333. DEFINITIONS.

In this subtitle:

(1) APPROPRIATE FISHING GEAR AND METHODS- The term `appropriate fishing gear and methods' means gear and methods used in fishing operations that are proven to be effective in reducing bycatch of cetaceans or sea turtles to sustainable levels.

(2) BYCATCH - The term `bycatch' means the incidental mortality or serious injury of an animal that is not the target of a fishing operation that occurs in the course of the fishing operation.

(3) CETACEAN - The term `cetacean' means an aquatic mammal that is a member of the order Cetacea, including whales, dolphins, and porpoises.

(4) INDEPENDENT EXPERTS- The term `independent experts' means individuals with expertise in issues related to cetaceans or sea turtles including representatives of academic and scientific organizations, nongovernmental organizations that promote conservation of cetacean populations, and the fishing industry.

(5) POPULATION- The term `population' means a distinct group of

individuals of a species or smaller taxa in a common spatial arrangement that interbreed when mature.

(6) SEA TURTLE- The term `sea turtle' means a member of--

(A) the family Cheloniidae; or

(B) the family Dermochelyidae.

(7) SUSTAINABLE LEVELS- The term `sustainable levels' means, with respect to bycatch , a level of bycatch that, in combination with other mortality caused by humans, does not exceed the maximum number of individuals that may be removed from a population while allowing that population to recover to a level at which such population maintains its maximum productivity.

SEC. 334. INTERNATIONAL AGREEMENTS AND STANDARDS.

(a) International Agreements- The Secretary, with the consent of the President and in consultation with independent experts and with the Secretary of State, shall negotiate with foreign governments that are engaged in, or that have persons or companies engaged in, commercial fishing operations that are adversely impacting populations of cetaceans or populations of sea turtles for the purpose of developing bilateral or multilateral agreements that require such governments to reduce bycatch of cetaceans or sea turtles to at least sustainable levels.

(b) Standards- An international agreement negotiated under subsection (a) shall include provisions to promote the development and implementation of standards for commercial fishing operations that interact with cetaceans or sea turtles that--

(1) require such operations to use appropriate fishing gear and methods; and

(2) are intended to reduce bycatch of cetaceans and sea turtles to at least sustainable levels.

(c) United Nations- The Secretary may consult and coordinate with the Committee on Fisheries of the Food and Agriculture Organization of the United Nations in developing international agreements under subsection (a) or standards under subsection (b).

SEC. 335. RESEARCH AND DEVELOPMENT GRANTS.

(a) Authority- The Secretary is authorized to award grants and to provide other assistance that the Secretary determines is appropriate to an eligible person to carry out the research or development of appropriate fishing gear and methods, including appropriate fishing gear and methods for use--

(1) in the North Sea, where harbor porpoise bycatch is severe;

(2) in Mexico's Gulf of California, where the vaquita porpoise faces extinction unless gillnets are banned;

(3) in the east coast of South America, including waters off the coasts of

Brazil, Uruguay, and Argentina, where bycatch of franciscana dolphins is contributing to the precipitous decline of that species; or

(4) in areas where bycatch of sea turtles associated with longline fishing has been found to occur frequently, as follows:

(A) The central Pacific Ocean.

(B) The southern Pacific Ocean.

(C) The southern Atlantic Ocean.

(D) The Mediterranean Sea.

(b) Definitions- In this section:

(1) APPROPRIATE CONGRESSIONAL COMMITTEES- The term `appropriate congressional committees' means the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Resources of the House of Representatives.

(2) FOREIGN PERSON DEFINED- The term `foreign person' means--

(A) an individual who is not a United States citizen;

(B) any corporation, partnership, business association, society, trust, organization, or other nongovernmental entity created or organized under the laws of a foreign country or that has its principal place of business outside the United States; or

(C) any governmental entity of a foreign country.

(3) MARINE MAMMAL COMMISSION- The term `Marine Mammal Commission' means the Marine Mammal Commission established by section 201 of the Marine Mammal Protection Act of 1972 (16 U.S.C. 1401).

(c) Eligibility-

(1) IN GENERAL- The Secretary shall determine if a person, including any governmental entity or any foreign person, is eligible to receive a grant under this section.

(d) Application- A person seeking a grant under this section shall submit an application to the Secretary at such time, in such manner, and including such information as the Secretary may reasonably require.

(e) Terms and Conditions-

(1) IN GENERAL- A recipient of a grant or other financial assistance provided by the Secretary under this section shall agree to such terms and conditions as the Secretary determines are necessary to protect the interests of the United States.

(2) REQUIREMENT FOR CONSULTATION- The Secretary shall consult with the Marine Mammal Commission prior to determining the terms and conditions described in paragraph (1) for a recipient of a grant or other financial assistance to be used to reduce bycatch of cetaceans.

(f) Report- Not later than one year after the date of enactment of this Act, and annually thereafter, the Secretary shall submit a report to the appropriate

congressional committees on the grants and other assistance provided under this section.

SEC. 336. BYCATCH DATABASE.

(a) Requirement for Database- The Secretary shall establish a database of bycatch data for cetaceans and sea turtles from fisheries around the world for the purpose described in subsection (b).

(b) Purpose of Database- The purpose of the database is to make information related to bycatch , including cetacean or sea turtles species affected by bycatch , the development and use of appropriate fishing gear and methods, and efforts to reduce the bycatch of cetaceans and sea turtles, available to scientists, resource managers, and the public.

(c) Availability- The Secretary shall make the database established pursuant to subsection (a) available by public posting through an Internet Web site.

SEC. 337. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated $5,000,000 for each fiscal year 2005 through 2008 to carry out the provisions of this subtitle.

APPENDIX F. Sample Cetacean Bycatch Legislation

110th Congress

1st Session

S.

To promote the conservation of cetacean species, and for other purposes.

IN THE SENATE OF THE UNITED STATES

introduced the following bill; which was read twice and referred to the Committee on _____

A Bill

To promote the conservation of cetacean species, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE

This Act may be cited as the "Cetacean Conservation Act of 2007."

SEC. 2. FINDINGS.

Congress makes the following findings:

(1) Cetaceans are a group of approximately 80 species of whales, dolphins, and porpoises that occur worldwide and are a biologically significant global resource. In the United States marine mammals are provided protection under the Marine Mammal Protection Act; some species are included on the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.). A number of species are listed as endangered by international agreements.

(2) The maintenance of healthy cetacean populations is essential to the maintenance of healthy ocean ecosystems.

(3) Cetaceans often inhabit international waters and are highly migratory, resulting in the management of a population of cetaceans frequently being shared by 2 or more countries.

(4) Eco-tourism based on whale watching, enjoyed by millions of people around the world, has grown into more than a $1,000,000,000 a year industry.

(5) Many species of cetaceans are threatened with extinction. Bycatch of cetaceans in fishing

operations is a major threat to cetaceans worldwide. Several species and many populations of cetaceans could be lost in the next few decades if nothing is done.

(6) The final report of the United States Commission on Ocean Policy (2004) identifies the severity of threats to cetaceans posed by accidental capture in fishing gear. The Report states that the greatest threat to marine mammals worldwide is the accidental capture or entanglement in fishing gear, with hundreds of thousands of such mammals unintentionally killed each year.

(7) The Report recommends that the United States use international agreements and other diplomatic means to strengthen protections for marine mammals, sea turtles, and other endangered marine species, including through the development and adoption of bycatch reduction methods.

(8) Considerable advances have been made in a few fisheries to address the problem of cetacean bycatch. However, progress to address this problem in other fisheries has been slow or non-existent throughout much of the world, in many cases due to a lack of technical capacity, financial resources, and political will to combat the problem. Fishing pressure on cetaceans is increasing with the expansion of fishing fleets and the establishment of new fisheries.

(9) From 1993 through 2006, the United States implemented measures that reduced cetacean bycatch in United States fisheries to less than one-third the previous rate of such bycatch.

(10) It is appropriate for the United States to build on its success in reducing cetacean bycatch by leading an international effort to implement measures to reduce such bycatch around the world and to promote an international regulatory framework in which countries adopt standards for reducing bycatch that are comparable to the standards adopted by the United States.

(11) Commercial fishing operations that are subject to United States regulations to reduce cetacean bycatch may be at a competitive disadvantage because, while the operations are required to mitigate such bycatch and bear the costs for doing so for most fisheries, the United States continues to allow the importation of fisheries products from countries that do not require comparable mitigation. U.S. longline fishermen represent at most no more than 2 percent of the total number of global pelagic longline fishermen.

(12) Global standards and international agreements to reduce such bycatch would help remedy this imbalance, and the United States can be instrumental in providing guidance and support toward this goal.

(13) Many developing countries require technical and financial assistance in order to effectively reduce cetacean bycatch.

(14) Bycatch of cetaceans is occurring at unsustainable levels in many locations, including----------

(A) the North Sea, where harbor porpoise bycatch is severe;

(B) Mexico's Gulf of California, where the vaquita porpoise faces extinction unless gillnets are banned; and

(C) The east coast of South America, including waters off the coasts of Brazil, Uruguay, and Argentina, where bycatch of franciscana dolphins is contributing to the precipitous decline of that species.

(15) An international effort led by the United States to increase technical capacity, financial resources, and political will necessary to reduce cetacean bycatch to sustainable levels globally and to develop international standards and guidelines to reduce such bycatch is necessary to ensure the conservation of cetaceans for the health of the world's oceans, the economic security of commercial fishing in the United States, and the enjoyment of future

generations.

SEC. 3. PURPOSES

The purposes of this Act are---

(1) to restore and perpetuate healthy populations of cetaceans by reducing bycatch to sustainable levels through the development of bilateral and multilateral efforts among the United States and other fishing nations;

(2) to increase the technical capacity, financial resources and political will necessary to reduce bycatch of cetaceans to sustainable levels globally;

(3) to promote international standards and guidelines to reduce bycatch of cetaceans; and

(4) to authorize financial resources for the purposes described in paragraphs (1) through (3).

SEC. 4. DEFINITIONS

In this Act:

(1) APPROPRIATE FISHING GEAR AND METHODS.---- The term “appropriate fishing gear and methods” means gear and methods used in fishing operations that are proven to be effective in reducing cetacean bycatch to sustainable levels.

(2) BYCATCH--- The term “bycatch” means the incidental mortality, serious injury, injury, or capture of an animal that is not the target of a fishing operation that occurs in the course of the fishing operation.

(3) CETACEAN--- The term “cetacean” means an aquatic mammal that is a member of the order Cetacea, including whales, dolphins and porpoises.

(4) INDEPENDENT EXPERTS--- The term “independent experts” means individuals with expertise in issues related to cetaceans including representatives of academic and scientific organizations, nongovernmental organizations that promote conservation of cetacean populations, and the fishing industry.

(5) POPULATION--- The term “population” means a distinct group of individuals of a species or smaller taxa in a common spatial arrangement that interbreed when mature.

(6) SUSTAINABLE LEVELS--- The term “sustainable levels” means, with respect to bycatch, a level of bycatch that, in combination with other mortality, does not exceed the maximum number of individuals that may be removed from a population while allowing that population to recover to a level at which such population maintains its maximum productivity.

SEC. 5. INTERNATIONAL AGREEMENTS AND STANDARDS

(a) INTERNATIONAL AGREEMENTS—The Secretary of Commerce, [with the consent of the President and] in consultation with independent experts and with the Secretary of State, shall negotiate with foreign governments that are engaged in, or that have persons or companies engaged in, commercial fishing operations that are adversely impacting populations of cetaceans for the purpose of developing bilateral or multilateral agreements that require such governments to reduce bycatch of cetaceans to at least sustainable levels.

(b) STANDARDS.--- An international agreement negotiated under subsection (a) shall include provisions to promote the development and implementation of standards for commercial fishing operations that interact with cetaceans that---

(1) require such operations to use appropriate fishing gear and methods; and

(2) are intended to reduce bycatch of cetaceans to at least sustainable levels.

(c) UNITED NATIONS.--- The Secretary of Commerce may consult and coordinate with the Committee on Fisheries of the Food and Agriculture Organization of the United Nations in developing international agreements under subsection (a) or standards under subsection (b).

SEC. 6 RESEARCHAND DEVELOPMENT GRANTS.

(a) AUTHORITY---The Secretary of Commerce is authorized to award grants and to provide other assistance that the Secretary determines is appropriate to an eligible person to carry out the research or development of appropriate fishing gear and methods, including appropriate fishing gear and methods for use in areas that the Secretary deems as priorities for such research.

(b) DEFINITIONS.---In this section:

(1) APPROPRIATE CONGRESSIONAL COMMITTEES.---The term “appropriate congressional committees” means the Committee on Commerce, Science and Transportation of the Senate and the Committee on Resources of the House of Representatives.

(2) FOREIGN PERSON DEFINED.---The term “foreign person” means—

(A) an individual who is not a United States citizen;

(B) any corporation, partnership, business association, society, trust, organization, or other nongovernmental entity created or organized under the laws of a foreign country or that has its principal place of business outside the United States; or

(C) any governmental entity of a foreign country.

(3) MARINE MAMMAL COMMISSION.--- The term “Marine Mammal Commission” means the Marine Mammals Commission established by section 201 of the Marine Mammals Protection Act of 1972 (16 U.S.C. 1401).

(c) ELIGIBILITY.---

(1) IN GENERAL.---The Secretary of Commerce shall determine if a person, including any governmental entity or any foreign person, is eligible to receive a grant under this section.

(d) APPLICATION----A person seeking a grant under this section shall submit an application to the Secretary of Commerce at such time, in such manner, and including such information as the Secretary may reasonably require.

(e) TERMS AND CONDITIONS.---

(1) IN GENERAL--- A recipient of a grant or other financial assistance provided by the Secretary of Commerce under this section shall agree to such terms and conditions as the Secretary determines are necessary to protect the interests of the United States.

(2) REQUIREMENT FOR CONSULTATION---The Secretary of Commerce shall consult

with the Marine Mammal Commission prior to determining the terms and conditions described in paragraph (1) for a recipient of a grant or other financial assistance to be used to reduce bycatch of cetaceans.

(f) REPORT--- Not later than one year after the date of enactment of this Act, and annually thereafter, the Secretary of Commerce shall submit a report to the appropriate congressional committees on the grants and other assistance provided under this section.

SEC. 7. BYCATCH DATABASE

(a) REQUIREMENT FOR DATABASE--- The Secretary of Commerce shall establish a database of bycatch data for cetaceans from fisheries around the world for the purpose described in subsection (b).

(b) PURPOSE OF DATABASE--- The purpose of the database is to make information related to bycatch, including cetacean species affected by bycatch, the development and use of appropriate fishing gear and methods, and efforts to reduce the bycatch of cetaceans, available to scientists, resource managers, and the public.

(c) AVAILABILITY--- The Secretary of Commerce shall make the database established pursuant to subsection (a) available by public posting through an Internet website.

SEC.8. AUTHORIZATION OF APPROPRIATIONS

There are authorized to be appropriated $10,000,000 for each fiscal year 2007 through 20012 to carry out the provisions of this Act.

APPENDIX D

STATUS OF INTERNATIONAL LIVING MARINE RESOURCES SHARED BY THE UNITED STATES OR SUBJECT TO TREATIES OR AGREEMENTS TO WHICH THE UNITED STATES IS A PARTY.

Status of International Living Marine Resources Shared by the United States or Subject to Treaties or Agreements to which the United States is a Party

		Common Name	Scientific Name	Status, if known	Source of status information	Date of next status review, if known	Relevant treaty or agreement, if any
Agreement on the International Dolphin Conservation Program	**AIDCP**						
		Coastal Spotted Dolphin	*Stenella attenuata graffmani*	Depleted			AIDCP
		Northeast Offshore Spotted Dolphin	*Stenella attenuata attenuata*	Depleted			AIDCP
		Eastern Spinner Dolphin	*Stenella longirostris orientalis*	Depleted			AIDCP
Central Bering Sea Pollock Convention		Alaska Pollock	*Theragra chalcogramma*	Low biomass in 2007-08 ≈ 486,667 t. This biomass is about 28% of target biomass level to resume a fishery under the Convention.	United States	Sep-08	Convention for the Conservation and management of Pollock Resources in the Central Bering Sea
Commission for the Conservation of Anarctic Living Marine Resources	**CCAMLR**	**Common Name**	**Scientific Name**	**Status, if known**	**Source of status information**	**Date of next status review, if known**	**Relevant treaty or agreement, if any**
Convention for the Conservation of Anarctic Seals	**CCAS**	**Common Name**	**Scientific Name**	**Status, if known**	**Source of status information**	**Date of next status review, if known**	**Relevant treaty or agreement, if any**
		Anarctic Fur Seal	*Arctocephalus gazella*	all populations with known status either stable or increasing			CCAS
		Subanarctic Fur Seal	*Arctocephalus tropicalis*	all populations with known status either stable or increasing			CCAS
		Southern Elephant Seal - South Georgia Stock	*Mirounga leonina*	varies by island			CCAS
		Southern Elephant Seal - Iles Kerguelen Stock	*Mirounga leonina*	varies by island			CCAS
		Southern Elephant Seal - Macquarie Island Stock	*Mirounga leonina*	varies by island			CCAS
Convention on International Trade in Endangered Species	**CITES**	**Common Name**	**Scientific Name**	**Status, if known**	**Source of status information**	**Date of next status review, if known**	**Relevant treaty or agreement, if any**
		elkhorn coral	*Acropora palmata*	Threatened under the ESA	http://www.nmfs.noaa.gov/pr/pdfs/statusreviews/corals.pdf	2011	CITES
		staghorn coral	*Acropora cervicornis*	Threatened under the ESA	http://www.nmfs.noaa.gov/pr/pdfs/statusreviews/corals.pdf	2011	CITES

Status of International Living Marine Resources Shared by the United States or Subject to Treaties or Agreements to which the United States is a Party

		Common Name	Scientific Name	Status, if known	Source of status information	Date of next status review, if known	Relevant treaty or agreement, if any
		Atlantic Spotted Dolphin	*Stenella frontalis*	Protected under the MMPA	MMPA Northern Gulf of Mexico (2005) -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2005doas-gmxn.pdf Western North Atlantic (2005) -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2005doas-wn.pdf Northern Gulf of Mexico (2007) -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007doas-gmxn.pdf Western North Atlantic (2007) -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2005doas-wn.pdf	Status of population in US waters reviewed every three years.	IWC
		Coastal spotted dolphin	*Stenella attenuata graffmani*	Protected under the MMPA	MMPA Northern Gulf of Mexico (2005) -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2005doas-gmxn.pdf Western North Atlantic (2005) -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2005doas-wn.pdf Northern Gulf of Mexico (2007) -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007dops-gmxn.pdf Western North Atlantic (2007) -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007dops-wn.pdf	Status of population in US waters reviewed every three years.	IWC
		Common Dolphin	*Delphinus spp.*	Protected under the MMPA	Western North Atlantic (2005) -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2005doco-wn.pdf Western North Atlantic (2007) -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007doco-wn.pdf		IWC
		Common Dolphin, Short-beaked	*Delphinus delphis*	Protected under the MMPA	California-Oregon-Washington -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po03shortbeakedcommondolphincaorwa.pdf California-Oregon-Washington 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007docl-ca.pdf	Status of population in US waters reviewed every three years.	IWC
		Common Dolphin, long-beaked	*Delphinus capensis*	Protected under the MMPA	California Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po03longbeakedcommondolphinca.pdf 2007 California Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007docl-ca.pdf	Status of portion of population in US waters reviewed annually.	
		Eastern spinner dolphin	*Stenella longirostris orientalis*	Depleted, protected under the MMPA	http://swfsc.noaa.gov/uploadedFiles/Divisions/PRD/Programs/ETP_Cetacean_Assessment/Gerrodettetal2005.pdf	Status of population in US waters reviewed every three years.	

Status of International Living Marine Resources Shared by the United States or Subject to Treaties or Agreements to which the United States is a Party

		Common Name	Scientific Name	Status, if known	Source of status information	Date of next status review, if known	Relevant treaty or agreement, if any
		Fraser's Dolphin	*Lagenodelphis hosei*	Protected under the MMPA	**Hawaii 2004** - http://www.nmfs.noaa.gov/pr/pdfs/sars/po04frasersdolphinhawaii%20.pdf **Northern Gulf of Mexico 2005** -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2005dofr-gmxn.pdf **Western North Atlantic 2005** -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2005dofr-wn.pdf Northern Gulf of Mexico 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007dofr-gmxn.pdf Western North Atlantic 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007dofr-wn.pdf	Status of population in US waters reviewed every three years.	
		Pantropical Spotted Dolphin	*Stenella attenuata*	Depleted, protected under the MMPA	**Hawaii 2004** -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po04pantropicalspotteddolphinhawaii.pdf Northern Gulf of Mexico 2005 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2005dops-gmxn.pdf Western North Atlantic Stock 2005 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2005dops-wn.pdf	Status of population in US waters reviewed every three years.	
		Northeastern offshore spotted dolphin	*Stenella attenuata attenuata*	Depleted, protected under the MMPA	Western North Atlantic Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2005dops-wn.pdf	Status of population in US waters reviewed every three years.	
		Northern Right Whale Dolphin	*Lissodelphis borealis*	Protected under the MMPA	California-Oregon-Washington 2003 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po03northernrightwhaledolphincaorwa.pdf	Status of population in US waters reviewed every three years.	
		Pacific White-Sided Dolphin	*Lagenorhynchus obliquidens*	Protected under the MMPA	California-Oregon-Washington, Northern and Southern Stocks 2003 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po03pacificwhitesideddolphincaorwa.pdf **North Pacific Stock** 2006 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2006_dopw-n.pdf California/Oregon/Washington 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007dopw-cow.pdf	Status of population in US waters reviewed every three years.	

Status of International Living Marine Resources Shared by the United States or Subject to Treaties or Agreements to which the United States is a Party

		Common Name	Scientific Name	Status, if known	Source of status information	Date of next status review, if known	Relevant treaty or agreement, if any
		Risso's Dolphin	*Grampus griseus*	Protected under the MMPA	**Hawaii 2004** -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po04rissosdolphinhawaii.pdf **California/Oregon/Washington Stock 2003** -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po03rissosdolphincaorwa.pdf **Northern Gulf of Mexico Stock 2005** -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2005dori-gmxn.pdf Western North Atlantic Stock 2006 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2006_dori-wn.pdf California/Oregon/Washington Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007dori-cow.pdf Northern Gulf of Mexico Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007dori-gmxn.pdf Western North Atlantic Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007dori-wn.pdf	Status of population in US waters reviewed every three years.	
		Rough-Toothed Dolphin	*Steno bredanensis*	Protected under the MMPA	**Hawaii 2004 -** http://www.nmfs.noaa.gov/pr/pdfs/sars/po04roughtotheddolphinhawaii.pdf **Northern Gulf of Mexico 2005** -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2005dort-gmxn.pdf Northern Gulf of Mexico 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007dort-gmxn.pdf	Status of population in US waters reviewed every three years.	
		Spinner Dolphins	*Stenella longirostris*	Protected under the MMPA	**Western North Atlantic Stock 2005** - http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2005dosp-wn.pdf **Hawaii 2004 --** http://www.nmfs.noaa.gov/pr/pdfs/sars/po04spinnerdolphinhawaii.pdf **Northern Gulf of Mexico 2005** -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2005dosp-gmxn.pdf Western North Atlantic Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007dosp-wn.pdf Northern Gulf of Mexico 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007dosp-gmxn.pdf	Status of population in US waters reviewed every three years.	

Status of International Living Marine Resources Shared by the United States or Subject to Treaties or Agreements to which the United States is a Party

		Common Name	Scientific Name	Status, if known	Source of status information	Date of next status review, if known	Relevant treaty or agreement, if any
		Striped Dolphin	*Stenella coeruleoalba*	Protected under the MMPA	**California-Oregon-Washington 2003 -** http://www.nmfs.noaa.gov/pr/pdfs/sars/po03stripeddolphincaorwa.pdf **Hawaii 2004** -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po04stripeddolphinhawaii.pdf **Northern Gulf of Mexico 2005** -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2005dost-gmxn.pdf **Western North Atlantic** - http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2005dost-wn.pdf Northern Gulf of Mexico Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007dost-gmxn.pdf Western North Atlantic 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007dost-wn.pdf	Status of population in US waters reviewed every three years.	
		White-Beaked Dolphin	*Lagenorhynchus albirostris*	Protected under the MMPA	**Western North Atlantic Stock 2006 --** http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2006_dowb-wn.pdf Western North Atlantic 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007dowb-wn.pdf	Status of population in US waters reviewed every three years.	
		Atlantic White-Sided Dolphin	*Lagenorhynchus acutus*	Protected under the MMPA	Western North Atlantic 2006 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2006_dows-wn.pdf Western North Atlantic Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007dows-wn.pdf	Status of population in US waters reviewed every three years.	
		European eel	*Anguilla anguilla*	Appendix II CITES			
		Dall's Porpoise	*Phoenoides dalli*	Protected under the MMPA	**Alaska 2006 --** http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2006_poda.pdf **California-Oregon-Washington** -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po03dallsporpoisecaorwa.pdf	Status of population in US waters reviewed every three years.	

Status of International Living Marine Resources Shared by the United States or Subject to Treaties or Agreements to which the United States is a Party

		Common Name	Scientific Name	Status, if known	Source of status information	Date of next status review, if known	Relevant treaty or agreement, if any
		Harbor Porpoise	*Phocoena phocoena*	Protected under the MMPA	**Bering Sea 2006** -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2006_poha-be.pdf Gulf of Alaska 2006 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2006_poha-ga.pdf Gulf of Maine/Bay of Fundy Stock 2006 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2006_poha-gme.pdf Inland Washington 2006 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2006_poha-wain.pdf Monterey Bay 2004 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po04harborporpoisemontereybay.pdf Morro Bay 2004 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po04harborporpoisemorrobay.pdf Northern California-Southern Oregon 2002 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/PO02harborporpoise_N.CA_S.OR.pdf Oregon-Washington Coastal 2006 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2006_poha-ow.pdf San Francisco-Russian River 2004-- http://www.nmfs.noaa.gov/pr/pdfs/sars/po04harborporpoisesanfranciscorussianriver.pdf Southeast Alaska Stock 2006 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2006_poha-se.pdf	Status of portion of population in US waters reviewed annually.	
		Finless Porpoise	*Neophocaena phocaenoides*	Protected under the MMPA, CITES Appendix I			
		Antarctic Fur Seal	*Arctocephalus gazella*	Protected under the MMPA, CITES Appendix II			
		Guadalupe Fur Seal	*Arctocephalus townsendi*	Threatened ESA/Depleted, protected under the MMPA, CITES Appendix I	http://www.nmfs.noaa.gov/pr/pdfs/sars/po2000segf-mx.pdf		
		Juan Fernandez Fur Seals	*Arctocephalus philippi*	Protected under the MMPA, Appendix II			
		Australian flatback turtle	*Natator depressus*	CITES, Appendix I	2007 IUCN Redlist -- http://www.iucnredlist.org/search/details.php/14363/summ		
		Sea Turtle, green	*Chelonia mydas*	ESA/Threatened/CITES, Appendix I	2007 Status Review -- http://www.nmfs.noaa.gov/pr/pdfs/species/greenturtle_5yearreview.pdf		

Status of International Living Marine Resources Shared by the United States or Subject to Treaties or Agreements to which the United States is a Party

		Common Name	Scientific Name	Status, if known	Source of status information	Date of next status review, if known	Relevant treaty or agreement, if any
		Sea Turtle, green (Two breeding populations)	*Chelonia mydas*	ESA/Endangered/CITES Appendix I	2007 Status Review -- http://www.nmfs.noaa.gov/pr/pdfs/species/greenturtle_5yearreview.pdf		
		Sea Turtle, hawksbill	*Eretmochelys imbricata*	ESA/Endangered; CITES, Appendix I	2007 Status Review -- http://www.nmfs.noaa.gov/pr/pdfs/species/hawksbill_5yearreview.pdf		
		Sea Turtle, Kemp's Ridley	*Lepidochelys kempii*	ESA/Endangered; CITES, Appendix I	2007 Status Review -- http://www.nmfs.noaa.gov/pr/pdfs/species/kempsridley_5yearreview.pdf		
		Sea Turtle, leatherback	*Dermochelys coriacea*	ESA/Endangered; CITES, Appendix I	2007 Status Review -- http://www.nmfs.noaa.gov/pr/pdfs/species/leatherback_5yearreview.pdf		
		Sea Turtle, loggerhead	*Caretta caretta*	ESA/Threatened/CITES, Appendix I (7 populations proposed as endangered under ESA, 2 populations	2009 Status Review -- http://www.nmfs.noaa.gov/pr/pdfs/statusreviews/loggerheadturtle2009.pdf		
		Sea Turtle, olive ridley	*Lepidochelys olivacea*	ESA/Threatened/CITES, Appendix I	2007 Status Review -- http://www.nmfs.noaa.gov/pr/pdfs/species/oliveridley_5yearreview.pdf		
		Sea Turtle, olive ridley	*Lepidochelys olivacea*	ESA/Endangered/CITES Appendix I	2007 Status Review -- http://www.nmfs.noaa.gov/pr/pdfs/species/oliveridley_5yearreview.pdf		
		Antarctic Minke Whale	*Balaenoptera bonaerensis*	Protected under the MMPA, CITES Appendix I			
		Beaked Whale, Baird's	*Berardius bardii*	Protected under the MMPA, CITES Appendix I	Alaska Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2005whba.pdf California/Oregon/Washington Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007whba-cow.pdf	Status of population in US waters reviewed every three years.	
		Beaked Whale, Blainville's	*Mesoplodon densirostris*	Protected under the MMPA, CITES Appendix I	Hawaiian Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2004whbv-hi.pdf Western North Atlantic -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao1995whbv-wn.pdf Northern Gulf of Mexico Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whbv-gmxn.pdf	Status of portion of population in US waters reviewed annually.	

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		Common Name	Scientific Name	Status, if known	Source of status information	Date of next status review, if known	Relevant treaty or agreement, if any
		Beaked Whale, Cuvier's	*Ziphius cavirostris*	Protected under the MMPA, CITES Appendix I	Alaska Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2005whcb.pdf California/Oregon/Washington Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007whcb-cow.pdf Hawaiian Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2004whcb-hi.pdf Northern Gulf of Mexico -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whcb-gmxn.pdf Western North Atlantic -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2005whcb-wn.pdf	Status of portion of population in US waters reviewed annually.	
		Beaked Whale, Gervais'	*Mesoplodon europaeus*	Protected under the MMPA, CITES Appendix I	Northern Gulf of Mexico -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whgv-gmxn.pdf Western North Atlantic Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao1995whgv-wn.pdf	Status of portion of population in US waters reviewed annually.	
		Beaked Whale, Longman's	*Indopacetus pacificus*	Protected under the MMPA, CITES Appendix I	Hawaiian Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2004whlb-hi.pdf	Status of population in US waters reviewed every three years.	
		Beaked Whale, Sowerby's	*Mesoplodon bidens*	Protected under the MMPA, CITES Appendix I	Western North Atlantic Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao1995whso-wn.pdf	Status of portion of population in US waters reviewed annually.	
		Beaked Whale, Stejneger's	*Mesoplodon stejnegeri*	Protected under the MMPA, CITES Appendix I	Alaska Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2005whsj.pdf	Status of population in US waters reviewed every three years.	
		Beaked Whale, True's	*Mesoplodon mirus*	Protected under the MMPA, CITES Appendix I	Western North Atlantic Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao1995whtb-wn.pdf	Status of portion of population in US waters reviewed annually.	

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		Common Name	Scientific Name	Status, if known	Source of status information	Date of next status review, if known	Relevant treaty or agreement, if any
		Beluga Whale	*Delphinapterus leucas*	Cook Inlet Beluga Whales/ESA/Endangered/ Protected under the MMPA	Beaufort Sea Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2005whbg-bf.pdf Bristol Bay Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2005whbg-bf.pdf Cook Inlet Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2007whbg-ci.pdf Cook Inlet DPS http://www.nmfs.noaa.gov/pr/pdfs/statusreviews/belugawhale_cookinlet.pdf Eastern Bering Sea Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2005whbg-bee.pdf Eastern Chucki Sea Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2005whbg-	Status of population in US waters reviewed every three years. Cook Inlet stock reviewed annually.	
		Blue Whale	*Balaenoptera musculus*	ESA/Endangered;MMPA/ Depleted;CITES/Appendix I	Western North Pacific -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2004whbl-wn.pdf Eastern North Pacific -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007whbl-en.pdf Western North Atlantic -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007whbl-en.pdf	Status of portion of population in US waters reviewed annually.	
		Bowhead Whale	*Balaena mysticetus*	ESA/Endangered;MMPA/ Depleted;CITES/Appendix I	Western Arctic Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2007whbh-arw.pdf	Status of portion of population in US waters reviewed annually.	
		Bryde's Whale	*Balaenoptera edeni*	Protected under the MMPA, CITES Appendix I	Eastern Tropical Pacific -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007whbr-etp.pdf Hawaiian Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2004whbr-hi.pdf Northern Gulf of Mexico Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2004whbr-hi.pdf	Status of population in US waters reviewed every three years.	
		Common Minke Whale	*Balaenoptera acutorostrata*	Protected under the MMPA, Appendix I/II for West Greenland population	Alaska Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2006whmi.pdf Canadian East Coast Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2006whmi.pdf California-Oregon-Washington Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007whmi-cow.pdf Hawaiian Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2004whmi-hi.pdf	Status of population in US waters reviewed every three years.	

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		Common Name	Scientific Name	Status, if known	Source of status information	Date of next status review, if known	Relevant treaty or agreement, if any
		Dwarf Minke Whale	*Balaenoptera acutorostrata subspecies*	Protected under the MMPA, CITES Appendix I			
		Dwarf Sperm Whale	*Kogia sima*	Protected under the MMPA	California/Oregon/Washington Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007whds-cow.pdf Hawaii Stock 2004 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2004whds-hi.pdf Northern Gulf of Mexico Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whds-gmxn.pdf Western North Atlantic Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whds-wn.pdf	Status of population in US waters reviewed every three years.	
		Eastern North Pacific gray whale	*Eschrichtius robustus*	Protected under the MMPA	Eastern North Pacific Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2007whgr-en.pdf	Status of portion of population in US waters reviewed annually.	
		False Killer Whale	*Pseudorca crassidens*	Protected under the MMPA	Pacific Islands Region Complex 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007whfk-hi.pdf Northern Gulf of Mexico Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whfk-gmxn.pdf	Status of population in US waters reviewed every three years.	
		Fin Whale	*Balaenoptera physalus*	ESA/Endangered;MMPA/Depleted;CITES/Appendix I	California/Oregon/Washington Stock 2003 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2003whfi-cow.pdf Hawaiian Stock 2005 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2004whfi-hi.pdf Northeast Pacific Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2007whfn-ne.pdf Western North Atlantic Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whfn-wn.pdf	Status of portion of population in US waters reviewed annually.	
		Gray Whale	*Eschrichtius robustus*	Western North Pacifi Gray WhaleESA/Endangered;MMPA/Depleted;CITES/Appendix I	Eastern North Pacific Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2007whgr-en.pdf	Status of portion of population in US waters reviewed annually.	

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		Humpback Whale	*Megaptera novaeangliae*	ESA/Endangered;MMPA/Depleted;CITES/Appendix I	Eastern North Pacific 2005 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2005whhb-en.pdf Central North Pacific 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2007whhb-pcnn.pdf Gulf of Maine 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whhb-gme.pdf Western North Pacific Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2007whhb-pwn.pdf	Status of portion of population in US waters reviewed annually.	
		Killer Whale	*Orcinus orca*	Protected under the MMPA [AT1 and Southern Resident listed as depleted]; Southern Resident listed as Endangered under ESA	AT1 Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2007whki-a1t.pdf Eastern North Pacific Alaska Resident -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2007whki-penar.pdf Eastern North Pacific Northern Resident Stock 2005 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2005whki-pennr.pdf Eastern North Pacific Offshore Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007whki-enos.pdf Eastern North Pacific Transient Stock 2000 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2000whki-pent.pdf Eastern North Pacific Southern Resident Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007whki-pensr.pdf Gulf of Alaska, Aleutian Islands and Bering Sea Transient Stock 2006 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2006whki-gaaibet.pdf Hawaii Stock 2004 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2004whki-hi.pdf Northern Gulf of Mexico Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whki-gmxn.pdf West Coast Transient 2005 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2005whki-	Status of population in US waters reviewed every three years. AT1 Transient and Eastern North Pacific Southern Resident stocks reviewed annually.	
		Melon-Headed Whale	*Peponocephala electra*	Protected under the MMPA		Status of population in US waters reviewed every three years.	
		Northern Atlantic Right Whale	*Eubalaena glacialis*	ESA/Endangered;MMPA/Depleted;CITES/Appendix I		Status of portion of population in US waters reviewed annually.	

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		Common Name	Scientific Name	Status, if known	Source of status information	Date of next status review, if known	Relevant treaty or agreement, if any
		Northern Bottlenose Whale	*Hyperoodon ampullatus*	Protected under MMPA, CITES Appendix I	Western North Atlantic Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whnb-wn.pdf	Status of population in US waters reviewed every three years.	
		Northern Pacific Right Whale	*Eubalaena japonica*	ESA/Endangered;MMPA/ Depleted;CITES/Appendix I	Eastern North Pacific Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2007whnr-pen.pdf	Status of portion of population in US waters reviewed annually.	
		Pilot Whale, Long-Finned	*Globicephala melas*	Protected under MMPA	Western North Atlantic 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whpl-wn.pdf	Status of population in US waters reviewed every three years.	
		Pilot Whale, Short-Finned	*Globicelphala macrorhynchus*	Protected under MMPA	California/Oregon/Washington Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007whps-cow.pdf Hawaii Stock 2006 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2006whps-hi.pdf Northern Gulf of Mexico Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whps-gmxn.pdf Western North Atlantic Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whps-wn.pdf	Status of population in US waters reviewed every three years.	
		Pygmy Right Whale	*Caperea marginata*	Protected under MMPA, CITES Appendix I			
		Pygmy Killer Whale	*Feresa attenuata*	Protected under MMPA	Hawaii Stock 2005 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2005whpk-hi.pdf Northern Gulf of Mexico stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whpk-gmxn.pdf Western North Atlantic Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whpk-wn.pdf	Status of population in US waters reviewed every three years.	
		Pygmy Sperm Whale	*Kogia breviceps*	Protected under MMPA	California/Oregon/Washington Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007whpy-cow.pdf Hawaii 2004 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2004whpy-hi.pdf Northern Gulf of Mexico 2004 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whpy-gmxn.pdf Western North Atlantic Stock -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whpy-wn.pdf	Status of population in US waters reviewed every three years.	

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		Sei Whale	*Balaenoptera borealis*	ESA/Endangered;MMPA/Depleted;CITES/Appendix I	Eastern North Pacific Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007whse-en.pdf Hawaii 2004 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2004whse-hi.pdf Nova Scotia Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whse-ns.pdf Western North Atlantic 2008 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao1998whse-wn.pdf	Status of portion of population in US waters reviewed annually.	
		Southern Bottlenose Whale	*Hyperoodon planifrons*	Protected under MMPA/CITES Appendix I			
		Southern Right Whale	*Eubalaena australis*	ESA/Endangered;MMPA/Depleted;CITES/Appendix I			
		Sperm Whale	*Physeter macrocephalus*	ESA/Endangered;MMPA/Depleted;CITES/Appendix I	California/Oregon/Washington Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007whsp-cow.pdf Hawaii 2004 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2004whsp-hi.pdf North Pacific 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2007whsp-pn.pdf North Atlantic 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whsp-n.pdf Northern Gulf of Mexico 2007 --- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whsp-gmxn.pdf	Status of portion of population in US waters reviewed annually.	
		Walrus	*Odobenus rosmarus*	Protected under MMPA, CITES Appendix III (Canada)	Pacific Walrus 2002 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/fws2002_walrus-p.pdf	USFWS species.	
		Basking shark	*Cetorhinus maximus*	50-90% decline	CITES (2002). Inclusion of Basking Shark in Appendix II. Prop 36	Unknown	CITES
		Porbeagle shark	*Lamna nasus*	Overfished, no overfishing occurring	Gibson and Campana 2005	Joint ICCAT/ICES assessment planned for 2009	ICCAT
		Smalltooth sawfish	*Pristis pectinata*	ESA/Endangered/90% decline	National Marine Fisheries Service. 2006. Recovery Plan for Smalltooth Sawfish (Pristis pectinata).	2008	ESA
		Whale Shark	*Rhincodon typus*	30-90% decline	CITES (2002). Inclusion of Whale Shark in Appendix II. Prop 35	Unknown	CITES
		White Shark	*Carcharodon carcharias*	60-90% decline	CITES (2004). Inclusion of White Shark in Appendix II. Prop 32	Unknown	CITES

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		Short-tailed albatross	*Phoebastria albatrus*	ESA/Endangered/Appendix 1, IUCN Endangered			CITES
Inter-American Convention on the Protection of Sea Turtles	**IAC**	**Common Name**	**Scientific Name**	**Status, if known**	**Source of status information**	**Date of next status review, if known**	**Relevant treaty or agreement, if any**
		Loggerhead turtle	*Caretta caretta*	ESA/Threatened - 7 DPS proposed for endangered/2 for threatened	2009 Status Review -- http://www.nmfs.noaa.gov/pr/pdfs/statusreviews/loggerheadturtle2009.pdf	2014	IAC
		Green turtle- Atlantic	*Chelonia mydas*	ESA/Threatened, except Florida breeding colony populations in Florida, which are endangered	NMFS 5-year review (August 2007)	2112	IAC
		Green turtle- Pacific	*Chelonia mydas*	ESA/Threatened, except breeding colony populations on Pacific coast of Mexico, which are endangered	NMFS 5-year review (August 2007)	2112	IAC
		Leatherback turtle	*Dermochelys coriacea*	ESA/Endangered	NMFS 5-year review (August 2007)	2112	IAC
		Hawksbill turtle	*Eretmochelys imbricata*	ESA/Endangered	NMFS 5-year review (August 2007)	2112	IAC
		Kemp's Ridley turtle	*Lepidochelys kempii*	ESA/Endangered	NMFS 5-year review (August 2007)	2112	IAC
		Olive Ridley turtle	*Lepidochelys olivacae*	Threatened everywhere found except breeding colony populations on the Pacific coast of Mexico, which are endangered	NMFS 5-year review (August 2007)	2112	IAC
Inter-American Tropical Tuna Commission	**IATTC**	**Common Name**	**Scientific Name**	**Status, if known**	**Source of status information**	**Date of next status review, if known**	**Relevant treaty or agreement, if any**
		Yellowfin tuna- Eastern Pacific	*Thunnus albacares*	Overfishing occuring	2006 report on the status of U.S. marine fish stocks		IATTC
		Bigeye tuna- Pacific	*Thunnus obesus*	Overfishing occuring	2006 report on the status of U.S. marine fish stocks		IATTC
		Skipjack tuna- Eastern Pacific	*Katsuwonus pelanis*	Overfishing not ocurring; not overfished	2006 report on the status of U.S. marine fish stocks		IATTC
		Striped Marlin- Eastern Pacific	*Tetrapturus audax*	Overfishing not ocurring; not overfished	2006 report on the status of U.S. marine fish stocks		IATTC
		Indo-Pacific Blue Marlin-Pacific	*Makaira mazara*	Close to fully exploited, but overfishing not occuring and not overfished	IATTC-74-04		IATTC
		Swordfish- North Pacific	*Xiphias gladius*	Overfishing not ocurring; not overfished	2006 report on the status of U.S. marine fish stocks		IATTC
		Swordfish- Southern Eastern Pacific Ocean	*Xiphias gladius*	Likely close to fully exploited	IATTC-74-04		IATTC

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		Dolphinfish- Pacific	*Coryphaena hippurus*	Unknown	2006 report on the status of U.S. marine fish stocks		IATTC
		Wahoo- Pacific	*Acanthocybium solandri*	Unknown	2006 report on the status of U.S. marine fish stocks		IATTC
		Jack Mackerel- Pacific	*Trachurus symmetricus*	Not overfished	2006 report on the status of U.S. marine fish stocks		IATTC
		Blue shark- Pacific	*Prionace glauca*	Overfishing not occurring; not overfished	2006 report on the status of U.S. marine fish stocks		IATTC
		Shortfin mako shark- Pacific	*Isurus oxyrinchus*	Unknown	Summary of Stock Status for Fish Stock Sustainability Index 2007		IATTC
		Longfin mako shark- Pacific	*Isurus paucus*	Unknown	2006 report on the status of U.S. marine fish stocks		IATTC
		Silky Shark- Pacific	*Carcharhinus falciformis*	Unknown	Summary of Stock Status for Fish Stock Sustainability Index 2007		IATTC
		Oceanic Whitetip Shark- Pacific	*Carcharhinus longimanus*	Unknown	Summary of Stock Status for Fish Stock Sustainability Index 2007		IATTC, WPFMC
		Antipodean albatross	*Diomedea antipodensis*	Vulnerable	IUCN 2004; IATTC BWG-5-05.a.1		IATTC
		Black-browed albatross	*Thalassarche melanophrys*	Endangered	IUCN 2004; IATTC BWG-5-05.a.1		IATTC
		Black-footed albatross	*Phoebastria nigripes*	Endangered	IUCN 2004; IATTC BWG-5-05.a.1		IATTC
		Buller's albatross	*Thalassarche bulleri*	Vulnerable	IUCN 2004; IATTC BWG-5-05.a.1		IATTC
		Chatham albatross	*Thalassarche eremita*	Critically Endangered	IUCN 2004; IATTC BWG-5-05.a.1		IATTC
		Grey-headed albatross	*Thalassarche chrysostoma*	Vulnerable	IUCN 2004; IATTC BWG-5-05.a.1		IATTC
		Laysan albatross	*Phoebastria immutabilis*	Vulnerable	IUCN 2004; IATTC BWG-5-05.a.1		IATTC
		Light-mantled albatross	*Phoebetria palpebrata*	Near Threatened	IUCN 2004; IATTC BWG-5-05.a.1		IATTC
		Northern royal albatross	*Diomedea sanfordi*	Endangered	IUCN 2004; IATTC BWG-5-05.a.1		IATTC
		Salvin's albatross	*Thalassarche salvini*	Vulnerable	IUCN 2004; IATTC BWG-5-05.a.1		IATTC
		Short-tailed albatross	*Phoebastria albatrus*	Vulnerable, ESA Endangered	IUCN 2004; IATTC BWG-5-05.a.1		IATTC
		Southern royal albatross	*Diomedea epomophora*	Vulnerable	IUCN 2004; IATTC BWG-5-05.a.1		IATTC
		Wandering albatross	*Diomedea exulans*	Vulnerable	IUCN 2004; IATTC BWG-5-05.a.1		IATTC
		Waved albatross	*Phoebastria irrorata*	Vulnerable	IUCN 2004; IATTC BWG-5-05.a.1		IATTC
		Black petrel	*Procellaria parkinsoni*	Vulnerable	IUCN 2004; IATTC BWG-5-05.a.1		IATTC
		Grey petrel	*Procellaria cineria*	Near Threatened	IUCN 2004; IATTC BWG-5-05.a.1		IATTC
		White-chinned petrel	*Procellaria aequinoctialis*	Vulnerable	IUCN 2004; IATTC BWG-5-05.a.1		IATTC
		Southern giant petrel	*Macronectes giganteus*	Vulnerable	IUCN 2004; IATTC BWG-5-05.a.1		IATTC
International Convention for the Conservation of Atlantic Tunas	**ICCAT**	**Common Name**	**Scientific Name**	**Status, if known**	**Source of status information**	**Date of next status review, if known**	**Relevant treaty or agreement, if any**
		Wahoo	*Acanthocybium solandri*	Unknown	ICCAT SCRS report	Unknown	ICCAT

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		Bigeye thresher	*Alopias superciliosus*	Atlantic-Unknown	ICCAT SCRS/2008	Unknown	ICCAT
		Common thresher	*Alopias vulpinus*	Atlantic-Unknown	ICCAT SCRS/2008	Unknown	ICCAT
		Silky	*Carcharhinus falciformis*	Atlantic-Unknown	ICCAT SCRS/2008	Unknown	ICCAT
		Oceanic whitetip	*Carcharhinus longimanus*	Atlantic-Unknown	ICCAT SCRS/2008	Unknown	ICCAT
		Atlantic black skipjack (Atlantic little tuna)	*Euthynnus alletteratus*	Unknown	ICCAT SCRS report	Unknown	ICCAT
		Sailfish	*Istiophorus albicans*	Unknown internationally; overfished with overfishing occurring domestically	ICCAT SCRS report; Status of U.S. Fisheries -- http://www.nmfs.noaa.gov/sfa/statusoffisheries/SOSmain.htm	2009	ICCAT
		Shortfin mako	*Isurus oxyrinchus*	North Atlantic - "non-negligible probability" that B is below Bmsy; overfishing occurring South Atlantic - Unknown	ICCAT SCRS/2008; Status of U.S. Fisheries -- http://www.nmfs.noaa.gov/sfa/statusoffisheries/SOSmain.htm	Unknown	ICCAT
		Longfin mako	*Isurus paucus*	Atlantic-Unknown	ICCAT SCRS/2008	Unknown	ICCAT
		Skipjack tuna	*Katsuwonus pelanis*	Not overfished; overfishing not occurring	ICCAT SCRS/2008	Unknown	ICCAT
		Porbeagle shark	*Lamna nasus*	Overfished, no overfishing occurring	Gibson and Campana (2005)	Joint ICCAT/ICES assessment planned for 2009	ICCAT
		Blue marlin	*Makaira nigricans*	Overfished/overfishing occurring	ICCAT SCRS/2006	2010	ICCAT
		Blue shark	*Prionace glauca*	North Atlantic - Not overfished; South Atlantic - Not overfished	ICCAT SCRS/2008	Unknown	ICCAT
		Crocodile shark	*Pseudocarcharias kamoharai*	Atlantic-Unknown	ICCAT SCRS/2008	Unknown	ICCAT
		Pelagic Stingray	*Pteroplatytrygon violacea*	Atlantic-Unknown	ICCAT SCRS/2008	Unknown	ICCAT
		Bonito	*Sarda sarda*	Unknown	ICCAT SCRS report	Unknown	ICCAT
		Serra Spanish mackerel	*Scomberomorus brasiliensis*	Unknown	ICCAT SCRS report	Unknown	ICCAT
		King mackerel	*Scomberomorus cavalla*	Unknown	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 13	2008	ICCAT
		Atlantic Spanish mackerel	*Scomberomorus maculatus*	Unknown	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 13	2008	ICCAT
		Scalloped hammerhead	*Sphyrna lewini*	Unknown	ICCAT SCRS/2008; Southeast Data, Assessment, and Review (SEDAR) Assessment Report 11	2008	ICCAT
		Smooth hammerhead	*Sphyrna zygaena*	Unknown	ICCAT SCRS/2008; Southeast Data, Assessment, and Review (SEDAR) Assessment Report 11	2008	ICCAT
		White marlin	*Tetrapturus albidus*	Overfished/overfishing occurring	ICCAT SCRS/2006	2010	ICCAT

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		Common Name	Scientific Name	Status, if known	Source of status information	Date of next status review, if known	Relevant treaty or agreement, if any
		Mediterranean Albacore tuna	*Thunnus alalunga*	Unknown	ICCAT SCRS report	Unknown	ICCAT
		Northern Albacore tuna	*Thunnus alalunga*	Overfished/overfishing occurring	ICCAT SCRS/2007	2009	ICCAT
		Southern Albacore tuna	*Thunnus alalunga*	Overfished	ICCAT SCRS/2007	Unknown	ICCAT
		Yellowfin tuna	*Thunnus albacares*	Fully exploited internationally; not overfished/no overfishing occurring domestically	ICCAT SCRS/2008; Status of U.S. Fisheries -- http://www.nmfs.noaa.gov/sfa/statusoffisheries/SOS main.htm	Unknown	ICCAT
		Blackfin tuna	*Thunnus atlanticus*	Unknown	ICCAT SCRS report	Unknown	ICCAT
		Bigeye tuna	*Thunnus obesus*	Overfished internationally; rebuilding domestically	ICCAT SCRS/2007; Status of U.S. Fisheries -- http://www.nmfs.noaa.gov/sfa/statusoffisheries/SOS main.htm	2011?	ICCAT
		Eastern Bluefin tuna	*Thunnus thynnus*	Overfished/overfishing ESA/candidate species	ICCAT SCRS report	2008	ICCAT
		Western Bluefin tuna	*Thunnus thynnus*	Overfished/overfishing ESA/candidate species	ICCAT SCRS/2008	Unknown	ICCAT
		North Atlantic Swordfish	*Xiphias gladius*	Fully exploited internationally; not overfished/rebuilding/no overfishing occurring domestically	ICCAT SCRS/2006; Status of U.S. Fisheries -- http://www.nmfs.noaa.gov/sfa/statusoffisheries/SOS main.htm	2009	ICCAT
		Mediterranean Swordfish	*Xiphias gladius*	Overfished/overfishing	ICCAT SCRS report	2008	ICCAT
		South Atlantic Swordfish	*Xiphias gladius*	Fully exploited	ICCAT SCRS report	2009	ICCAT
		Wandering albatross	*Diomedea exulans*	Vulnerable (Declining Rapidly)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Tristan albatross	*Diomedea dabbenena*	Endangered (Declining Rapidly)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Northern royal albatross	*Diomedea sanfordi*	Endangered (Stable/Increasing)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Southern royal albatross	*Diomedea epomophora*	Vulnerable (Stable)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Shy albatross	*Thalassarche cauta*	Near Threatened (Stable/Increasing)	IUCN 2004 (SCRS 2007 report)		ICCAT
		White-capped albatross	*Thalassarche steadi*	Vulnerable (Possibly Declining)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Black-browed albatross	*Thalassarche melanophrys*	Endangered (Overall Declining)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Grey-headed albatross	*Thalassarche chrysostoma*	Vulnerable (Declining Rapidly/Stable)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Atlantic yellow-nosed albatross	*Thalassarche chlororhynchos*	Endangered (Declining Rapidly)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Indian yellow-nosed albatross	*Thalassarche carteri*	Endangered (Declining)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Sooty albatross	*Phoebetria fusca*	Endangered (Declining)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Light-mantled albatross	*Phoebetria palpebrata*	Near Threatened	IUCN 2004 (SCRS 2007 report)		ICCAT

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		Southern giant petrel	*Macronectes giganteus*	Near Threatened (Decreasing/Increasing)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Northern giant petrel	*Macronectes halli*	Neart Threatened (Increasing/Stable)	IUCN 2004 (SCRS 2007 report)		ICCAT
		White-chinned petrel	*Procellaria aequinoctialis*	Vulnerable (Decreasing)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Spectacled petrel	*Procellaria conspicillata*	Vulnerable (Increasing)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Grey petrel	*Procellaria cinerea*	Near Threatened	IUCN 2004 (SCRS 2007 report)		ICCAT
		Cape petrel	*Daption capense*	Least Concern	IUCN 2004 (SCRS 2007 report)		ICCAT
		Northern fulmar	*Fulmarus glacialis*	Least Concern (Stable)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Southern fulmar	*Fulmarus glacialoides*	Least Concern	IUCN 2004 (SCRS 2007 report)		ICCAT
		Cory's shearwater	*Calonectris diomedea*	Least Concern (Decreasing Rapidly/Increasing)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Cape Verde shearwater	*Calonectris edwardsii*	Near Threatened (Possibly Stable)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Manx shearwater	*Puffinus puffinus*	Least Concern (Stable/Decreasing)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Balearic shearwater	*Puffinus mauritanicus*	Critically Endangered (Decreasing Rapidly)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Yelkouan shearwater	*Puffinus yelkoan*	Least Concern (Stable/Decreasing)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Great shearwater	*Puffinus gravis*	Least Concern	IUCN 2004 (SCRS 2007 report)		ICCAT
		Sooty shearwater	*Puffinus griseus*	Near Threatened	IUCN 2004 (SCRS 2007 report)		ICCAT
		Little shearwater	*Puffinus assimilis*	Least Concern (Stable)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Audubon's shearwater	*Puffinus lherminieri*	Least Concern	IUCN 2004 (SCRS 2007 report)		ICCAT
		Black-capped petrel	*Pterodroma hasitata*	Vulnerable (Decreasing)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Bermuda petrel	*Pterodroma cahow*	Endangered (Increasing)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Atlantic petrel	*Pterodroma incerta*	Vulnerable	IUCN 2004 (SCRS 2007 report)		ICCAT
		Great-winged petrel	*Pterodroma macroptera*	Least Concern	IUCN 2004 (SCRS 2007 report)		ICCAT
		Cape gannet	*Morus capensis*	Vulnerable (Decreasing Rapidly)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Northern gannet	*Morus bassanus*	Least Concern (Increasing)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Audouin's gull	*Larus audouinni*	Near Threatened (Increasing)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Yellow-legged gull	*Larus cachinnans*	Least Concern (Increasing)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Herring gull	*Larus argentatus*	Least Concern (Increasing)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Great black-backed gull	*Larus marinus*	Least Concern (Increasing/Stable)	IUCN 2004 (SCRS 2007 report)		ICCAT
		Laughing gull	*Larus atricilla*	Least concern	IUCN 2004 (SCRS 2007 report)		ICCAT
		Great skua	*Catharacta skua*	Least Concern (Increasing/Stable)	IUCN 2004 (SCRS 2007 report)		ICCAT
International Pacific Halibut Commission	**IPHC**	**Common Name**	**Scientific Name**	**Status, if known**	**Source of status information**	**Date of next status review, if known**	**Relevant treaty or agreement, if any**

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		Pacific Halibut	*Hippoglossus stenolepsis*	Near historic high abundance but declining, overfishing not occurring; not overfished	2007 Stock Assessment Report for IPHC Annual Meeting	Feb-09	Convention between Canada and the USA for the Preservation of the Halibut Fishery of the NE Pacific Ocean and Bering Sea
International Whaling Commission	**IWC**	**Common Name**	**Scientific Name**	**Status, if known**	**Source of status information**	**Date of next status review, if known**	**Relevant treaty or agreement, if any**
		Antarctic Minke Whale	Balaenoptera bonaerensis	Protected under the MMPA, CITES Appendix I. Widely varying estimates of abundance from circumpolar surveys leave current status unresolved.	IWC Scientific Committee	Continuous and reviewed annually by IWC	ICRW
		Blue Whale	Balaenoptera musculus	ESA/Endangered;MMPA/Depleted;CITES/Appendix I. Status varies by population: eastern North Pacific considered abundant, entire Southern hemisphere at <1% of pre-whaling abundance.		New information for Southern Hemisphere will be reviewed annually by IWC. No plans for boreal stocks. Status of portion of population in US waters reviewed annually.	ICRW
		Bowhead Whale	Balaena mysticetus	ESA/Endangered;MMPA/Depleted;CITES/Appendix I. Western Arctic stock abundant and growing; eastern Arctic appears ot be recovering well; Okhotsk Sea stock small, with unclear status; Spitsbergen stock may be functionally extinct.	IWC Scientific Committee (last review of western Arctic in 2007). Western Arctic: http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2007whbh-arw.pdf	Western Arctic: 2012. None planned for other stocks. Status of portion of population in US waters reviewed annually.	ICRW
		Bryde's Whale	Balaenoptera edeni	Protected under the MMPA, CITES Appendix I. Status largely unknown due to low effort and unresolved taxonomic issues.	IWC Scientific Committee Eastern Tropical Pacific: http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007whbr-etp.pdf Hawaii: http://www.nmfs.noaa.gov/pr/pdfs/sars/po2004whbr-hi.pdf Northern Gulf of Mexico: http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2005whbr-gmxn.pdf	None planned. Status of population in US waters reviewed every three years.	ICRW

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		Common Minke Whale	Balaenoptera acutorostrata	Protected under the MMPA, Appendix I/II for West Greenland population. Information regarding status varies from poor to good. West Greenland population subject to native catch. Status of Sea of Japan population a major concern due to high bycatch.	IWC Scientific Committee Alaska: http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2006whmi.pdf Canadian Eastern Coastal: http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whmi-cneco.pdf California-Oregon-Washington: http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007whmi-cow.pdf Hawaii: http://www.nmfs.noaa.gov/pr/pdfs/sars/po2004whmi-hi.pdf	Status of population in US waters reviewed every three years	ICRW
		Fin Whale	Balaenoptera physalus	ESA/Endangered;MMPA/Depleted;CITES/Appendix I. Information regarding status varies from poor to good.	IWC Scientific Committee California-Oregon-Washington: http://www.nmfs.noaa.gov/pr/pdfs/sars/po2003whfi-cow.pdf Hawaii: http://www.nmfs.noaa.gov/pr/pdfs/sars/po2004whfi-hi.pdf Northeast Pacific: http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2007whfn-ne.pdf Western North Atlantic: http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whfn-wn.pdf	North Atlantic population review may occur in 2009/10. Status of portion of population in US waters reviewed annually.	ICRW
		Gray Whale	Eschrichtius robustus	ESA/Endangered;MMPA/Depleted;CITES/Appendix I. Eastern population abundant and well recovered. Western population likely ca. 100 whales and critically endangered.	IWC Scientific Committee Eastern North Pacific: http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2007whgr-en.pdf	Eastern population: 2009. Western population: no review scheduled. Status of population in US waters reviewed every three years.	ICRW
		Humpback Whale	Megaptera novaeangliae	ESA/Endangered;MMPA/Depleted;CITES/Appendix I. North Atlantic & North Pacific: abundant and increasing. Southern Hemisphere: varies by stock from abundant to very small.	IWC Scientific Committee (N Atlantic stock reviewed in 2001). Eastern North Pacific: http://www.nmfs.noaa.gov/pr/pdfs/sars/po2005whhb-en.pdf Central North Pacific: http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2007whhb-pcnn.pdf Gulf of Maine: http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whhb-gme.pdf Western North Pacific: http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2007whhb-pwn.pdf	S Hemisphere status assessments ongoing. No plans for N Pacific. Status of portion of population in US waters reviewed annually. ESA status review underway.	ICRW

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		Northern Atlantic Right Whale	Eubalaena glacialis	ESA/Endangered;MMPA/Depleted;CITES/Appendix I. Critically endangered due to anthropogenic mortality.	IWC Scientific Committee, NMFS Stock Assessment Reports. Last reviewed by IWC in 1998. Western Stock: http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whnr-w.pdf	Ongoing by NMFS as part of SAR process. Status of portion of population in US waters reviewed annually.	ICRW
		Northern Pacific Right Whale	Eubalaena japonica	ESA/Endangered;MMPA/Depleted;CITES/Appendix I. Eastern stock critically endangered and likely < 100 animals due to illegal whaling in 1960s; western stock unknown but likely in hundreds.	NMFS/AFSC.NMML, Stock Assessment Reports. Last reviewed by IWC in 1998. Eastern North Pacific: http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2007whnr-pen.pdf	Ongoing by NMFS as part of SAR process. Status of portion of population in US waters reviewed annually.	ICRW
		Sei Whale	Balaenoptera borealis	ESA/Endangered;MMPA/Depleted;CITES/Appendix I. Information generally too poor to reliably assess status for any stock.	Eastern North Pacific Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007whse-en.pdf Hawaii 2004 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2004whse-hi.pdf Nova Scotia Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whse-ns.pdf	Status of portion of population in US waters reviewed annually.	ICRW
		Southern Right Whale	Eubalaena australis	ESA/Endangered;MMPA/Depleted;CITES/Appendix I. Status varies by population from abundant and increasing to small/unknown.	IWC Scientific Committee (last review in 1998).	None planned	ICRW
		Sperm Whale	Physeter macrocephalus	ESA/Endangered;MMPA/Depleted;CITES/Appendix I.	California/Oregon/Washington Stock 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007whsp-cow.pdf Hawaii 2004 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/po2004whsp-hi.pdf North Pacific 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2007whsp-pn.pdf North Atlantic 2007 -- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whsp-n.pdf Northern Gulf of Mexico 2007 --- http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2007whsp-gmxn.pdf	Status of portion of population in US waters reviewed annually.	

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North Atlantic Fisheries Organization	**NAFO**	**Common Name**	**Scientific Name**	**Status, if known**	**Source of status information**	**Date of next status review, if known**	**Relevant treaty or agreement, if any**
Note: The NAFO Convention applies to all fishery resources within the NAFO Convention Area, excluding: salmon, tunas and marlins, cetacean stocks, managed by the IWC, and sedentary species of the Continental Shelf. Parties are known to target approximately 25 commercial species.		American plaice	*Hippoglossoides platessoides*	Moratorium on fishing	2007 Scientific Council Reports		NAFO
		Atlantic cod	*Gadus morhua*	Moratorium on fishing	2007 Scientific Council Reports		NAFO
		Witch flounder	*Glyptocephalus cynoglossus*	Moratorium on fishing	2007 Scientific Council Reports		NAFO
		Capelin	*Mallotus villosus*	Moratorium on fishing	2007 Scientific Council Reports		NAFO
		Greenland halibut	*Reinhardtius hippogloides*	Under 15 year rebuilding plan-continued decline (overfished)	2007 Scientific Council Reports		NAFO
		Beaked redfishes	*Sebastes spp.*	Species include: *Sebastes marinus and Sebastes fasciatus*. Stocks managed by NAFO Division: Div. 3LN - moratorium, Divs. 3M, 3O, and Subarea 2 and Div 1F+3K - stable.	2007 Scientific Council Reports		NAFO
		Oceanic redfish	*Sebastes mentella*	Managed with *Sebastes marinus* and *Sebastes fasciatus*. Stock managed by NAFO in Division 1F+3K - stable.	2007 Scientific Council Reports		NAFO
		White hake	*Urophycis tenuis*	Stable/recent decline	2007 Scientific Council Reports		NAFO
		Yellowtail flounder	*Limanda ferruginea*	Stable/increasing	2007 Scientific Council Reports		NAFO
		Short-finned squid	*Illex illecebrosus*	Stable/intermittant fishery	2007 Scientific Council Reports		NAFO
		Shrimps	*Pandalus sp.*	Stocks stable in Divs 3L and 3M. Moratorium in Div. 3NO	2007 Scientific Council Reports		NAFO

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		Thorny skate (starry ray)	*Amblyraja radiata*	Overfished	NEFSC 44th Stock Assessment Summary 25b:Skate Complex	Unknown	NAFO
		Winter skate	*Leucoraja ocellata*	Overfishing is occurring	NEFSC 44th Stock Assessment Summary 25b:Skate Complex	Unknown	NAFO
		Barndoor skate	*Dipturus laevis*	Not overfished or overfishing occurring	NEFSC 44th Stock Assessment Summary 25b:Skate Complex	Unknown	NAFO
		Clearnose skate	*Raja eglanteria*	Not overfished or overfishing occurring	NEFSC 44th Stock Assessment Summary 25b:Skate Complex	Unknown	NAFO
		Rosette skate	*Leucoraja garmani*	Not overfished or overfishing occurring	NEFSC 44th Stock Assessment Summary 25b:Skate Complex	Unknown	NAFO
		Little	*Leucoraja erinacea*	Not overfished or overfishing occurring	NEFSC 44th Stock Assessment Summary 25b:Skate Complex	Unknown	NAFO
		Smooth skate	*Malacoraja senta*	Not overfished or overfishing occurring	NEFSC 44th Stock Assessment Summary 25b:Skate Complex	Unknown	NAFO
		Roundnose grenadier	*Macrourus rupestris*	Not regulated/SubAreas 0+1 -stable			NAFO
		Roughhead grenadier	*Macrourus rupestris*	Not regulated/low levels			NAFO
		Wolffishes (catchfish) (NS)	*Anarhichas spp.*	Not regulated. Species Include: *Anarhichas lupus, Anarhichas minor, and Anarhichas denticulatus* . Stocks at low levels -potential for future management			NAFO
		Dogfishes (NS)	*Raja spp.*	Data gathering and finning regulations for all "sharks"			NAFO
		Silver Hake	*Squalidae*	Not regulated/unknown. Includes *Squalus acanthias and Centroscyllium terraenovae*			NAFO
		Red hake	*Merluccius bilinearis*	Not regulated/unknown			NAFO
		Pollock (saithe)	*Urophycis chuss*	Not regulated/unknown			NAFO
		Haddock	*Pollachius virens*	Not regulated/unknown			NAFO
		American angler	*Melanogrammus aeglefinus*	Not regulated/unknown			NAFO
		Atlantic halibut	*Lophius americanus*	Not regulated/unknown			NAFO
		Atlantic herring	*Hippoglossus hippoglossus*	Not regulated/unknown			NAFO
		Atlantic mackerel	*Clupea harengus*	Not regulated/unknown			NAFO
		Winter flounder	*Scomber scombrus*	Not regulated/unknown			NAFO
Other species found in the NAFO Area (Note: not a complete listing of the species over which NAFO has jurisdiction)		Windowpane flounder	*Pseudopleuronectes americanus*	Not regulated/unknown			NAFO
		Flatfish (NS)	*Scophthalmus aquosus*	Not regulated/unknown			NAFO
		Atlantic searobins	*Pleuronectiformes*	Not regulated/unknown			NAFO

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		Atlantic tomcod	*Prionotus spp.*	Not regulated/unknown			NAFO
		Blue antimora	*Microgadus tomcod*	Not regulated/unknown			NAFO
		Blue whiting (Poutassou)	*Antimora rostrata*	Not regulated/unknown			NAFO
		Cunner	*Micromesistius poutassou*	Not regulated/unknown			NAFO
		Cusk (Tusk)	*Tautogalabrus adspersus*	Not regulated/unknown			NAFO
		Greenland cod	*Brosme brosme*	Not regulated/unknown			NAFO
		Blue ling	*Gadus ogac*	Not regulated/unknown			NAFO
		Ling	*Molva dypterygia*	Not regulated/unknown			NAFO
		Lumpfish (lumpsucker)	*Molva molva*	Not regulated/unknown			NAFO
		Northern kingfish	*Cycloterus lumpus*	Not regulated/unknown			NAFO
		Northen puffer	*Menticirrhus saxatilis*	Not regulated/unknown			NAFO
		Eelpouts (NS)	*Sphoeroides maculatus*	Not regulated/unknown			NAFO
		Ocean pout	*Lycodes spp.*	Not regulated/unknown			NAFO
		Polar cod	*Macrozoarces americanus*	Not regulated/unknown			NAFO
		Sandeels (Sandlances)	*Boreogadus saida*	Not regulated/unknown			NAFO
		Sculpins (NS)	*Ammodytes spp.*	Not regulated/unknown			NAFO
		Scup	*Myoxocephalus spp.*	Not regulated/unknown			NAFO
		Tautog	*Stenotomuschrysops*	Not regulated/unknown			NAFO
		Tilefish	*Tautoga onitis*	Not regulated/unknown			NAFO
		Atlantic butterfish	*Lopholatilus chamaeleonticeps*	Not regulated/unknown			NAFO
		River herring (alewife)	*Peprilus triacanthus*	Not regulated/unknown			NAFO
		Argentines (NS)	*Alosa pseudoharengus*	Not regulated/unknown			NAFO
		Atlantic argentine	*Argentina spp.*	Not regulated/unknown			NAFO
		Long-finned squid	*Argentina silus*	Not regulated/unknown			NAFO
		Greenland cod	*Loligo pealei*	Not regulated/unknown			NAFO
		Atlantic menhaden		Not regulated/unknown			NAFO
		Atlantic saury	*Brevoortia tyrannus*	Not regulated/unknown			NAFO
		Bay anchovy	*Scomberesox saurus*	Not regulated/unknown			NAFO
		Bluefish	*Anchoa mitchilli*	Not regulated/unknown			NAFO
		Crevalle jack	*Pomatomus saltatrix*	Not regulated/unknown			NAFO
		Amberjacks (NS)	*Caranx hippos*	Not regulated/unknown			NAFO
		American conger	*Seriola spp.*	Not regulated/unknown			NAFO
		American eel	*Conger oceanicus*	Not regulated/unknown			NAFO
		Atlantic hagfish	*Anguilla rostrata*	Not regulated/unknown			NAFO
		Atlantic croaker	*Myxine glutinosa*	Not regulated/unknown			NAFO
		Atlantic needlefish	*Micropogonias undulatus*	Not regulated/unknown			NAFO
		Atlantic silverside	*Strongylura marina*	Not regulated/unknown			NAFO
		Atlantic thread herring	*Menidia menidia*	Not regulated/unknown			NAFO
		Baird's slickhead	*Opisthonema oglinum*	Not regulated/unknown			NAFO
		Black drum	*Alepocephalus bairdii*	Not regulated/unknown			NAFO
		Black seabass	*Pogonias cromis*	Not regulated/unknown			NAFO
		Blueback herring	*Centropristis striata*	Not regulated/unknown			NAFO
		Chars (NS)	*Alosa aestivalis*	Not regulated/unknown			NAFO

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		Common Name	Scientific Name	Status, if known	Source of status information	Date of next status review, if known	Relevant treaty or agreement, if any
		Cobia	*Salvelinus spp.*	Not regulated/unknown			NAFO
		Common (Florida) pompano	*Rachycentron canadum*	Not regulated/unknown			NAFO
		Gizzard shad	*Trachinotus carolinus*	Not regulated/unknown			NAFO
		Grunts (NS)	*Dorosoma cepedianum*	Not regulated/unknown			NAFO
		Hickory shad	*Pomadasyidae*	Not regulated/unknown			NAFO
		Lampfishes	*Alosa mediocris*	Not regulated/unknown			NAFO
		Mullets (NS)	*Notoscopelus spp.*	Not regulated/unknown			NAFO
		North Atlantic harvestfish	*Mugilidae*	Not regulated/unknown			NAFO
		Pigfish	*Peprilus alepidotus (=paru)*	Not regulated/unknown			NAFO
		Rainbow smelt	*Orthopristis chrysoptera*	Not regulated/unknown			NAFO
		Red drum	*Osmerus mordax*	Not regulated/unknown			NAFO
		Red porgy	*Sciaenops ocellatus*	Not regulated/unknown			NAFO
		Rough scad	*Pagrus pagrus*	Not regulated/unknown			NAFO
		Sand perch	*Trachurus lathami*	Not regulated/unknown			NAFO
		Sheepshead	*Diplectrum formosum*	Not regulated/unknown			NAFO
		Spot croaker	*Archosaurgus probatocephalus*	Not regulated/unknown			NAFO
		Spotted weakfish	*Leiostomus xanthurus*	Not regulated/unknown			NAFO
		Squeteague (Gray weakfish)	*Cynoscion nebulosus*	Not regulated/unknown			NAFO
		Striped bass	*Cynoscion regalis*	Not regulated/unknown			NAFO
			Morone saxatilis	Not regulated/unknown			NAFO
North Atlantic Salmon Conservation Organization	**NASCO**	**Common Name**	**Scientific Name**	**Status, if known**	**Source of status information**	**Date of next status review, if known**	**Relevant treaty or agreement, if any**
		Atlantic salmon	*Salmo salar*	ESA/ Gulf of Maine DPS Endangerd	http://www.nmfs.noaa.gov/pr/pdfs/statusreviews/atlanticsalmon.pdf	2011	Convention for the Conservatoin of North Atlantic Salmon
North Pacific Anadromous Fish Commission	**NPAFC**	Chum salmon	**Scientific Name**	**Status, if known**	**Source of status information**	**Date of next status review, if known**	**Relevant treaty or agreement, if any**
		Coho salmon	*Oncorhynchus keta*	Near historical high abundance with high hatchery production; not overfished	Canada. Japan, ROK, Russia, United States	Nov-08	N. Pac. Anadromous Stocks Convention
		Pink salmon	*Oncorhynchus kisutch*	Variable abundance but at medium level, Not overfished	Canada, Japan, ROK, Russia, United States	Nov-08	N. Pac. Anadromous Stocks Convention

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		Common Name	Scientific Name	Status, if known	Source of status information	Date of next status review, if known	Relevant treaty or agreement, if any
		Sockeye salmon	*Oncorhynchus gorbuscha*	Near historical high abundance with high hatchery production in Russia and Alaska; not overfished	Canada, Japan, ROK, Russia, United States	Nov-08	N. Pac. Anadromous Stocks Convention
		Chinook salmon	*Oncorhynchus nerka*	Variable abundance but at medium level, not overfished	Canada, Japan, ROK, Russia, United States	Nov-08	N. Pac. Anadromous Stocks Convention
		Cherry salmon	*Oncorhynchus tshawytscha*	Low natural and hatchery production; near levels of overfishing	Canada, Japan, ROK, Russia, United States	Nov-08	N. Pac. Anadromous Stocks Convention
		Steelhead trout	*Oncorhynchus masou*	Low natural production, not overfished	Canada, Japan, ROK, Russia, United States	Nov-08	N. Pac. Anadromous Stocks Convention
			Oncorhynchus mykiss	Low abundance, some near overfished	Canada, Japan, ROK, Russia, United States	Nov-08	N. Pac. Anadromous Stocks Convention
Pacific Salmon Commission	**PSC**	**Common Name**	**Scientific Name**	**Status, if known**	**Source of status information**	**Date of next status review, if known**	**Relevant treaty or agreement, if any**
		Chum salmon	*Oncorhynchus keta*	Low production in Pacific NW and some overfished stocks	Canada, United States	Jan-09	U.S.-Canada Pacific Salmon Treaty
		Coho salmon	*Oncorhynchus kisutch*	Low production in Pacific NW and some overfished stocks	Canada, United States	Jan-09	U.S.-Canada Pacific Salmon Treaty
		Pink salmon	*Oncorhynchus gorbuscha*	Low production in Pacific NW and some overfished stocks	Canada, United States	Jan-09	U.S.-Canada Pacific Salmon Treaty
		Sockeye salmon	*Oncorhynchus nerka*	Low production in Pacific NW and many overfished stocks	Canada, United States	Jan-09	U.S.-Canada Pacific Salmon Treaty
		Chinook salmon	*Oncorhynchus tshawytscha*	Low production in Pacific NW and many overfished stocks	Canada, United States	Jan-09	U.S.-Canada Pacific Salmon Treaty
		Steelhead trout	*Oncorhynchus mykiss*	Low production in Pacific NW and many overfished stocks	Canada, United States	Jan-09	U.S.-Canada Pacific Salmon Treaty
U.S.- Canada Alabacore Treaty		**Common Name**	**Scientific Name**	**Status, if known**	**Source of status information**	**Date of next status review, if known**	**Relevant treaty or agreement, if any**
		North Pacific Albacore	*Thunnus alalunga*	Unknown			
U.S.-Canada Pacific Whiting Agreement		**Common Name**	**Scientific Name**	**Status, if known**	**Source of status information**	**Date of next status review, if known**	**Relevant treaty or agreement, if any**
		Pacific Hake/Pacific Whiting	*Merluccius productus*	Overfishing not ocurring; not overfished	2007 report on the status of U.S. marine fish stocks	Mar-09	Agreement pending Canada ratification
Western and Central Pacific Fisheries Commission	**WCPFC**	**Common Name**	**Scientific Name**	**Status, if known**	**Source of status information**	**Date of next status review, if known**	**Relevant treaty or agreement, if any**

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		Common Name	Scientific Name	Status, if known	Source of status information	Date of next status review, if known	Relevant treaty or agreement, if any
		WCPO Bigeye Tuna	*Thunnus obesus*	Overfishing may be occurring, not yet overfished	WCPFC Scientific Committee, International Scientific Committee		WCPFC
		WCPO Yellowfin Tuna	*Thunnus albacares*	Overfishing may be occurring, not yet overfished	WCPFC Scientific Committee, International Scientific Committee		WCPFC
		Pacific Bluefin Tuna	*Thunnus orientalis*	Unknown	WCPFC Scientific Committee, International Scientific Committee		WCPFC
		WCPO Skipjack Tuna	*Katsuwonis pelamis*	Not overfished	WCPFC Scientific Committee, International Scientific Committee		WCPFC
		South Pacific Albacore	*Thunnus alalunga*	Not overfished; not subject to overfishing	WCPFC Scientific Committee, International Scientific Committee		WCPFC
		North Pacific Albacore	*Thunnus alalunga*	Fully exploited	WCPFC Scientific Committee, International Scientific Committee		WCPFC
		SW Pacific Swordfish	*Xiphias gladius*	May be overfished	WCPFC Scientific Committee, International Scientific Committee		WCPFC
		North Pacific Striped Marlin	*Tetrapturus audax*	Unknown	WCPFC Scientific Committee, International Scientific Committee		WCPFC
		South Pacific Striped Marlin	*Tetrapturus audax*	Unknown	WCPFC Scientific Committee, International Scientific Committee		WCPFC
		Antipodean Albatross	*Diomedea antipodensis*	Vulnerable	WCPFC-SC3-EB-SWG/IP-17		WCPFC
		Black-browed Albatross	*Thalassarche melanophrys*	Endangered	WCPFC-SC3-EB-SWG/IP-17		WCPFC
		Black-footed Albatross	*Phoebastria nigripes*	Endangered	WCPFC-SC3-EB-SWG/IP-17		WCPFC
		Buller's Albatross	*Thalassarche bulleri*	Vulnerable	WCPFC-SC3-EB-SWG/IP-17		WCPFC
		Campbell Albatross	*Thalassarche impavida*	Vulnerable	WCPFC-SC3-EB-SWG/IP-17		WCPFC
		Chatham Albatross	*Thalassarche eremita*	Critically Endangered	WCPFC-SC3-EB-SWG/IP-17		WCPFC
		Grey-headed Albatross	*Thalassarche chrysostoma*	Vulnerable	WCPFC-SC3-EB-SWG/IP-17		WCPFC
		Laysan Albatross	*Phoebastria immutabilis*	Vulnerable	WCPFC-SC3-EB-SWG/IP-17		WCPFC
		Light-mantled Albatross	*Phoebetria palpebrata*	Near Threatened	WCPFC-SC3-EB-SWG/IP-17		WCPFC
		Northern Royal Albatross	*Diomedea sanfordi*	Endangered	WCPFC-SC3-EB-SWG/IP-17		WCPFC
		Salvin's Albatross	*Thalassarche salvini*	Vulnerable	WCPFC-SC3-EB-SWG/IP-17		WCPFC
		Short-tailed Albatross	*Phoebastria albatrus*	Vulnerable, ESA Endangered	WCPFC-SC3-EB-SWG/IP-17		WCPFC
		Shy Albatross	*Thalassarche cauta*	Near Threatened	WCPFC-SC3-EB-SWG/IP-17		WCPFC
		Southern Royal Albatross	*Diomedea epomophora*	Vulnerable	WCPFC-SC3-EB-SWG/IP-17		WCPFC
		Wandering Albatross	*Diomedea exulans*	Vulnerable	WCPFC-SC3-EB-SWG/IP-17		WCPFC
		Waved Albatross	*Phoebastria irrorata*	Vulnerable	WCPFC-SC3-EB-SWG/IP-17		WCPFC
		Northern Giant-petrel	*Macronectes halli*	Near Threatened	WCPFC-SC3-EB-SWG/IP-17		WCPFC
		Southern Giant-petrel	*Macronectes giganteus*	Vulnerable	WCPFC-SC3-EB-SWG/IP-17		WCPFC
		Westland Petrel	*Procellaria westlandica*	Vulnerable	WCPFC-SC3-EB-SWG/IP-17		WCPFC

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		Common Name	Scientific Name	Status, if known	Source of status information	Date of next status review, if known	Relevant treaty or agreement, if any
		Short-tailed Shearwater	*Puffinus tenuirostris*	Least Concern	WCPFC-SC3-EB-SWG/IP-17		WCPFC
Commission for the Conservation of Anarctic Living Marine Resources	**CCAMLR**	**Common Name**	**Scientific Name**	**Applicable Statistical Area, Subarea, Division**	**State of Knowledge**	**IUCN and ESA Status (where applicable)**	**(Status) Fisheries Type**
		Patagonian toothfish	*Dissostichus eleginoides*	48.4	assessed		established
		Patagonian toothfish	*Dissostichus eleginoides*	58. 5.2	assessed		established
		Patagonian toothfish	*Dissostichus eleginoides*	48.3	assessed		established
		Mackerel icefish	*Champsocephalus gunnari*	48.3	assessed		established
		Mackerel icefish	*Champsocephalus gunnari*	58.5.2	assessed		established
		Antarctic krill	*Euphuasia superba*	48.1	assessed		established
		Antarctic krill	*Euphuasia superba*	48.2	assessed		established
		Antarctic krill	*Euphuasia superba*	48.3	assessed		established
		Antarctic krill	*Euphuasia superba*	48.4	assessed		established
		Antarctic krill	*Euphuasia superba*	58.4.1	assessed		established
		Antarctic krill	*Euphuasia superba*	58.4.2	assessed		established
		Toothfish	*Dissostichus spp.*	58.5.1 within French and South African EEZs	assessed		established
		Toothfish	*Dissostichus spp.*	58.6 within French and South African EEZs	assessed		established
		Toothfish	*Dissostichus spp.*	58.7 within French and South African EEZs	assessed		established
		Toothfish	*Dissostichus spp.*	88.1	assessed		exploratory
		Toothfish	*Dissostichus spp.*	88.2	assessed		exploratory
		Toothfish	*Dissostichus spp.*	48.6	new		exploratory
		Toothfish	*Dissostichus spp.*	58.4.2	new		exploratory
		Toothfish	*Dissostichus spp.*	58.4.3a outside areas of national jurisdiction	new		exploratory
		Toothfish	*Dissostichus spp.*	58.4.3b outside areas of national jurisdiction	new		exploratory
		Patagonian toothfish	*Dissostichus eleginoides*	58.5.2	new		exploratory
		Toothfish	*Dissostichus spp.*	88.2	new		exploratory
		Toothfish	*Dissostichus spp.*	58.4.1	new		exploratory
		Toothfish	*Dissostichus spp.*	48.3	new		exploratory
		Sevenstar flying squid	*Martialia hyadesi*	48.3	new		exploratory
		Subantarctic lithodid crab	*Paralomis spinosissima*	48.3	new		exploratory
		Subantarctic lithodid crab	*Paralomis formosa*	48.3	new		exploratory

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		Marbled rockcod	*Notothenia rossii*	48.1	insufficient data or stock biomass		prohibited
		Marbled rockcod	*Notothenia rossii*	48.2	insufficient data or stock biomass		prohibited
		Marbled rockcod	*Notothenia rossii*	48.3	insufficient data or stock biomass		prohibited
		Humped rockcod	*Gobionotothen gibberifrons*	48.3	insufficient data or stock biomass		prohibited
		Blackfin icefish	*Chaenocephalis aceratus*	48.3	insufficient data or stock biomass		prohibited
		South Georgia icefish	*Pseudochaenichthys georgianus*	48.3	insufficient data or stock biomass		prohibited
		Grey rockcod	*Lepidonothen squamifrons*	48.3	insufficient data or stock biomass		prohibited
		Patagonian rockcod	*Patagonotothen guntheri*	48.3	insufficient data or stock biomass		prohibited
		Grey rockcod	*Lepidonothen squamifrons*	58.4.4	insufficient data or stock biomass		prohibited
		Toothfish	*Dissostichus spp.*	58.4.4 outside areas of national jurisdiction	insufficient data or stock biomass		prohibited
		Toothfish	*Dissostichus spp.*	58.5.1 outside areas of national jurisdiction	insufficient data or stock biomass		prohibited
		Toothfish	*Dissostichus spp.*	58.6 outside areas of national jurisdiction	insufficient data or stock biomass		prohibited
		Toothfish	*Dissostichus spp.*	58.7 outside areas of national jurisdiction	insufficient data or stock biomass		prohibited
		Patagonian toothfish	*Dissostichus eleginoides*	58.6	insufficient data or stock biomass		prohibited
		Patagonian toothfish	*Dissostichus eleginoides*	58.7	insufficient data or stock biomass		prohibited
		Patagonian toothfish	*Dissostichus eleginoides*	58.5.1 outside areas of national jurisdiction	insufficient data or stock biomass		prohibited
		Patagonian toothfish	*Dissostichus eleginoides*	58.5.2 east of 70º 20' E and outside the EEZ to the west of 70º 20' E	insufficient data or stock biomass		prohibited
		Toothfish	*Dissostichus spp.*	88.2 north of 65° S	insufficient data or stock biomass		prohibited
		Toothfish	*Dissostichus spp.*	88.3	insufficient data or stock biomass		prohibited
		Lanternfish	*Electrona carlsbergi*	48.3	insufficient data or stock biomass		prohibited
		sharks		anywhere in the Convention Area	insufficient data or stock biomass		prohibited
		Unicorn icefish	*Channichthys rhinoceratus*	58.5.2			bycatch limited
		Grey rockcod	*Lepidonotothen squamifrons*	58.5.2			bycatch limited
		Rattails, grenadiers	*Macrourus spp.*	58.5.2			bycatch limited
		Humped rockcod	*Gobionotothen gibberifrons*	48.3			bycatch limited
		Blackfin icefish	*Chaenocephalis aceratus*	48.3			bycatch limited
		South Georgia icefish	*Pseudochaenichthys georgianus*	48.3			bycatch limited
		Marbled rockcod	*Notothenia rossii*	48.3			bycatch limited
		Grey rockcod	*Lepidonotothen squamifrons*	48.3			bycatch limited

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		southern elephant seal	*Mirounga leonina*	All CCAMLR Convention Area			bycatch minimized
		Antarctic fur seal	*Arctocephalus gazella*	All CCAMLR Convention Area		Least concern	bycatch minimized
		Wandering albatross	*Diomedea exulans*	All CCAMLR Convention Area		Vulnerable (Declining Rapidly)	bycatch minimized
		Royal albatross	*Diomedea epomophora*	All CCAMLR Convention Area		Vulnerable (Stable)	bycatch minimized
		Black-browed albatross	*Thalassarche melanophrys*	All CCAMLR Convention Area		Endangered (Overall Declining)	bycatch minimized
		Campbell albatross	*Thalassarche impavida*	All CCAMLR Convention Area		Vulnerable (stable)	bycatch minimized
		Grey-headed albatross	*Thalassarche chrysostoma*	All CCAMLR Convention Area		Vulnerable	bycatch minimized
		Sooty albatross	*Phoebetria fusca*	All CCAMLR Convention Area		Endangered (Declining)	bycatch minimized
		Light-mantled albatross	*Phoebetria palpebrata*	All CCAMLR Convention Area		Near Threatened	bycatch minimized
		Amsterdam albatross	*Diomedea amsterdamensis*	All CCAMLR Convention Area		Critically Endangered (Declining), ESA-Endangered	bycatch minimized
		Southern giant petrel	*Macronectes giganteus*	All CCAMLR Convention Area		Near Threatened (Decreasing/Increasing)	bycatch minimized
		Northern giant petrel	*Macronectes halli*	All CCAMLR Convention Area		Near Threatened (Increasing/Stable)	bycatch minimized
		White-chinned petrel	*Procellaria aequinoctialis*	All CCAMLR Convention Area		Vulnerable (Decreasing)	bycatch minimized
		Gibson's albatross	*Diomedea gibsoni*	All CCAMLR Convention Area	No data on distribution in the CCAMLR Area		bycatch minimized
		Indian yellow-nosed albatross	*Thalassarche carteri*	All CCAMLR Convention Area	Distributed in Subareas 58.5, 58.7 and Division 58.4.1	Endangered (Declining)	bycatch minimized
		Atlantic yellow-nosed albatross	*Thalassarche chlororhynchos*	All CCAMLR Convention Area	No data on distribution in the CCAMLR Area	Endangered (Declining Rapidly)	bycatch minimized
		Shy albatross	*Thalassarche cauta*	All CCAMLR Convention Area	Distributed in Subareas 58.6 and 58.7, Divisions 58.4.1, 58.4.3, 58.5.1 and 58.5.2	Near Threatened (Stable/Increasing)	bycatch minimized
		White-capped albatross	*Thalassarche steadi*	All CCAMLR Convention Area	No data on distribution in the CCAMLR Area	Vulnerable (Possibly Declining)	bycatch minimized
		Salvin's albatross	*Thalassarche salvini*	All CCAMLR Convention Area	Distributed in Subareas 58.6 and 88.1	Vulnerable	bycatch minimized
		Chatham albatross	*Thalassarche eremita*	All CCAMLR Convention Area	Distributed in Subarea 88.1	Critically Endangered	bycatch minimized
		Antipodean albatross	*Diomedea antipodensis*	All CCAMLR Convention Area	Distributed in Subareas 88.1 and 88.2, no records for Division 58.4.1	Vulnerable	bycatch minimized
		Cape petrel	*Daption capense*	All CCAMLR Convention Area	Distributed in all the CCAMLR Convention Area	Least Concern	bycatch minimized
		Grey petrel	*Procellaria cinerea*	All CCAMLR Convention Area	Distributed in all Areas of the CCAMLR Convention Area, but only northern part of Subareas 48.6 and 88.1	Near Threatened	bycatch minimized

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		Sooty shearwater	*Puffinus griseus*	All CCAMLR Convention Area	Distributed in Subareas 48.6 and 88.1, Divisions 58.4.1, 58.4.2, 58.4.3 and 58.5.2	Near Threatened	bycatch minimized
		Gentoo penguin	*Pygoscelis papua*	All CCAMLR Convention Area		Near Threatened	bycatch minimized
		Macaroni penguin	*Eudyptes chrysolophus*	All CCAMLR Convention Area		Vulnerable (Declining)	bycatch minimized
		Short-tailed shearwater	*Puffinus tenuirostris*	All CCAMLR Convention Area	Distributed in Subarea 88.1, Divisions 58.4.1, 58.4.2, 58.4.3 and 58.5.2.	Least Concern	bycatch minimized
Other International Living Marine Resources Shared by the United States		**Common Name**	**Scientific Name**	**Status, if Known**	**Source of Status Information**	**Date of next status review, if known**	**Relevant treaty or agreement, if any**
Large Coastal Sharks		Tiger	*Galeocerdo cuvier*	Unknown	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 11	Unknown	
		Blacktip	*Carcharhinus limbatus*	Gulf of Mexico - Not overfished or overfishing occurring; South Atlantic - Unknown	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 11	2010	
		Sandbar	*Carcharhinus plumbeus*	Overfished and overfishing occurring	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 11	2010	
		Bull	*Carcharhinus leucas*	Unknown	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 11	Unknown	
		Great hammerhead	*Sphyrna mokarran*	Unknown[1]	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 11	unknown	
		Lemon	*Negaprion brevirostris*	Unknown	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 11	Unknown	
		Nurse	*Ginglymostoma cirratum*	Unknown	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 11	Unknown	
		Spinner	*Carcharhinus brevinpinna*	Unknown	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 11	Unknown	
		Tope, Soupfin, School	*Galeorhinus galeus*	Unknown	Summary of Stock Status for Fish Stock Sustainability Index 2007	Unknown	
Small Coastal Sharks		Atlantic sharpnose	*Rhizoprionodon terraenovae*	Not overfished or overfishing occurring	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 13	2011	
		Blacknose	*Carcharhinus acronotus*	Overfished and overfishing occurring	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 13	2011	
		Bonnethead	*Sphyrna tiburo*	Not overfished or overfishing occurring	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 13	2011	
		Finetooth	*Carcharhinus isodon*	Not overfished or overfishing occurring	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 13	2011	
Pelagic Sharks		Common Thresher	*Alopias vulpinus*	Pacific-Unknown	Summary of Stock Status for Fish Stock Sustainability Index 2007	Unknown	IATTC, WCPFC
		Pelagic thresher	*Alopias pelagicus*	Unknown	Summary of Stock Status for Fish Stock Sustainability Index 2007	Unknown	IATTC, WPFMC
Prohibited Species		Atlantic angel	*Squatina dumerili*	Unknown			
		Bigeye sand tiger	*Odontaspis noronhai*	Unknown	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 11		

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		Bigeye sixgill	*Hexanchus vitulus*	Unknown			
		Bigeye thresher	*Alopias superciliosus*	Pacific-Unknown	Summary of Stock Status for Fish Stock Sustainability Index 2007	Unknown	IATTC, WPFMC
		Bignose	*Carcharhinus altimus*	Unknown	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 11	Unknown	
		Caribbean reef	*Carcharhinus perezi*	Unknown	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 11	Unknown	
		Caribbean sharpnose	*Rhizoprionodon porosus*	Unknown			
		Dusky shark	*Carcharhinus obscurus*	Overfished and overfishing occurring	Cortes (2006)[2]	Unknown	
		Galapagos	*Carcharhinus galapagensis*	Unknown	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 11		
		Narrowtooth	*Carcharhinus brachyurus*	Unknown	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 11		
		Night shark	*Carcharinus signatus*	Unknown	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 11[3]	Unknown	
		Sand tiger shark	*Carcharias taurus*	Unknown	Southeast Data, Assessment, and Review (SEDAR) Assessment Report 11	2008	
		Sevengill	*Heptranchias perlo*	Unknown			
		Sixgill	*Hexanchus griseus*	Unknown			
Deepwater/Other Shark Species		Blotched catshark	*Scyliorhinus meadi*	Unknown			
		Broadgill catshark	*Apristurus riveri*	Unknown			
		Chain dogfish	*Scyliorhinus retifer*	Unknown			
		Deepwater catshark	*Apristurus profundorum*	Unknown			
		Dwarf catshark	*Scyliorhinus torrei*	Unknown			
		Iceland catshark	*Apristurus laurussoni*	Unknown			
		Marbled catshark	*Galeus arae*	Unknown			
		Smallfin catshark	*Apristurus parvipinnis*	Unknown			
		Bigtooth cookiecutter	*Isistius plutodus*	Unknown			
		Blainville's dogfish	*Squalus blainvillei*	Unknown			
		Bramble shark	*Echinorhinus brucus*	Unknown			
		Broadband dogfish	*Etmopterus gracilispinnis*	Unknown			
		Caribbean lanternshark	*Etmopterus hillianus*	Unknown			
		Cookiecutter shark	*Isistius brasiliensis*	Unknown			
		Cuban dogfish	*Squalus cubensis*	Unknown			
		Flatnose gulper shark	*Deania profundorum*	Unknown			
		Fringefin lanternshark	*Etmopterus schultzi*	Unknown			
		Great lanternshark	*Etmopterus princeps*	Unknown			
		Green lanternshark	*Etmopterus virens*	Unknown			
		Greenland shark	*Somniosus microcephalus*	Unknown			
		Gulper shark	*Centrophorus granulosus*	Unknown			
		Japanese gulper shark	*Centrophorus acuus*	Unknown			
		Kitefin shark	*Dalatias licha*	Unknown			
		Lined lanternshark	*Etmopterus bullisi*	Unknown			

Status of International Living Marine Resources Shared by the United States or Subject to Treaties or Agreements to which the United States is a Party

		Common Name	Scientific Name	Status, if known	Source of status information	Date of next status review, if known	Relevant treaty or agreement, if any
		Little gulper shark	*Centrophorus uyato*	Unknown			
		Portuguese shark	*Cetroscymnus coelolepis*	Unknown			
		Pygmy shark	*Squaliolus laticaudus*	Unknown			
		Roughskin spiny dogfish	*Squalus asper*	Unknown			
		Smallmouth velvet dogfish	*Scymnodon obscurus*	Unknown			
		Smooth lanternshark	*Etmopterus pusillus*	Unknown			
		American sawshark	*Pristiophorus schroederi*	Unknown			
		Florida smoothhound	*Mustelus norrisi*	Unknown			
		Smooth dogfish	*Mustelus canis*	Unknown			
		Smalltooth sawfish	*Pristis pectinata*	ESA/endangetred -US DPS	National Marine Fisheries Service. 2006. Recovery Plan for Smalltooth Sawfish (Pristis pectinata).	2008	

APPENDIX E

MARINE MAMMAL PROTECTION ACT REGULATORY HISTORY OF SECTION 101(a)

Appendix E. Regulatory History

NMFS first issued regulations to implement Section 101(a)(2) and 102(c)(3) in 1974 (39 FR 32117, September 5, 1974), making it illegal to import into the United States any fish or fish product that were caught in a manner prohibited by regulations implementing the MMPA or in a manner that would not be allowed for a person subject to the jurisdiction of the United States fishing under a general permit. The regulations also authorized NMFS to make a finding allowing imports of fish and fish products even if the fishing did not conform to these requirements but was accomplished in a manner not resulting in an incidental mortality and serious injury rate exceeding U.S. fishing operations under these regulations (39 FR 32117, September 5, 1974). The regulations also required all fish imported into the United States to include documentation of the country of origin, species of fish, and certification from a government official that the fishing technology permitted by the country of origin did not result in serious injury or death to marine mammals exceeding U.S. standards prescribed in the regulations. Finally, it provided an alternative whereby a nation could certify to the United States that specified vessels flying its flag conformed to U.S. regulations.

In December 1975, NMFS identified yellowfin tuna, halibut, salmon, and canned sardines/pilchards from South Africa as fish products prohibited from import because they were harvested by commercial fishing operations that cause the death or injury of marine mammals. Import of the products were blocked unless accompanied by documentation that the fishing technology permitted by the country of origin did not result in serious injury or death to marine mammals exceeding U.S. standards prescribed in the regulations. (40 FR 56899, December 5, 1975).

NMFS modified the regulations in March 1977, adding the Fisheries Certificate of Origin (Standard Form 369-1). The Fisheries Certificate of Origin required a statement from a "responsible official of the country of origin" that the fishing technology permitted by that country does not result in a rate of serious injury or death to marine mammals exceeding that which results from U.S. fishing operations. Alternatively, the responsible official or the master of the vessel that caught the fish could make a statement that such fish were not caught in a manner prohibited for U.S. fishermen (42 FR 12010, March 1, 1977). During the time these regulations were in effect, the general permit governing U.S. fishermen and fishing operations contained few requirements or prohibitions, with the exception of yellowfin tuna purse seine fisheries in the eastern tropical Pacific.

From 1977 to 1980, NMFS continued the import prohibitions on halibut, salmon and South African canned sardines/pilchards. In October 1980, when NMFS modified the regulations on the incidental taking of marine mammals in the tuna purse seine fishery in the eastern tropical Pacific, South African canned sardines/pilchards were removed from the list; and halibut and salmon retained (45 FR 72194, October 31, 1980).

In 1986, NMFS eliminated the standard form 369-1 but continued to require the same documentation and statements. Salmon and halibut remained on the prohibited import list unless certification was provided (51 FR 28963, August 13, 1986). These regulations never progressed beyond the interim final rule stage (54 FR 9438, March 7, 1989).

In 1991, NMFS amended these regulations to implement provisions of the Dolphin Protection Consumer Information Act, which amended the MMPA in 1990 (56

FR 47418, September 19, 1991). This revised the import requirements for yellowfin tuna captured in purse seine fisheries and added species of fish taken in high seas driftnet fisheries to the list of fish products prohibited from import without certain certifications (50 CFR 216.24 (f)(2)(iii)). The regulations focused the import provisions of Section 101(a)(2) on yellowfin tuna harvested with purse seine nets in the eastern tropical Pacific and fish products harvested on the high seas with large-scale driftnets. The regulations also require that a Fisheries Certificate of Origin (NOAA Form 370) accompany imports of certain fish products from nations identified by the United States as having vessels engaged in large-scale driftnet fishing, documenting that the fish were not harvested by a large-scale driftnet on the high seas.

Marine mammal incidental mortality and serious injury in eastern tropical Pacific yellowfin tuna purse seine fisheries, covered by section 101(a)(2)(B) and Title III of the MMPA (16 U.S.C. 1371(a)(2)(B) and 16 U.S.C. 1411-1417) and implemented in 50 CFR 216.24, is not addressed in this rulemaking. NMFS is not proposing to amend the regulations on importing fish products taken in high seas driftnet fisheries or in eastern tropical Pacific yellowfin tuna purse seine fisheries.

The 1991 regulations effectively removed the standard for all other fisheries that exported fish and fish products to the United States. Under the interim exemption, no standard existed while the United States developed one governing the incidental mortality and serious injury of marine mammals in its domestic commercial fisheries.

APPENDIX F

INTERNATIONAL MARINE MAMMAL ACTION PLAN 2012-2016

NOAA FISHERIES

INTERNATIONAL MARINE MAMMAL ACTION PLAN 2012–2016

October 2012

INTERNATIONAL MARINE MAMMAL ACTION PLAN

2012–2016

National Marine Fisheries Service

October 2012

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International Marine Mammal Action Plan: Executive Summary

"For [marine mammals], the ecosystem in which they live encompasses the high seas and the waters of many other countries. In order to address impacts to these species throughout their ecosystem, the United States will need to use international agreements and other diplomatic means to strengthen protections for species beyond U.S. waters."

Report of the U.S. Commission on Ocean Policy
An Ocean Blueprint for the 21st Century

Marine mammals are distributed throughout the world's oceans, and their conservation and recovery requires action on a global scale. Whales, dolphins, porpoises, seals, and sea lions[1] face an array of threats from human activities, domestic and international, including incidental killing as a result of entanglement in fishing gear, deliberate killing of some species for food and predator control, depletion of prey resources from commercial and artisanal fishing, climate change, collision with vessels, and habitat degradation and loss. Disturbances also are caused by ship noise, seismic operations and military readiness activities, drilling, and other acoustic inputs to the marine environment. Further, exceptionally high levels of chemical contaminants in their tissues potentially affect marine mammals' immune and reproductive systems.

Although population status and trends are poorly known for many marine mammal stocks outside U.S. waters, the International Union for the Conservation of Nature estimates that 25 percent of marine mammal species are now threatened with extinction. The status of an additional 30 percent is unknown because data are lacking.

Increasingly, scientists and policymakers find that marine mammal research and conservation are linked to several critical issues: environmental (e.g., climate change), economic (e.g., fisheries and resource development), national security (e.g., military readiness), food security (e.g., harvests), and ocean health (e.g., pollution). Marine mammals are sentinels of ocean health. As such, the health of marine mammals and the oceans can have significant impacts on human lives and livelihoods, and on coastal communities. Reducing and mitigating the impact of human activities on marine mammals, and acquiring the scientific data to conserve them, require strategic planning and long-term coordinated international efforts by the United States and its international partners.

The Marine Mammal Protection Act (MMPA) mandates that NOAA's National Marine Fisheries Service (NMFS) protect and conserve marine mammals both domestically and internationally, and manage impacts of U.S. activities on them, including negotiating with other nations to protect and con-

[1] This Action Plan focuses solely on marine mammals managed by the National Marine Fisheries Service, intentionally omitting manatees, sea otters, walrus, and polar bears; these marine mammals are managed by the U.S. Fish and Wildlife Service.

serve all marine mammals. Internationally, NMFS is responsible for implementing measures to protect marine mammals from U.S. activities on the high seas. The agency also is required to demonstrate that domestic efforts to protect marine mammals ultimately do not place U.S. industries at a competitive disadvantage to foreign industries that are not constrained by such conservation measures.

This International Marine Mammal Action Plan provides a strategic framework that integrates NMFS' Regional Offices, Science Centers, and Headquarters offices to leverage science and policy strengths to achieve conservation goals and mandates of the MMPA and other environmental statutes. The Action Plan is guided by two sets of goals: NOAA's Next Generation Strategic Plan and the statutory goals of the MMPA. One goal of the Next Generation Strategic Plan is "Healthy oceans," where "[m]arine fisheries, habitats, and biodiversity are sustained within healthy and productive ecosystems." Two other Next Generation goals—improved understanding of ecosystems to inform resource management decisions, and recovered and healthy marine and coastal species—are particularly relevant to international marine mammal conservation and management.

The Action Plan is also designed to meet primary MMPA goals to:

- Maintain marine mammals as functioning elements of their ecosystem(s) and preserve the health and stability of the marine ecosystem(s).[2]
- Reduce the adverse impacts of fishing and other practices on marine mammals to sustainable, and ultimately insignificant, levels.[3]
- Recover marine mammal populations and protect essential habitats.[4]
- Promote international efforts to encourage research on, and conservation of, marine mammals.[5]

These MMPA goals inform the overarching objective of this Action Plan, to *conduct research and collaborate with international partners to conserve marine mammals in international or foreign waters, emphasizing the recovery of depleted or endangered marine mammals.* To meet this objective over the next 5 years NMFS must:

- Improve its ability to assess and manage transboundary and shared marine mammal stocks on a biologically relevant, ecosystem scale.
- Improve its ability to monitor, detect, and respond to shifts in distribution and trends of marine mammals across the globe; identify marine mammal areas in need of protection; and inform marine spatial planning decisions.
- Work with foreign nations and multilateral institutions to identify, prevent, and mitigate human impacts on marine mammals in international and foreign waters.
- Improve the capacity of nations and international organizations to adequately assess, evaluate, manage, and reduce threats to marine mammal stocks.

Threats to marine mammals in international waters are often the same as or similar to those in U.S. waters. For 40 years NMFS has implemented MMPA domestic provisions, making it uniquely qualified to lead international efforts to address these threats. Implementation of the MMPA's international

[2] MMPA §2(6)

[3] MMPA §101(a)(2), §118(a)(1)

[4] MMPA §2(2)

[5] MMPA §2(4)

goals has lagged behind domestic efforts. The Action Plan's Seven Strategic Priorities that emerged from this strategic planning process will guide NMFS' international work.

The Action Plan's Seven Strategic Priorities will improve research and understanding of marine mammal biology, global stewardship of marine mammals, and cooperation and collaboration with national and international partners. These priorities, ranked in order, are:

1. Reduce the bycatch of marine mammals in international and foreign fisheries to sustainable levels.
2. Improve understanding of climate change impacts on marine mammals.
3. Reduce the threat of prey depletion by considering predator-prey relationships under an ecosystem approach to fishery management.
4. Reduce the threat of marine debris to marine mammals by decreasing the presence of marine debris—including derelict fishing gear—in the ocean.
5. Reduce the number of vessel strikes in international and foreign waters.
6. Prevent habitat loss, degradation, and disturbance through marine spatial planning and marine protected area designation.
7. Improve understanding of, and response to, the occurrence of disease and die-offs in marine mammal populations.

The Seven Strategic Priorities focus on the greatest international threats to marine mammals. The National Marine Fisheries Service operates bilaterally, multilaterally, regionally, and globally to build capacity and negotiate conservation and management measures to address these multinational threats. The complexity of cultural, societal, economic, and environmental impacts on conservation and management requires systematic, rapid, and sustained diplomatic and grassroots efforts with international partners and stakeholders. The agency will use regional and multinational agreements, supported by technical and financial assistance, as appropriate, to promote international marine mammal conservation. The agency's scientific capabilities will increase understanding of marine mammal populations and threats, and its international policy authority can provide the technical expertise for strategies to mitigate these threats. In Fiscal Year (FY) 2011, implementation of this Action Plan could have been accomplished largely through existing levels of funding; however, budget reductions in FY 2012 and additional reductions anticipated in FY 2013 mount a serious challenge to NMFS' ability to accomplish this Action Plan's goal. Investment beyond current levels of support for research, assessment, and mitigation will be required to ensure its success. Conserving the planet's diverse and abundant marine mammal fauna will require not only rapid progress on the work laid out in this Action Plan, but also the resources and will to pursue this vision without delay.

List of Acronyms and Abbreviations

Acronym	Full Name
ACCOBAMS	Agreement on the Conservation of Cetaceans of the Black and Mediterranean Seas
ACSCOBANS	Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas
AERD	Antarctic Ecosystem Research Division
AIDCP	Agreement on the International Dolphin Conservation Program
AIS	Automatic Identification System
AFSC	Alaska Fisheries Science Center [of NMFS]
AKR	Alaska Regional Office [of NMFS]
AMLR	Antarctic Marine Living Resources Program
CAFF	Conservation of Arctic Flora and Fauna
CCAMLR	Convention for the Conservation of Antarctic Living Marine Resources
CCAS	Convention on the Conservation of Antarctic Seals
CERD WG	Cetacean Resurging and Emerging Disease Working Group
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CONAPESCA	Comisión Nacional de Acuacultura y Pesca (National Commission of Aquaculture and Fishing)
CPPS	Comisión Permanente del Pacífico Sur (Permanent Commission for the South Pacific)
DDT	Dichlorodiphenyltrichloroethane
DFO	Department of Fisheries and Oceans, Canada
EAM	Ecosystem Approaches to Management
EBSAs	Ecologically and Biologically Significant Areas
EEZ	Exclusive Economic Zone
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ETP	Eastern Tropical Pacific
F/IA	Office of International Affairs [of NMFS]
FAO	United Nations Food and Agriculture Organization
FFA	Forum Fisheries Agency
F/PR	Office of Protected Resources [of NMFS]
F/ST	Office of Science and Technology [of NMFS]
FTE	Full-Time Equivalent
HSDFMPA	High Seas Driftnet Fishing Moratorium Protection Act
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICES	International Council for the Exploration of the Sea
ICRW	International Convention for the Regulation of Whaling
ICMMPA	International Committee on Marine Mammal Protected Areas
IFAW	International Fund for Animal Welfare
IMO	International Maritime Organization

Acronym	Full Name
IPOA(s)	International Plan of Action
IUCN	International Union for the Conservation of Nature
IUU	Illegal, Unreported, Unregulated
IWC	International Whaling Commission
LRIT	Long-Range Identification and Tracking System
MARPOL	International Convention for the Prevention of Pollution from Ships
MMHSRP	Marine Mammal Health and Stranding Response Program
MMPA	Marine Mammal Protection Act
MPA	Marine Protected Area
MSRA	Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006
NAFO	Northwest Atlantic Fisheries Organization
NAMMCO	North Atlantic Marine Mammal Commission
NEFSC	Northeast Fisheries Science Center [of NMFS]
NERO	Northeast Regional Office [of NMFS]
NGSP	NOAA's Next Generation Strategic Plan
NMFS	National Marine Fisheries Service
NMML	National Marine Mammal Lab
NOAA	National Oceanic and Atmospheric Administration
NWFSC	Northwest Fisheries Science Center [of NMFS]
NWRO	Northwest Regional Office [of NMFS]
PAME	Protection of the Arctic Marine Environment Working Group
PBDEs	Polybrominated diphenylethers
PBR	Potential Biological Removal Level
PCBs	Polychlorinated Biphenyls
PIFSC	Pacific Islands Fisheries Science Center [of NMFS]
PIRO	Pacific Islands Regional Office [of NMFS]
RFMO	Regional Fisheries Management Organization
SARA	Species at Risk Act
SBNMS	Stellwagen Bank National Marine Sanctuary
SEFSC	Southeast Fisheries Science Center [of NMFS]
SEGARPA	Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food)
SEMARNAT	Secretaría del Medio Ambiente y Recursos Naturales (Secretariat of Environment and Natural Resources)
SERO	Southeast Regional Office [of NMFS]
SPAW Protocol	The Protocol concerning Specially Protected Areas and Wildlife
SPREP	South Pacific Regional Environment Program
SRKW	Southern Resident killer whales
SWFSC	Southwest Fisheries Science Center [of NMFS]
SWRO	Southwest Regional Office [of NMFS]
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environment Program
VMS	Vessel monitoring system
VOS	Voluntary Observing Ships
WCPFC	Western and Central Pacific Fisheries Commission

INTRODUCTION

The National Marine Fisheries Service's Emerging Role in International Marine Mammal Conservation and Management

In the Marine Mammal Protection Act (MMPA),[6] Congress recognized that marine mammals are valuable resources of great international significance. The animals have substantial intrinsic aesthetic, recreational, and economic value, and affect marine ecosystems including fish and shellfish species commercially important to both domestic and international trade.[7] Further, as apex predators, marine mammals have major impacts on the structure and function of food webs and serve as sentinels for ecosystem health, environmental changes, and potential threats to human health.

Marine mammals are threatened by human activities in all of the world's oceans, including: fisheries bycatch and prey depletion, marine debris, vessel strikes, habitat degradation and disturbance, direct harvest or removals, and pollution. The effects of human activities in predominantly coastal areas now extend to high seas as fisheries, and oil and gas exploration and development, become more technologically and economically feasible in the deep sea. In addition to direct human impacts, marine mammals face increasing ecological pressures and ecosystem shifts associated with climate change.

The MMPA mandates, among other things, that NOAA's National Marine Fisheries Service (NMFS) protect and conserve marine mammals domestically, manage impacts of U.S. activities on marine mammals domestically and internationally, and negotiate with other nations to protect and conserve all marine mammals. Internationally, NMFS is responsible for implementing measures to protect marine mammals from U.S. activities on the high seas, including the issuance of permits for high seas fishing vessels and other anthropogenic activities (e.g., seismic exploration for oil and gas development, military operations, pile driving, and scientific research).

The agency is also required to demonstrate that domestic efforts to protect marine mammals ultimately do not place U.S. industries at a competitive disadvantage with foreign industries that are not constrained by such conservation measures. Thus, the MMPA requires that the United States ban imports of fish and fish products from nations whose fisheries exceed U.S. marine mammal bycatch reduction standards. Specifically, MMPA Section101(a)(2) applies U.S. marine mammal bycatch standards to the importation of commercial fish and fish products, and Section 102(c)(3) prohibits the importation of fish caught using methods and gear prohibited by the United States. Sections 2 and 108 of the MMPA call for the development of international arrangements for research on, and conservation of, all marine mammals, and Section 108 also calls for the negotiation of a binding international convention to protect and conserve all marine mammals.

[6] MMPA §2

[7] MMPA§2(5)(B) and (6)

In addition, since marine mammals are also listed under the Endangered Species Act (ESA), Section 8 of the ESA calls for engagement and cooperation with foreign nations on the recovery of endangered or threatened species.

The High Seas Driftnet Fishing Moratorium Protection Act authorizes additional responsibilities, with Congress, recognizing the importance of U.S. leadership in establishing international measures to end or reduce bycatch of protected living marine resources, such as marine mammals. Section 610(a) requires the Secretary of Commerce to identify nations whose fishing vessels (regardless of gear type) engage in bycatch of marine mammals or other protected living marine resources, and certify that each nation has (1) adopted a regulatory program governing the conservation of marine mammals that is comparable to that of the United States and (2) established a management plan that will assist in gathering species-specific data to support international stock assessments and conservation enforcement efforts for marine mammals.

Congress recognized that the application of these stringent laws solely within U.S. waters and to U.S. citizens is insufficient to protect and conserve marine mammals, given the statutory goals of maintaining marine mammal stocks as functioning elements of their ecosystems and at optimum sustainable population levels. Many marine mammals are migratory and/or have geographic ranges that span international boundaries (transboundary), and are subject to some of the most severe threats beyond U.S. waters. However, the ability of the United States to take effective action to protect and conserve marine mammals outside U.S. waters is constrained by:

1. A lack of information on marine mammal stock status[8] and threats on the high seas and within the territorial seas of many nations.
2. The limited number and efficacy of marine mammal conservation measures implemented by international fisheries management organizations and other multilateral arrangements.
3. A lack of capacity in many nations and international organizations to adequately assess and manage human activities affecting marine mammal stocks.
4. Few international conservation and management measures to reduce marine mammal bycatch, and poor enforcement of existing national measures.

This Action Plan identifies and describes a strategy for implementing actions NMFS can and should undertake to overcome these constraints. The agency's legal and regulatory authorities, operational and international agreements, and capacity-building capabilities provide the framework for action to conserve marine mammals and the ecosystems they inhabit.

[8] The MMPA endeavors to manage marine mammals at the level of "population" or "stock," defined as a group of marine mammals of the same species or smaller taxa in a common spatial arrangement that interbreed when mature. Although we use these terms, we recognize that most marine mammals on the high seas and in the Exclusive Economic Zones (EEZ) of foreign nations have not been delineated to the stock level.

Action Plan Goals and Objectives

Alignment of This Action Plan with NOAA's Next Generation Strategic Plan

The Action Plan is guided by two sets of goals: NOAA's Next Generation Strategic Plan and the statutory goals of the MMPA. One of the long-term goals of NOAA's Next Generation Strategic Plan is "healthy oceans" where "marine fisheries, habitats, and biodiversity are sustained within healthy and productive ecosystems." The Strategic Plan identified two objectives under this goal relevant to international marine mammal conservation and management.

1. *Improved understanding of ecosystems to inform resource management decisions.*

Fewer than 25 percent of all protected species within the U.S. Exclusive Economic Zone (EEZ) have been adequately assessed,[9] and an even smaller percentage of international marine mammal species. To preserve the wide range of benefits humans derive from healthy ecosystems, decision-makers dealing with marine mammal recovery planning need information on individual species, the quantity and quality of habitat they occupy, the effects of human activities on ecosystem health and resilience, and the consequences of ecosystem condition on human populations. Accurate status assessments for protected and potentially at-risk species—based on enhanced, consistent, long-term observations—are key. Next Generation Strategic Plan benchmarks include increased use of climate considerations in protected resource decisions and in coastal and marine spatial planning processes; next-generation protected resource stock assessments incorporating habitat, ecosystem, and climate information; and the use of high-quality data to inform management plans and decisions. This Action Plan proposes to develop international marine mammal stock assessments for use with information on climate, habitat, prey availability, and ecosystem health to elevate protected species management decisions to an ecosystem level.

2. *Recovered and healthy marine and coastal species.*

To ensure the sustainability, long-term health, and resilience of marine mammals and the ecosystems supporting them, science-based policy guidance, economic incentive programs, and sound regulations and enforcement are needed. Benchmarks for success include stabilized or increased abundance of species that are depleted, threatened, or endangered; decreased bycatch of protected species; and an increased number of protected species with improving status. International dimensions require participation in multinational species. This Action Plan uses international cooperation, management, and capacity building to ensure agreements and conservation efforts are robust, practical, and implemented.

By aligning the Action Plan's strategies with the Next Generation Strategic Plan, NMFS' international efforts support the goals and objectives of the Strategic Plan and will realize global progress in marine mammal conservation and management.

[9] http://www.ppi.noaa.gov/wp-content/uploads/NOAA_NGSP.pdf

MMPA Goals and Objectives

The MMPA's primary marine mammal conservation goals are to:

- Maintain marine mammals as functioning elements of their ecosystem(s) and preserve the health and stability of the marine ecosystem(s).[10]
- Reduce the adverse impacts of fishing and other practices on marine mammals to sustainable, and ultimately insignificant, levels.[11]
- Recover marine mammal populations and protect essential habitats.[12]
- Promote international efforts to encourage research on, and conservation of, marine mammals.[13]

Based on NOAA and MMPA goals, the overarching objective of this Action Plan is to *conduct research and collaborate with international partners to conserve marine mammals in international or foreign waters, emphasizing the recovery of depleted or endangered marine mammals.* To meet this objective over the next 5 years, NMFS must:

Northern elephant seals are thriving and have increased their population numbers significantly under the protection of the Marine Mammal Protection Act. Credit: NOAA National Ocean Service

- Improve its ability to assess and manage transboundary and shared marine mammal stocks on a biologically relevant, ecosystem scale.
- Improve its ability to monitor, detect, and respond to shifts in distribution and trends of marine mammals across the globe, identify marine mammal areas in need of protection, and inform marine spatial planning decisions.
- Work with foreign nations and multilateral institutions to identify, prevent, and mitigate human impacts on marine mammals in international and foreign waters.

To achieve this objective in international and foreign waters, NMFS must: (1) collaborate with nations and work through international organizations to collect information on marine mammal stock status and threats in international and foreign waters; (2) develop, and negotiate the adoption of, effective international marine mammal conservation measures; and (3) improve the capacity of nations and international organizations to adequately assess, evaluate, manage, and reduce threats to marine mammal stocks. The United States

[10] MMPA §2(6)

[11] MMPA §101(a)(2), §118(a)(1)

[12] MMPA §2(2)

[13] MMPA §2(4)

and its international partners will benefit from a coordinated effort to improve global marine mammal conservation and management.

Threats to marine mammals in international waters are often similar to threats in U.S. waters. For 40 years NMFS has implemented the domestic provisions of the MMPA, making the agency uniquely qualified to lead internationally. Implementation of the MMPA's international goals has lagged behind domestic efforts. But now the priorities that emerged from this strategic planning process will guide and provide a framework that integrates NMFS Regional Offices, Science Centers, and Headquarters science and policy strengths to achieve the goals and mandates within the MMPA and other environmental statutes.

Strategic Planning Process to Develop the Action Plan

A working group of experts from NMFS Science Centers, Regional Offices, and Headquarters offices[14] reviewed information on the status of marine mammals worldwide, threats to these species, and existing NMFS conservation efforts. The working group identified and ranked 11 primary threats (Table 3). The working group then organized these into a list of seven strategic priorities that form the core of this Action Plan. To address these seven strategic priorities, the working group developed regional action plans, provided in Appendix 1, integrating science, policy, capacity building, and international (government-to-government) actions to better use limited funds, achieve greater coordination and integration across NMFS, and improve the likelihood for success. This section discusses the historic achievements of marine mammal conservation, determination of species covered in the plan, and the strategic priorities.

Building on Past Accomplishments to Advance Marine Mammal Conservation in the Future

From 2005 through 2009, NMFS invested substantial funds and staff time in efforts to conserve and protect marine mammals outside U.S. waters through the following international agreements:

- Agreement on the International Dolphin Conservation Program (AIDCP) in the Eastern Tropical Pacific Ocean, which focuses on controlling bycatch of pelagic dolphins in tuna purse seine fisheries and also includes broader ecological and ecosystem research.
- Various international bycatch working groups and workshops, including leadership of the U.S. delegation to the UN Food and Agriculture Organization (FAO) Technical Consultation to Develop International Guidelines on Bycatch Management and the Reduction of Discards.
- International Whaling Commission (IWC) Scientific Committee.
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
- Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR).
- Marine mammal bycatch measures introduced or adopted in regional fisheries management organizations (e.g., the Western and Central Pacific Fisheries Convention).
- Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas.
- First and Second International Conferences on Marine Mammal Protected Areas.

[14] Working Group members are listed in Appendix 2.

- Protocol Concerning Specially Protected Areas and Wildlife (SPAW Protocol).
- United Nations Environment Programme Regional Seas Programme.

NMFS sponsored many international workshops, policy guidance, and recovery projects, including:

- Assessments and working groups on foreign harvest of shared pinniped stocks.
- Reviews of historic whaling data.
- Analyses of tissues from marine mammal species around the world to evaluate the prevalence of pollution (contaminants) and disease.
- Workshops on diseases, in order to better coordinate and promote information exchange on disease research and outbreak/stranding occurrence and investigations.
- Eight workshops to evaluate and mitigate the impact of marine debris on marine mammals.
- Evaluation of the potential impacts of human-origin sound in the ocean on marine mammals.
- Development of recovery plans for endangered species (e.g., vaquita), including activities for international cooperation and joint management.
- Development and adoption of appropriate dolphin- and whale-watching guidelines in the Caribbean and Canada.
- Integration of marine mammal issues in planning documents of Arctic Council working groups (especially Conservation of Arctic Flora and Fauna, and the Protection of the Arctic Marine Environment Working Group), and designation of Ecologically and Biologically Significant Areas (EBSAs) for the Arctic under the International Union for the Conservation of Nature (IUCN).
- Efforts to control trade in live dolphins through CITES.

Because building the capacity of foreign nations and multilateral organizations is essential, NMFS has invested significantly in this area, through:

- Collecting relevant data on threats facing marine mammals.
- Studying the impacts of prey depletion on the transboundary, endangered stock of Southern Resident killer whales (SRKW).
- Developing acoustic monitoring methods, population abundance estimates, and risk assessment models for vaquita in Mexico.
- Training and supporting the development of stranding (including necropsy training) and disentanglement response networks.
- Assessing and/or mitigating bycatch of marine mammals outside U.S. waters.

Table 1 and Figure 1 show these NMFS financial and staff time investments from 2005 through 2009.

Table 1. Total NMFS funding and staff time (FTEs) investments to protect and conserve marine mammals outside U.S. waters during 2005–2009, by threat (source: NMFS Marine Mammal Working Group).

Threat*	Funding ($1000s)	Funding and FTEs** ($1000s)
Bycatch – AIDCP	6,300	17,138
Bycatch	460	700
Direct harvest - IWC	3,099	7,959
Direct harvest	61	256
Lack of information	1,211	2,186
Lack of information - capacity building	694	1,519
Pollution and diseases	677	1,652
Disturbance and habitat degradation	334	1,197
Prey depletion	90	840
Multiple threats	126	4,176
TOTAL	13,052	37,623

*Investments are summarized in categories that are exclusive and non-overlapping. For example, "Bycatch" investments include all investments focused on bycatch except those included in the "Bycatch-AIDCP" category.
**Staff time investments estimated at $150,000 per full-time equivalent (FTE).

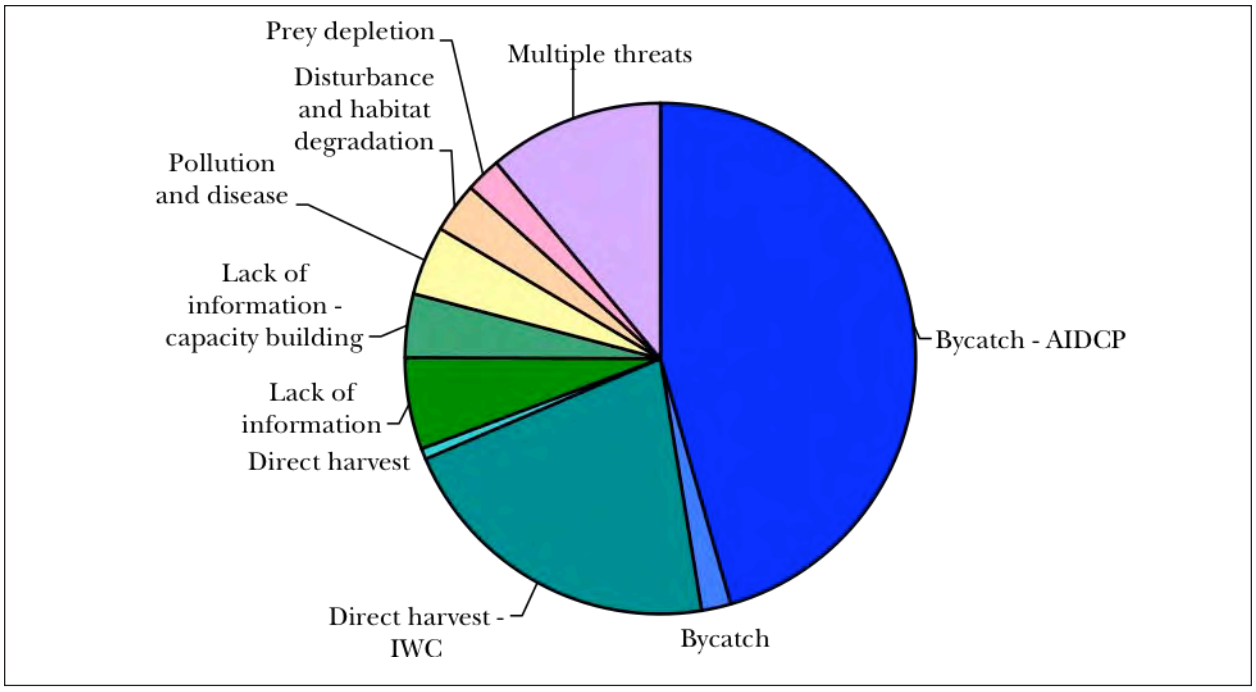


Figure 1. Relative NMFS investment (including staff time) in efforts to protect and conserve marine mammals outside U.S. waters during 2005–2009, by threat.

Assessing International Marine Mammal Species to be Covered by the Action Plan

This Action Plan focuses on the marine mammal species that have been identified by the IUCN as most at risk of extinction. The IUCN Red List of Threatened Species is considered the global standard for evaluating the risk of extinction for marine species, and is the foundation for the identification of marine conservation priorities worldwide. While both the ESA threatened and endangered list and the MMPA depleted list include marine mammals that inhabit international and foreign waters, the IUCN identifies marine mammals of concern beyond the scope of the ESA and MMPA. Although population status and trends are poorly known for many marine mammal stocks outside U.S. waters, the IUCN estimates that 25 percent of marine mammals are now threatened (including species ranked as Critically Endangered, Endangered, Vulnerable, and Near Threatened). More than 30 percent of marine mammals are considered "data deficient," where not enough information is available to assess the species' or stock's status.

Table 2 illustrates at-risk marine mammal species and stocks listed as Near Threatened, Vulnerable, Endangered, and Critically Endangered and the primary threats to their continued survival. Several of these stocks are "transboundary" or shared with the United States; others are found in international waters or EEZs of other nations, but are impacted by threats that also affect marine mammal stocks within U.S. waters. Thus, efforts to assess, protect, and recover many of these stocks would improve NMFS' efforts to address threats facing U.S. domestic, transboundary, and shared marine mammal stocks. Table 2 is not a comprehensive list of species covered by this Action Plan. The Action Plan includes work on species not currently listed as threatened or endangered under the ESA or as depleted under the MMPA or that are listed as "Data Deficient" or "Least Concern" under the IUCN Red List (e.g., ice seals and bowhead whales).

Table 2. At-risk marine mammal species covered by the Action Plan, their IUCN Red List classification,[15] population trends, and primary threats (Source: IUCN Red List).[16]

COMMON NAME	SCIENTIFIC NAME	POP. TREND	PRIMARY THREAT(S)
Species or stocks considered "Critically Endangered" under the IUCN Red List Classification			
Vaquita	*Phocoena sinus*	decreasing	Bycatch (gillnet)
Mediterranean monk seal	*Monachus monachus*	decreasing	Harvest bycatch
Hawaiian monk seal*	*Monachus schauinslandi*	decreasing	Competition, prey depletion, shark predation
Maui's dolphin	*Cephalorhynchus hectori maui*	decreasing	Bycatch (gillnet)
Bowhead whale (Svalbard-Barents Sea-Spitsbergen subpopulation)	*Balaena mysticetus*	unknown	Harvest, climate change
Blue whale (Antarctic subpopulation)	*Balaenoptera musculus intermedia*	increasing	Harvest, prey depletion, climate change
Beluga (Cook Inlet subpopulation) *	*Delphinapterus leucas*	decreasing	Harvest, habitat degradation
Southern right whale (Chile-Peru subpopulation)	*Eubalaena australis*	unknown	Harvest, bycatch, vessel strikes
North Pacific right whale (Northeast Pacific subpopulation) *	*Eubalaena japonica*	unknown	Harvest, bycatch, vessel strikes
Western gray whale*	*Eschrichtius robustus*	increasing	Bycatch (various), disturbance, habitat degradation
Harbor porpoise (Baltic Sea subpopulation and North Sea subpopulation)	*Phocoena phocoena*	decreasing	Bycatch (gillnet), pollution, contaminants
Irrawaddy dolphin (includes Ayeyarwaddy River, Chilika Lagoon, Mahakam River, Malampaya Sound, Mekong River, and Songkhla Lake)	*Orcaella brevirostris*	decreasing	Bycatch, vessel strikes, electrofishing
Indo-Pacific hump-backed dolphin (Eastern Taiwan Strait subpopulation)	*Sousa chinensis*	decreasing	Bycatch (gillnet)
Bottlenose dolphin (Fiordland subpopulation)	*Tursiops truncatus*	decreasing	Bycatch
Species or Stocks considered " Endangered" under the IUCN Red List Classification			
Hector's dolphin	*Cephalorhynchus hectori*	decreasing	Bycatch (gillnet)
Sei whale*	*Balaenoptera borealis*	unknown	Bycatch, vessel strikes
Bowhead whale (Okhotsk Sea subpopulation)	*Balaena mysticetus*	unknown	Bycatch, harvest, climate change
Blue whale*	*Balaenoptera musculus*	increasing	Bycatch, vessel strikes

* Denotes marine mammal species or stock that is found in the United States or is transboundary.

[15] This list focuses on Critically Endangered, Endangered, Near Threatened, Vulnerable classifications.

[16] This list only includes marine mammal species for which the MMPA provides management authority to NMFS (i.e., it does not include polar bear, walrus, sea and marine otters, or the dugong or manatees).

COMMON NAME	SCIENTIFIC NAME	POP. TREND	PRIMARY THREAT(S)
Fin whale*	*Balaenoptera physalus*	unknown	Bycatch, vessel strikes
North Atlantic right whale*	*Eubalaena glacialis*	increasing	Bycatch (fixed gear), vessel strikes
North Pacific right whale*	*Eubalaena japonica*	unknown	Bycatch (various)
Humpback whale (Arabian Sea and Oceana subpopulations)	*Megaptera novaeangliae*	unknown/ increasing	Bycatch, vessel strikes
Steller sea lion*	*Eumetopias jubatus*	decreasing**	Prey depletion
Galápagos fur seal	*Arctocephalus galapagoensis*	decreasing	Bycatch (various)
Saimaa seal	*Phoca hispida saimensis*	unknown	Bycatch, harvest
Caspian seal	*Pusa caspica*	decreasing	Harvest, bycatch, disease, climate change
Galapagos sea lion	*Zalophus wollebaeki*	decreasing	Disease, climate change
Australian sea lion	*Neophoca cinerea*	decreasing	Harvests bycatch
Killer whale southern resident*	*Orcinus orca*	stable	Prey depletion, pollution, disturbance
South Asian river dolphin or Ganges river dolphin	*Platanista gangetica subsp. gangetic, subsp. minor*	decreasing	Habitat degradation, pollution, harvest, bycatch
Short-beaked common dolphin (Mediterranean subpopulation)	*Delphinus delphis*	decreasing	Bycatch
Finless porpoise	*Neophoceaena phocaenoides subsp. asiaeorientalis*	unknown	Bycatch, habitat degradation
Harbor porpoise (Black Sea subpopulation)	*Phocoena phocoena subsp. relicta*	decreasing	Bycatch
Bottlenose dolphin (Black Sea subpopulation)	*Tursiops truncates subsp. ponticus*	unknown	Bycatch
Species or Stocks considered "Vulnerable" under the IUCN Red List Classification			
Franciscana (Rio Grande de Sul/Uruguay subpopulation)	*Pontoporia blainvillei*	decreasing	Bycatch
Atlantic humpbacked dolphin	*Sousa teuszii*	decreasing	Bycatch (gillnet)
Finless porpoise	*Neophocaena phocaenoides*	decreasing	Bycatch (gillnet), habitat degradation
Short-beaked common dolphin (Black Sea subpopulation)	*Delphinus delphis ponticus*	unknown	Bycatch (gillnet), habitat degradation
Irrawaddy dolphin	*Orcaella brevirostris*	decreasing	Bycatch, vessel strikes, electrofishing
Eastern spinner dolphin*	*Stenella longirostris orientalis*	increasing	Bycatch
Sperm whale*	*Physeter macrocephalus*	unknown	Bycatch, contaminants, vessel strikes

* Denotes marine mammal species or stock that is found in the United States or is transboundary.
** Western distinct population segment (DPS) is decreasing whereas the Eastern DPS is increasing.

COMMON NAME	SCIENTIFIC NAME	POP. TREND	PRIMARY THREAT(S)
Northern fur seal*	*Callorhinus ursinus*	decreasing	Bycatch, prey depletion, climate change, pollution
Hooded seal*	*Cystophora cristata*	decreasing	Harvest, bycatch (trawl)
New Zealand sea lion	*Phocarctos hookeri*	decreasing	Disease, bycatch, prey depletion, disturbance
Species or Stocks considered "Near Threatened" under the IUCN Red List Classification			
Chilean dolphin	*Cephalorhynchus eutropia*	decreasing	Bycatch, harvest (for bait)
Australian snubfin dolphin	*Orcaella heinsohni*	unknown	Bycatch, habitat degraqdation
Indo-Pacific hump-backed dolphin	*Sousa chinensis and S. plumbea*	decreasing	Bycatch (gillnet)
Beluga (Beluga—West Greenland, St. Lawrence River and Ungava Bay, eastern Hudson Bay)	*Delphinapterus leucas*	unknown	Pollution, harvest, bycatch
Narwhal	*Monodon monoceros*	unknown	Harvest, climate change, habitat degradation
Juan Fernández fur seal	*Arctocephalus philippii*	increasing	Disease, climate change
Guadalupe fur seal*	*Arctocephalus townsendi*	increasing	Disease, pollution, contaminants

* Denotes marine mammal species or stock that is found in the United States or is transboundary.

Identifying Strategic Priorities for the Marine Mammal Action Plan

The working group evaluated and prioritized international threats to marine mammals to develop strategic priorities based on geographic scope, severity of impact on one or more species or stocks, and trend in severity and scope. The group also considered the types of actions NMFS could take to address the threats and how relevant those actions were to legislative mandates, NOAA's priorities, and the Next Generation Strategic Plan. Finally, the group assessed the feasibility of NMFS actions to address each threat—given the agency's expertise, capabilities, and jurisdiction—as well as ongoing efforts and the availability of interested foreign and international partners and stakeholders. Since the working group included representatives from NMFS Science Centers, Regional Offices, and Headquarters offices, the rankings represent all inputs and regional priorities, and, therefore, may differ from one region's priorities. For example, NMFS has specific mandates to address climate change and prey depletion (especially as they relate to ecosystem-based management), which resulted in the elevation of these two threats in the overall list of priorities. The priorities are not cast in stone and circumstances such as the Deepwater Horizon oil spill in 2010 may elevate lower priorities to greater prominence so they can be adequately evaluated and, where possible, threats and damage mitigated. Table 3 summarizes the working group's assessment and prioritization of the threats.

Table 3. Assessment and prioritization of international threats facing marine mammals and the feasibility and relevance of NMFS actions to address those threats.

Threat	Scope	Severity	Trend	Relevance	Feasibility	Strategic Priorities
Bycatch						HIGHEST – lead international bycatch reduction
Climate Change						HIGHEST – lead international research efforts
Prey Depletion						HIGH – lead international effort to reduce overfishing
Marine Debris						MEDIUM – work with NOS Marine Debris Program
Vessel Strikes						MEDIUM – lead international efforts
Habitat Loss/ Degradation						MEDIUM – support MPA efforts
Disturbance (Including Noise)						MEDIUM – research and monitor threat
Direct Removals						MEDIUM – work through IWC and CITES
Disease						LOW – continue international disease surveillance efforts
Pollution/ Contaminants						LOW – support EPA and UNEP efforts
Harmful Algal Blooms						LOW – continue research and support international efforts

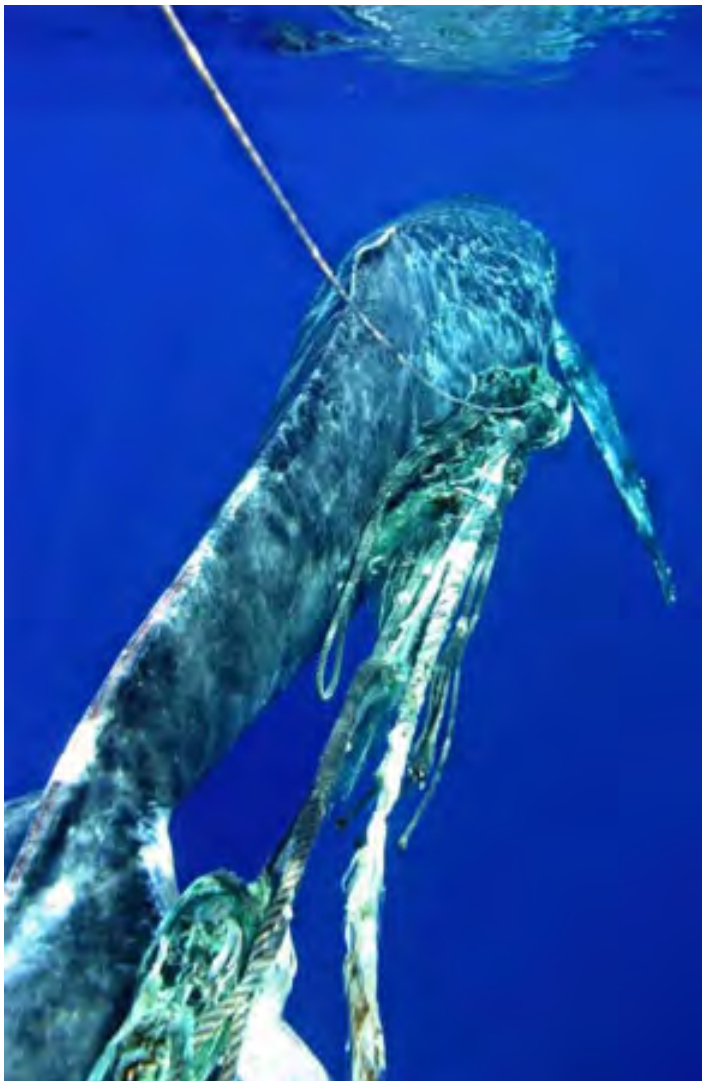
Color Code	Scope	Severity	Trend	Relevance	Feasibility
	Global	Strong impacts on many stocks	Increasing	Core mission	High – clear course of action
	Regional or localized but in many areas	Strong impacts likely but unknown	Stable or increasing, or mixed	High explicit mandate	Moderate – limited by international cooperation
	Localized in few areas or targeting few stocks	Strong impacts on few stocks or sublethal impacts	Stable or decreasing	Relevant – no explicit mandate or led by other agency	Low – challenging to address, involves many sectors

Strategic Priorities for the Action Plan

The working group identified four tiers of threat priorities: highest, high, medium, and low (Table 3), pointing to seven strategic priorities that are the core of this Action Plan. The working group clustered some of the threats together according to their rank, pairing similar or linked threats that would benefit from actions applicable to both threats. The seven strategic priorities encompass the main threats to the marine mammals listed in Table 2. These seven strategic priorities are:

1. Reduce the bycatch of marine mammals in international and foreign fisheries to sustainable levels.
2. Improve understanding of climate change impacts on marine mammals.
3. Reduce the threat of prey depletion by considering predator-prey relationships under an ecosystem approach to fishery management.
4. Reduce the threat of marine debris to marine mammals by decreasing the presence of marine debris—including derelict fishing gear—in the ocean.
5. Reduce the number of vessel strikes in international and foreign waters.
6. Prevent habitat loss, degradation, and disturbance through marine spatial planning and marine protected area designation.
7. Improve understanding of, and response to, disease and die-offs in marine mammal populations.

Currently, NMFS participates in or leads ongoing international efforts to address all of the identified threats, and the working group generally agreed that these should be maintained even for lower-priority efforts. The working group recognized that some restructuring may be necessary to improve coordination and better align these efforts with NMFS priorities. For higher-priority threats, the working group recommends enhanced international efforts, as described below; although bycatch, climate change, and prey depletion were all identified as high priorities, bycatch was overwhelmingly identified as the highest priority for NMFS international efforts. The Action Plan focuses primarily and in most detail on those top priorities, and then provides more general guidance for the medium and low priorities. For each priority, the plan provides a goal statement for action, a description of the threat and effects on marine mammals, and a description of NMFS' 5-year strategy to address the issue. Detailed regional action plans that describe initial or continuing actions to implement the strategy are provided in Appendix 1.



Humpback entangled in marine debris. The animal was disentangled by an experienced team from the Hawaiian Islands Humpback Whale National Marine Sanctuary Credit: NOAA National Ocean Service

HIGH PRIORITIES

1. Reduce the Bycatch of Marine Mammals in International and Foreign Fisheries to Sustainable Levels

Goal Statement: *Build the capacity in developing countries and implement international agreements and U.S. laws to reduce marine mammal bycatch and harvest in international and foreign fisheries that export commercial fish products to the United States.*

What is the threat?

Bycatch, resulting in the serious injury and mortality of marine mammals incidental to fishing operations, is regarded as the most severe threat impacting most marine mammal stocks outside U.S. waters. Direct exploitation/harvest[17] is bycatch retained for utilization as bait in the fishery where the marine mammal was caught or in another commercial fishery; for food to be consumed or exchanged in local areas or villages (subsistence); or for meat, blubber, oil, and other commodities sold in national and international markets (commercial).[18] Without harvest and trade controls, the demand for products can lead to overexploitation.

Why are marine mammals impacted by the threat?

Marine mammals and fishing operations are often concentrated in the same regions because they both tend to occur in areas of high productivity and dense prey (or target fish) concentrations. Marine mammals, initially taken as bycatch, can become the target of direct harvests for food, oil, leather, bait, and other uses.

[17] Direct exploitation or harvest, while ranked as a medium threat, is included here because it is often a natural extension of bycatch. Many marine mammals initially taken as bycatch become targets for harvests for food or bait. This combining of bycatch and harvest is not intended to elevate as a high priority or include in this priority scientific, commercial, drive fisheries (beaching animals) or subsistence whaling.

[18] Robards, M.D. and Reeves, R.R. The global extent and character of marine mammal consumption by humans: 1970–2009. *Biological Conservation*, 2011; 144 (12): 2770 DOI: 10.1016/j.biocon.2011.07.034

How are marine mammals impacted by the threat?

Nearly all commercial fishing gear types are known to incidentally catch marine mammals and most, if not all, marine mammal species that occur in areas with active fisheries are known to be caught incidentally in at least one fishery. Bycatch is the primary threat facing many marine mammal stocks, including several critically endangered species (Table 2). For example, dolphin and porpoise bycatch retained and utilized for bait fisheries in South America and "bush meat" harvests of dolphins in Africa have led to dramatic declines in the abundance of these species.[19] Bycatch can occur in aquaculture and predator nets: in Australia, dolphins attracted to "tuna feedlots" become entangled and die in predator-exclusion nets,[20] and the anti-shark nets that protect prime bathing areas along the coasts of South Africa and Australia kill cetaceans[21] as well as the large sharks they are meant to deter. Finless porpoise, and Indus and Ganges river dolphins are subjected to captures in gillnet fisheries.

NMFS 5-Year Strategy: Over the next 5 years NMFS will strongly enhance its international efforts to assess, prevent, and reduce marine mammal bycatch globally. The overexploitation of small and medium cetaceans by developing nations for food and bait further emphasizes the need for an international regulatory regime to conserve and sustainably manage marine mammals that are still the targets of direct harvest. As an initial step, NMFS will identify the nations that export fish and fish products to the United States from fisheries that have bycatch of marine mammals and, to the extent possible using available literature, estimate the abundance of the individual marine mammal species and quantify the estimated bycatch (Appendix 1, Fisheries International Affairs Objective 1). The agency will then consult with these nations and help them develop scientific and regulatory programs to assess marine mammal populations and to estimate and mitigate bycatch (Appendix 1, Fisheries International Affairs Objective 2).

Coincident with this effort, NMFS will host a series of international workshops on bycatch, to develop and share assessment and mitigation methods, and regulatory and other frameworks to address bycatch in artisanal and commercial fisheries. The goal of these workshops will be the identification of best practices, or the development of a toolkit/framework for assessing and mitigating bycatch in artisanal and commercial fisheries (Appendix 1, Fisheries International Affairs Objective 2). In addition, NMFS will engage with FAO to develop guidelines for reducing the entanglement of marine mammals in commercial and artisanal fishing gear, following the successful International Plans of Action for seabirds, sea turtles, and sharks, and the sea turtle guidelines developed under the FAO to reduce sea turtle entanglement. These guidelines will provide the basis for action within Regional Fisheries Man-

[19] Costello, M.J. and Baker, C.S. Who eats sea meat? Expanding human consumption of marine mammals. *Biological Conservation*, 2011; 144 (12): 2745 DOI:10.1016/j.biocon.2011.10.015

[20] Kemper, C.M. & S.E. Gibbs (2001). Dolphin interactions with tuna feedlots at Port Lincoln, South Australia and recommendations for minimizing entanglements. *Journal of Cetacean Research and Management.* 3:283-292.

[21] Cockcroft, V.G. 1990. Dolphin catches in the Natal shark nets, 1980 to 1988. *South African Journal of Wildlife Research* 20(2), 44–51. Cockcroft, V.G. 1992. Incidental capture of bottlenose dolphins (*Tursiops truncatus*) in shark nets: an assessment of some possible causes. *Journal of Zoology, London* 226, 123–134. Cockcroft, V.G. and Ross, G.J.B. 1991. Bottlenose dolphins in Natal shark nets, 1980 through 1987: catch rates and associated contributing factors. Pp.115–127 *in: Cetaceans and Cetacean Research in the Indian Ocean Sanctuary* (eds. S. Leatherwood and G.P. Donovan). UNEP Marine Mammal Technical Report No. 3, Nairobi, Kenya. Parra, G.J., Azuma, C., Preen, A.R., Corkeron, P.J., and Marsh, H. 2002. Distribution of Irrawaddy dolphins, *Orcaella brevirostris*, in Australian waters. *Raffles Bulletin of Zoology,* Supplement, 141–154. Paterson, R.A. 1990. Effects of long-term anti-shark measures on target and non-target species in Queensland, Australia. *Biological Conservation* 52, 147–159.

agement Organizations (RFMO) and other international agreements to achieve a global reduction in marine mammal bycatch (Appendix 1, Fisheries International Affairs Objective 2).

Regional efforts

Bycatch reduction efforts in NMFS regions will focus on threatened and endangered species and critical data gaps. For example:

- The Northeast will continue its efforts with Canada to reduce the bycatch of North Atlantic right whales and humpback whales in gillnet and pot gear (Appendix 1, Northeast Objective 1).
- The Southwest and Northwest will work collaboratively with Mexico and Canada to assess levels and trends of bycatch and develop an effective reporting program, disentanglement response, and entanglement mitigation of Eastern gray whales and humpback whales, as well as fin, blue, and sperm whales, in commercial fisheries (Appendix 1, Northwest Objective 1 and Southwest Objective 7).
- The Southeast will work through the Marine Mammal Action Plan under the Specially Protected Areas and Wildlife (SPAW) Protocol to evaluate bycatch data throughout the wider Caribbean with the goal of estimating and ultimately reducing bycatch in that region (Appendix 1, Southeast Objectives 1 and 2).
- The Southwest also will work with Mexican scientists and gear experts to assess and monitor trends in abundance of vaquita, and develop gear that can be substituted for gillnets (Appendix 1, Southwest Objective 1).
- The Southwest will continue efforts to further reduce dolphin mortality in the Eastern Tropical Pacific tuna purse-seine fishery and, working with Mexican scientists, assess populations of short- and long-beaked common dolphins and their bycatch in coastal fisheries (Appendix 1, Southwest Objectives 2 and 4).
- Alaska will document the bycatch of marine mammals in Russian and Canadian fisheries through a literature survey, and information gathered at workshops and international meetings, to help evaluate the extent of bycatch in Russian and Canadian fisheries and identify possible mitigation measures (Appendix 1, Alaska Objective 2).
- The Pacific Islands will improve fisheries observer data quality to better assess and reduce marine mammal bycatch in South Pacific fisheries (Appendix 1, Pacific Islands Objective 1).

2. Improve Understanding of Climate Change Impacts on Marine Mammals

Goal Statement: *Improve the ability to monitor, detect, and respond to shifts in distribution and population trends of marine mammals across the globe, in response to changes in climate and ocean conditions.*

The ribbon seal may become a victim of climate change due to habitat loss from shrinking sea ice. Credit: Michael Cameron, NOAA National Marine Fisheries Service.

What is the threat?

Predicted climate changes will profoundly affect marine ecosystems and some species and/or populations of marine mammals, principally in polar regions (e.g., the Arctic and Antarctic) but also in temperate and tropical regions, which in turn will result in changes in prey distribution, abundance, and habitat availability for marine mammals and will alter human interactions with marine mammals.

Why are marine mammals impacted by the threat?

At least eight pinniped and three cetacean species are closely associated with or dependent upon ice-related habitat.[22] Many of the most threatened cetacean populations are in temperate and tropical areas where the manifestations of climate change—e.g., greater frequency and severity of storms, flooding, and drought—will exacerbate resource-use conflicts between people and wildlife, especially for Asian and South American rivers inhabited by cetaceans.[23]

How are marine mammals impacted by the threat?

Physical changes in polar sea ice and freshwater discharge are ongoing and influencing ocean productivity, human activities, and contaminant flux, with implications for marine mammal populations.[24] Cetaceans may respond to increases in water temperature by changing their range (e.g., expand, shift

[22] Moore, Sue E., and Henry P. Huntington. 2008. Arctic Marine Mammals and Climate Change: Impacts And Resilience. *Ecological Applications* 18:S157–S165. [doi:10.1890/06-0571.1] Ragen, Timothy J., Henry P. Huntington, and Grete K. Hovelsrud. 2008. Conservation of Arctic Marine Mammals Faced With Climate Change. *Ecological Applications* 18:S166–S174. [doi:10.1890/06-0734.1]

[23] Würsig, B., Reeves, R.R., and Ortega-Ortiz, J.G. 2001. Global climate change and marine mammals. Pp.589–608 *in: Marine Mammals: Biology and Conservation* (eds. P.G.H. Evans and J.A.Raga). Kluwer Academic/Plenum Publishers, New York.

[24] Moore, Sue E., and Henry P. Huntington. 2008. Arctic Marine Mammals and Climate Change: Impacts And Resilience. *Ecological Applications* 18:S157–S165. [doi:10.1890/06-0571.1] Ragen, Timothy J., Henry P. Huntington, and Grete K. Hovelsrud. 2008. Conservation of Arctic Marine Mammals Faced With Climate Change. *Ecological Applications* 18:S166–S174. [doi:10.1890/06-0734.1] Laidre, Kristin L., Ian Stirling, Lloyd F. Lowry, Øystein Wiig, Mads Peter Heide-Jørgensen, and Steven H. Ferguson. 2008. Quantifying the Sensitivity of Arctic Marine Mammals to Climate-Induced Habitat Change. *Ecological Applications* 18:S97–S125. [doi:10.1890/06-0546.1]

poleward, or contract, based on their current distributions). Scientists anticipate that the ranges of 88% of cetaceans may be affected by changes in water temperature resulting from global climate change. For 47% of species, these changes are anticipated to have unfavorable implications for their conservation, and for 21% the changes may put at least one geographically isolated population of the species at high risk of extinction.[25] Several ice-dependent pinnipeds (ice seals) have been proposed for listing under the ESA.

Climate change indirectly affects marine mammals by changes in prey availability affecting distribution, abundance, migration, community structure, and susceptibility to disease and contaminants.[26] Establishing direct links between climate change and the health of individual cetaceans or pinnipeds, or indirect links between climate change and the availability of marine mammal prey resources or habitat, is difficult. But advanced technology and analytical tools—e.g., satellite tracking, ecosystem modeling, climate downscaling, multi-sensor ocean observing systems, multi-species tagging studies, unmanned systems, and stomach content analysis and tissue sampling (isotopic and fatty acid signatures)—hold promise for investigating linkages.

NMFS 5-Year Strategy: Some species are more sensitive to a changing climate than others. Baseline data on marine mammal health, distribution, and population abundance and trends are needed to investigate the impact of climate change on the overall viability of marine mammals. Staff at NMFS have participated in each of the three International Whaling Commission (IWC) workshops on climate change and will take a leadership role in an upcoming workshop on the anthropogenic effects of climate change on cetaceans.

Regional efforts

At the regional level, the focus will be the continuation of long-term studies and review of stranding records to shed light on climate change impacts on distribution, marine mammal migration, habitat use, and prey availability. For example:

- Staff in the Alaska Region will continue to monitor bowhead, gray, and beluga whale populations to better assess variations in migration, habitat use, and prey availability in response to climate change. They also will work with Canada and Russia to improve the understanding of stock structure, abundance, and vital rates for key stocks, such as Steller sea lions and ribbon, spotted, bearded, and ringed seals. This information may help develop conservation, management, and recovery efforts in an ice-diminishing Arctic (Appendix 1, Alaska Objective 1).
- Because there are many killer whale ecotypes in the Antarctic, the Southwest will conduct boat-based surveys to satellite-tag Antarctic killer whales to understand movement patterns and foraging behavior, and the killer whale's role in a changing Antarctic ecosystem (Appendix 1, Southwest Objective 5).

[25] Macleod, C.D. 2009. Global climate change, range changes, and potential implications for the conservation of marine cetaceans: a review and synthesis. *Endangered Species Research*. 7:125-136.

[26] Learmonth, J.A., Macleod, C.D., Santos, M.B., Pierce, G.J., Crick, H.Q.P. and Robinson, R.A. 2006. Potential effect of climate change on marine mammals. *Oceanography and Marine Biology: An Annual Review* 44:431-464.

- With over 25 years of ecosystem-based monitoring in the Southern Ocean around the Antarctic Peninsula, the U.S. Antarctic Living Marine Resources (AMLR) program provides a model for detecting and predicting the impacts of climate change on pinniped populations in the Antarctic and the southern portions of all the major oceans. The Southwest Region will continue to assess trends in Antarctic fur seal populations and the variability in prey availability, foraging ecology, reproductive success, movement, and condition in response to climate change. The AMLR program provides information to support U.S. policy on the conservation and management of the living marine resources in the Antarctic through CCAMLR (the Convention for the Conservation of Antarctic Living Marine Resources) (Appendix 1, Southwest Objective 3).

3. Reduce the Threat of Prey Depletion by Considering Predator-Prey Relationships Under an Ecosystem Approach to Fishery Management

Goal Statement: *Work toward an ecosystem-based management approach in international and foreign fisheries management to reduce the likelihood of prey depletion due to overfishing.*

What is the threat?

The removal of one or more prey species from an ecosystem can have repercussions throughout the food web, altering predator-prey relationships, competition for resources, and the distribution, abundance, or recruitment of marine mammals and their prey.

In western Alaska, where the Steller sea lion population is listed as endangered, the potentially highest risk factor for their recovery is competition with fisheries. Credit: NOAA, Alaska Fisheries Science Center

Why are marine mammals impacted by the threat?

Prey depletion may have serious long-term consequences for marine mammal survival and reproduction. Of special concern are large-scale high-seas commercial fisheries that extract vast amounts of fish and squid biomass from the world's oceans, and in so doing may transform biological communities or reduce the environmental carrying capacity for marine mammal populations. And in the Mediterranean, North Sea, and Southwest Atlantic Ocean, thousands of small gillnet fishing boats, plus large bottom trawlers and longliners, have depleted numerous fish, crustacean, and mollusk populations that serve as prey for numerous marine mammal species.[27] Some say Antarctic killer whales may be affected by depletion of toothfish.[28]

[27] Bearzi G, Politi E, Agazzia S, Azzellino A (2006) Prey depletion caused by overfishing and the decline of marine megafauna in eastern Ionian Sea coastal waters (central Mediterranean). *Biological Conservation* 127:373-382.

[28] Ainley D.G., Ballard, G., Olmastroni, S. (2009) An Apparent Decrease in the Prevalence of "Ross Sea Killer Whales" in the Southern Ross Sea. *Aquatic Mammals* 35(3), 335-347.

How are marine mammals impacted by the threat?

Depending on the amount extracted of both target and non-target species and the level of prey depletion, marine mammals may respond to the reduced prey supply by either switching their prey or moving to another area to capitalize on alternative prey aggregations. Reduction in local prey abundance or dispersion of prey schools could make it more energetically costly for foraging marine mammals to obtain enough food for successful growth and reproduction.

It is rarely possible to show a direct link between prey depletion and reduced numbers of a particular marine mammal species or stock. One exception is in the Bering Sea and Gulf of Alaska, where substantial declines in the numbers and/or reduced fitness or productivity of Steller sea lions and northern fur seals may be linked to a decline in food availability resulting from commercial fisheries targeting key prey species of these mammals. Another example is the link between reduced salmon stocks in the Pacific Northwest and the declining southern resident killer whales (SRKW), which also exhibit reduced fitness and productivity.

NMFS 5-Year Strategy: Prey depletion and ecological cascades highlight the complex nature of ecological interactions in marine ecosystems and the lack of knowledge about the inter-relationships of many marine species. Prey depletion can largely be avoided through ecosystem-based management in international fisheries and by requiring nations to consider marine mammals and other predators when setting harvest control rules and targets to end overfishing. The agency will continue to advocate in RFMOs for ecosystem-based management and catch limits, allocations, and harvest control rules that consider the marine ecosystem and predator-prey relationships of keystone species such as marine mammals.

Regional efforts

- In Alaska and the Northwest region, much of the existing research on population abundance, distribution, vital rates, and habitat use will be used in studies of prey availability and utilization by transboundary stocks of Steller sea lions, northern fur seals, and southern resident killer whales (SRKW) (Appendix 1, Alaska Objective 1 and Northwest Objective 2).
- The Northwest Region will work with Canada to understand the effects of prey depletion on SRKW and may develop transboundary regulations for the recovery and management of ESA-listed threatened and endangered salmon runs—the primary prey of SRKW. Specifically, NMFS and Fisheries and Oceans Canada sponsored a series of three workshops in 2011–2012 to review available scientific information on the effects of salmon fisheries on SRKW (Appendix 1, Northwest Objective 2).[29]
- The Southwest Region will conduct studies on the prey habits of Antarctic killer whales to improve understanding of energetics, prey utilization patterns, and potential impacts on pinnipeds, cetaceans, and fishes (e.g., Patagonian tooth fish) in the Southern Ocean (Appendix 1, Southwest Objective 5).

[29] Background information on the workshop process and presentations from the first workshop are available at: http://www.nwr.noaa.gov/Marine-Mammals/Whales-Dolphins-Porpoise/Killer-Whales/ESA-Status/KW-Chnk.cfm.

MEDIUM PRIORITIES

1. Reduce the Threat of Marine Debris to Marine Mammals by Decreasing the Loss of Marine Debris, Including Derelict Fishing Gear, into the Ocean

Goal Statement: *Reduce the amount of derelict fishing gear and marine debris posing a threat to marine mammals in the marine ecosystem, through international agreements, conservation actions, and education.*

What is the threat?

Marine debris impacts the economy, human health and safety, and the health and survival of fishery resources, wildlife, and habitat. Packing bands, net fragments, lost traps and pots, and ropes and lines can drift at or below the water surface or along the bottom and ensnare wildlife. Ocean garbage such as abandoned and lost fishing gear, plastic bags, and tires can have potentially significant adverse impacts on the marine environment, including:

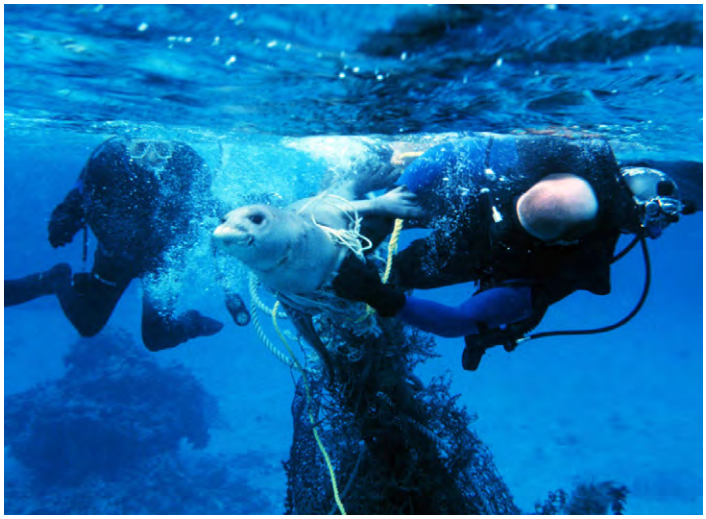
- Hazards posed by floating derelict fishing gear to vessel navigation and to life and property when encountered at sea by water-craft of all sizes.
- Mortality of commercial fish species from derelict fishing gear ("ghost fishing").
- Introduction of foreign or invasive species to new areas.
- Diminished tourism, recreation, and beach use when marine debris washes ashore onto coastlines and beaches.

Why are marine mammals impacted by the threat?

Marine mammals can become entangled in marine debris, causing serious injury or death. They can also mistake marine debris for food or accidentally consume debris particles while feeding.

How are marine mammals impacted by the threat?

Entanglement leads to suffocation, starvation, drowning, increased vulnerability to predators, reduced productivity, or other injury. It can also restrict the animal's movement, resulting in exhaustion or infection from the deep wounds caused by tightening material or by drag. Derelict fishing gear, especially, is a serious threat to northern fur seals and such endangered species as Hawaiian monk seals and North Atlantic



Divers free a Hawaiian monk seal from derelict fishing nets. Credit: NOAA National Ocean Service

right whales. Entanglement is also exacerbating declines in Antarctic fur seal[30] and Australian fur seal populations.[31]

Ingestion, on the other hand, can lead to starvation or malnutrition when the marine debris prevents absorption of vital nutrients, and can allow pollutants to enter the body, compromise the immune system, and increase susceptibility to disease or result in death. At least 31 species of marine mammals are known to ingest plastic debris,[32] including harbor porpoise, pygmy sperm whales, and Blainville's beaked whales.

NMFS 5-Year Strategy: In 2009, the United Nations Environment Programme (UNEP) concluded in *Marine Litter, a Global Challenge* that "deficiencies in the implementation and enforcement of existing international, regional, and national regulations and standards that could improve the situation, combined with a lack of awareness among main stakeholders and the general public, are other major reasons why the marine litter problem not only remains, but continues to increase worldwide."[33] In March 2011, UNEP and NOAA organized the Fifth International Marine Debris Conference in Honolulu,[34] bringing together 440 participants from 38 countries and adopting the "Honolulu Commitment," 12 actions to reduce marine debris. International organizations, governments at national and sub-national levels, industry, non-governmental organizations, citizens, and other stakeholders were invited to help develop, review, and implement the Honolulu Strategy, a framework to prevent, reduce, and manage marine debris. The Honolulu Commitment requires collective action at global, regional, country, local, and individual levels; NMFS, working through the IWC, can pursue multilateral initiatives to successfully implement the Honolulu Strategy. These include improving global knowledge, understanding, and monitoring of the scale, nature, source, and impact of marine debris, as well as raising awareness of its impact on biodiversity.

A second advance is facilitated through the International Maritime Organization (IMO), which in 2011 adopted a revised Annex V to the International Convention for the Prevention of Pollution from Ships (MARPOL Annex V), which prohibits the discharge of all garbage into the ocean, with regulated exceptions for protection of vessels, mariners, and the environment. Within RFMOs, NMFS can elevate the issue of marine debris and compliance with MARPOL Annex V; NMFS has already led marine debris removal efforts in the Pacific Northwest and the Northwest Hawaiian Islands, removing hundreds of tons of marine debris and derelict fishing gear. Training and capacity-building assistance could be provided by NMFS in world areas where marine debris hot spots overlap marine mammal habitat. Information on the sources of derelict fishing gear removed from the marine environment would be used to increase awareness and encourage compliance with national and international laws, such as MARPOL Annex V.

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[30] Croxall, J. P., Rodwell, S. and Boyd, I. L. 1990. Entanglement in man-made debris of Antarctic fur seals at Bird Island, South Georgia. *Marine Mammal Science* 6: 221-223.

[31] Pemberton, D., Brothers, N. P. and Kirkwood, R. 1992. Entanglement of Australian fur seals in man-made debris in Tasmanian waters. *Wildlife Research* 19: 151-159. Jones, M.M., 1995. Fishing debris in the Australian marine environment. Marine Pollution Bulletin 30, 25–33.

[32] Baird, R.W., and S.K. Hooker. 2000. Ingestion of plastic and unusual prey by a juvenile harbor porpoise. *Marine Pollution Bulletin* 40:719-720.

[33] UNEP, 2009. *Marine Litter: A Global Challenge.* Nairobi: UNEP. 232 pp.

[34] http://www.5imdc.org/

2. Reduce the Number of Vessel Strikes in International and Foreign Waters

Goal Statement: *Reduce the number of marine mammals struck by vessels through continuing education programs, notifying mariners, and implementing speed restrictions and rerouting vessels in heavily used marine mammal habitats.*

What is the threat?

Serious injury and death can result from marine mammal collisions with vessels. Accurate rates of mortality and injury from ship strikes are difficult to estimate because many carcasses are never recovered and because the cause of death may not be evident when a carcass is found and not thoroughly examined.

Why are marine mammals impacted by the threat?

Marine mammals and shipping operations (e.g., container vessels, tankers, ferries, and whale-watching and recreational vessels) are often concentrated in the same areas. Marine mammals tend to forage in areas of high productivity and dense prey (or target fish) concentrations, and these can overlap with areas used for vessel traffic and other maritime activities. Whale-watching and recreational boats viewing marine mammals may also increase the likelihood of a vessel strike. The magnitude of this threat increases as vessel manufacturing produces larger, faster vessels that increase the risk to marine mammal populations, including those that may already be depleted.

How are marine mammals impacted by the threat?

Many species of whales, dolphins, seals, and sea lions are vulnerable to ship collisions. Cetaceans can be injured or killed outright, depending on the angle, duration of onset, and force of impact (dependent on vessel speed and size). Ship propellers can cut a whale's skin including blubber, and slice off pieces of its tail. Collisions can cause fracturing, internal bleeding, and bruising that is not always noticeable, although wounds and scars seen on the bodies of living animals indicate that some animals survive the initial injuries from collisions. The problem is most serious for populations that are small or already subject to other stressors, such as North Atlantic right whales,[35] fin and sperm whales in the Mediterranean Sea,[36] southern right whales

This 36-foot, 8.5 ton endangered sei whale was struck by an 800-foot container ship. Credit: Maryland Department of Natural Resources

[35] Kraus SD, Brown MW, Caswell H, Clark CW, Fujiwara M, Hamilton PK, Kenney RD, Knowlton AR, Landry S, Mayo CA, McLellan WA, Moore MJ, Nowacek DP, Pabst DA, Read AJ, Rolland RM. North Atlantic right whales in crisis. *Science* 2005; 309: 561-562; and/or Clapham PJ, Young SB, Brownell Jr. RL. Baleen whales: conservation issues and the status of the most endangered populations. *Mammal Review* 1999; 29(1): 35-60.

[36] Cagnolaro, L. and Notarbartolo di Sciara, G. 1992. Attivit di ricerca sui cetacei e loro status di conservazione in Italia. *Boll. Mus. Ist. biol. Univ. Genova* 56–57, 53–85.

in Argentina,[37] and sperm whales around the Canary Islands.[38] Vessel collisions are also a factor in the mortality of the endangered Hector's dolphins in New Zealand,[39] Indo-Pacific hump-backed dolphins and finless porpoises in Hong Kong,[40] and probably many other species of small cetaceans around the world.[41]

NMFS 5-Year Strategy: Data on shipping and vessel use areas can provide information on where they collocate with marine mammal aggregations, pointing to potential high-risk areas. Recent developments in electronic navigation and reporting systems have greatly increased the available data on shipping movements and density; of particular value are Automatic Identification System (AIS) and Long-Range Identification and Tracking systems. The Voluntary Observing Ships Scheme may also provide data on historical shipping patterns. International risk assessments are needed, using shipping and whale data overlays to identify probable high-encounter areas and compare them with locations of known ship strike fatalities. Since 2007, the IWC has been developing a global database of collisions between vessels and marine mammals. NMFS will continue contributing to the IWC ship strike database, and help develop a standardized protocol for record entry and data usage. In addition, NMFS will continue its work with the IWC's Ship Strike Working Group to develop worldwide ship strike reduction measures, starting in particular with the ship strike issue in the Mediterranean. This group is collaborating with the IMO to identify ways vessel operators can use risk assessment data to reduce the likelihood of hitting large whales and other marine mammals, such as alternative routing measures. The agency is also working through formal and informal channels with shipping industry representatives, maritime communities, and government representatives to reduce collisions, and NOAA has developed various AIS vessel-monitoring programs for communities attempting to reduce ship strikes.

Regional efforts

The Southwest Region is working with other agencies, scientists, and industry to consider alternative routes into ports to reduce the overlap with whale hot spots, such as cruise industry vessels traveling to Canada and Mexico (Appendix 1, Southwest Objectives 7 and 8). The Alaska Region is working with the USCG and other stakeholders to address the expected increased vessel traffic through the Bering Strait as a result of climate change. Potential marine mammal mitigation or avoidance measures include vessel speed and routing restrictions, establishing cooperative international protocols, and action through the IMO (Appendix 1, Alaska Objective 1).

[37] Rowntree, V.J., Payne, R.S., and Schell, D.M. 2001. Changing patterns of habitat use by southern right whales (*Eubalaena australis*) on their nursery ground at Península Valdés, Argentina, and in their long-range movements. *Journal of Cetacean Research and Management* (Special Issue) 2, 133–143.

[38] André, M., Ramos, A.G., and Lopez-Jurado, L.F. 1994. Sperm whale acoustic survey off the Canary Islands, in [a]n area of heavy maritime traffic: preliminary results. *European Research on Cetaceans* 8, 65.

[39] Stone, G. and Yoshinaga, A. 2000. Hector's dolphin (*Cephalorhynchus hectori*) calf mortalities may indicate new risks from boat traffic and habituation. *Pacific Conservation Biology* 6, 162–171.

[40] Parsons, E.C.M. and Jefferson, T.A. 2000. Post-mortem investigations on stranded dolphins and porpoises from Hong Kong waters. *Journal of Wildlife Diseases* 36,342–356.

[41] Van Waerebeek K, Baker AN, Felix F, Gedamke J, Inigeuz M, Sanino GP, Secchi E, Sutaria D, Helden AV, Wang Y. Vessel collisions with small cetaceans worldwide and with large whales in the Southern Hemisphere; building a standardized database. Paper to the IWC Scientific Committee. 16 p. St Kitts and Nevis, West Indies, June (SC/58/BC6), 2006.

3. Prevent Habitat Loss, Degradation, and Disturbance through Marine Spatial Planning and Marine Protected Area Designation

Goal Statement: *Protect critical marine mammal foraging, breeding, and calving areas through the application of marine spatial planning to identify key habitats that are in need of additional regulations or marine protected area designation and management.*

Vessel noise and presence from whale watching vessels pose a risk to southern resident killer whales. Credit: Dawn Noren, NOAA National Marine Fisheries Service

What is the threat?

Marine mammal habitat can be degraded in several ways.[42] Large dead zones have been created in coastal regions due to runoff of agricultural chemicals. Harmful algal blooms resulting from human-generated runoff are becoming more common and are more severe. Seagrass beds are being lost to trawling, dredging, and coastal construction, including alternative energy sites. Ecotourism activities, such as whale watching and swim-with programs, and increased noise from anthropogenic sources (e.g., shipping, sonar, and seismic testing) are increasingly disturbing marine mammals. Damming, water diversion, and pollution threaten river dolphins.

Why are marine mammals impacted by the threat?

Marine mammals have preferred locations for breeding, giving birth, rearing young, and feeding. These locations have certain physical (including acoustic) and biological oceanographic features that cause marine mammals to select them, but human activities can affect the animals if the habitats are significantly altered, damaged, or destroyed.

How are marine mammals impacted by the threat?

Many activities have reduced the available habitat for freshwater and coastal cetaceans, including harbor construction, land "reclamation," shoreline development, hydroelectric and water diversion (e.g., irrigation) and flood control projects, alternative energy site construction, oil and gas exploration and development, and aquaculture. Ice seals are losing haul-out sites, particularly important during the pupping season, as warming temperatures degrade and reduce sea ice, and vessels further break up the available ice sheets in the Arctic ecosystem.

Aquatic noise generated by humans is also a serious problem. Sound levels in many oceans, seas, rivers, and lakes have increased dramatically, potentially disrupting important marine mammal activities (e.g., nursing, foraging, and resting), impairing communication by masking the animals' signals, and even potentially displacing marine mammals from key habitat (e.g., feeding grounds and migration routes). Over the past decade, some mass stranding events of beaked whales have

[42] Harwood, J. 2001. Marine mammals and their environment in the twenty-first century. *Journal of Mammalogy* 82, 630–640.

been attributed to high-intensity noise from military ship mid-frequency sonars, and airguns used for geophysical research.

NMFS 5-Year Strategy: The preservation and restoration of marine mammal habitat are among the goals of U.S. laws (e.g., MMPA and ESA). International treaties and agreements must be used to conserve important habitat, and marine protected areas are a means to achieve habitat protection. Internationally, marine mammal protected areas (MPAs) are a patchwork of boxes drawn around hot spots and, although growing in number, their effective coverage for many wide-ranging species remains low. Many MPAs have been slow to set up management plans with effective monitoring and enforcement. Management must be continuous and science-based, incorporate ecosystem-based management and monitoring, take into account socioeconomic concerns and larger environmental issues (particularly those related to fisheries, ecotourism and whale watching, anthropogenic sound,[43] and ship strikes), and include public participation and education programs. In addition, MPAs must be large enough to be effective and contiguous along national boundaries; for example, the Wadden Sea Agreement for seals covers areas in Germany, Denmark, and Netherlands.[44] MPAs can be an effective tool to address many of the threats discussed in this Action Plan.

There is an urgent need for a worldwide effort to identify and define key marine mammal habitats and the threats to them. This information must be mapped with other species data and ecogeographic data to: (1) assess data gaps, (2) justify the need for protected area status, and (3) identify specific conservation and management requirements for MPA networks in national waters and on the high seas. National Marine Fisheries Service staff will work through national governments and various regional and international fora, and in collaboration with the International Committee on Marine Mammal Protected Areas, to promote the development and management of these protected areas, as well as to ensure that marine mammals are well represented and included in larger MPA, ocean zoning, and marine spatial planning initiatives. National Marine Fisheries Service was a major sponsor of, and an active participant in, two International Conferences on Marine Mammal Protected Areas and will work to implement the resulting recommendations.

National Marine Fisheries Service staff will work through the International Maritime Organization to institute ship-quieting technologies, the Arctic Council to secure Arctic oil spill response and prevention measures, and the SPAW Protocol to improve coastal zone management in the Caribbean. To ensure the health of marine and coastal habitats, NMFS staff will continue scientific efforts to evaluate and define acoustic thresholds for marine mammals and will establish industry best practices for

[43] See Joint Subcommittee on Ocean Science and Technology (2009) *Addressing the Effects of Human-Generated Sound on Marine Life: An Integrated Research Plan for U.S. Federal Agencies*: http://www.nmfs.noaa.gov/pr/pdfs/acoustics/jsost2009.pdf

[44] The trilateral Agreement was concluded between Denmark, Germany, and the Netherlands on October 16, 1990 in Bonn, Germany, and entered into force one year later. The Secretariat is located in Wilhelmshaven, Germany. The trilateral conservation area is situated within the Wadden Sea, and consists of certain areas in the Netherlands, Germany, and Denmark. The geographical range of the Wadden Sea Plan is the Trilateral Wadden Sea Cooperation Area (or Wadden Sea Area), which is an offshore zone three nautical miles from the baseline as fixed nationally including all islands. The aim of the Agreement is to promote close cooperation among the Parties in order to achieve and maintain a favorable conservation status for the Common seal population, which is an irreplaceable component of the Wadden Sea and an important indicator of its environmental health.

seismic surveys and international standards or guidelines for mitigating acoustic impacts on marine mammals.

Regional efforts

Regional efforts will focus on identifying key habitats and implementing measures to reduce disturbances to threatened and endangered species.

- The Northeast will continue its work with Canada to identify North Atlantic right whale critical habitat under the ESA and Species at Risk Act (SARA), and additional conservation measures that should be adopted (Appendix 1, Northeast Objective 1).
- The Northeast will also work with other researchers to coordinate and improve humpback whale research efforts in the Cape Verde Islands, with the goal of defining the threats to, and key habitat of, these whales (Appendix 1, Northeast Objective 4).
- The Southeast will develop transboundary plans for regulating vessels, especially for whale watches and cruise ships in the Gulf of Mexico and wider Caribbean (Appendix 1, Southeast Objective 1).
- The Northwest will work with Canada to develop transboundary regulations for whale watch operations in order to reduce the disturbance to SRKW (Appendix 1, Northwest Objective 2).
- The Southwest will continue to evaluate the impact of oil and gas exploration on the western population of gray whales (Appendix 1, Southwest Objective 6).
- The Pacific Islands will work with the Hellenic Society for the Study and Protection of the Mediterranean monk seal to improve protected area designation and management for this species (Appendix 1, Pacific Islands Objective 2).

International Fund for Animal Welfare staff and volunteers assess white-sided dolphins during a mass stranding event. Credit: International Fund for Animal Welfare

LOW PRIORITIES

Improve Understanding of, and Response to, Disease and Die-offs in Marine Mammal Populations[45]

Goal Statement: *Build the capacity to establish international stranding networks to document and investigate the occurrence of die-offs, disease outbreaks, and mass strandings, and to evaluate the role human activities play in these events.*

What is the threat?

Diseases occur naturally in animal populations, but human activities can introduce them, potentially alter their transmission routes and geographic spread, and alter the animals' susceptibility to them. Environmental contamination is increasing worldwide (by 1999, some 20 million chemicals had been registered, with 2,000 to 3,000 new chemicals registered every year); these contaminants have increasingly found their way into the marine environment, where their effects on marine mammals are largely unknown. Harmful algal blooms also occur naturally, but some human activities may exacerbate them, as well. The frequency and severity of algal blooms have increased due to greater nutrient loading of coastal waters and the inadvertent transport of harmful species of algae to new places, posing a threat to marine mammals. The prevalence and severity of disease outbreaks or marine mammal die-offs may be exacerbated by contaminants, harmful algal blooms, habitat loss, and reduced amount or quality of prey.

Why are marine mammals impacted by the threat?

Many marine mammals are at the top of the food chain, putting them at risk for accumulating high levels of contaminants in their tissues over their lifetime or assimilating biotoxins present in their prey. Very high levels of PCBs, DDT, and polybrominated diphenylethers (PBDEs) have been documented in the blubber of beluga whales from the St. Lawrence River (Canada) and killer whales off Washington and British Columbia. And freshwater cetaceans may be at greater risk from pollutants than marine cetaceans because they inhabit areas where the pollutant discharges are high and extremely concentrated due to the diminished river flow (e.g., South Asian rivers) caused by extensive damming and abstraction.[46] Because coastal areas are particularly susceptible to harmful algal blooms, marine

[45] As this Action Plan was being drafted, the Deepwater Horizon oil spill occurred in the Gulf of Mexico. The lessons learned from that event demonstrated that very little is known about marine mammal health and the effect of oil spills to the well-being of marine mammals. This oil spill renewed interest in oil and gas exploration and development, and an unusual mortality event involving several species of ice seals in the Arctic will likely result in this priority being revisited and possibly elevated.

[46] Dudgeon, D. 1992. Endangered ecosystems: a review of the conservation status of tropical Asian rivers. *Hydrobiologia* 248, 167–191.

mammals that inhabit these coastal waters and remain in the area of a bloom are subject to the cumulative effects of biotoxins ingested or toxic aerosols inhaled over a period of days or weeks.

How are marine mammals impacted by the threat?

Disease outbreaks and mass mortality events (die-offs), some involving thousands of animals, can affect the long-term survival and reproduction of marine mammal populations, particularly small ones. Examples of major disease events include outbreaks of phocine distemper virus in European harbor seals in 1988 and again in 2002; dolphin morbillivirus in bottlenose dolphins along the U.S. Atlantic coast in 1987–1988, striped dolphins in the Mediterranean Sea,[47] and various cetacean species in the Gulf of California;[48] and morbillivirus in Baikal seals in Lake Baikal (1988) and Caspian seals in the Caspian Sea (2000). The lower immunocompetence induced by contaminants aggravated these die-offs, and exposure to high levels of contaminants played a key role in facilitating the transmission of the virus and increasing the susceptibility of individuals to the disease.

Marine mammal die-offs linked to harmful algal blooms include multiple large-scale events in sea lions, dolphins, and southern sea otters along the California coast attributed to domoic acid from an algal diatom. Die-offs of manatees and bottlenose dolphins were linked to brevetoxin produced by red tides in Florida. Saxitoxin-related deaths of humpback whales in Cape Cod Bay and bottlenose dolphins in Florida's Indian River Lagoon were caused by dinoflagellate protozoa. Phycotoxins were suspected as a cause of mortality of endangered Mediterranean monk seals in West Africa.

NMFS 5-Year Strategy: Establishing or supporting international stranding response networks, and improving coordination and communication among disease specialists, regional stranding response groups, and marine mammal biologists, are vitally important to marine mammal protection and conservation. Stranding events offer a window of opportunity to learn about emerging diseases, harmful algal blooms, and pollution/contamination problems for marine mammals. Determining the cause and effect of disease outbreaks and die-offs of marine mammal populations is challenging because baseline data are often lacking. While many well-coordinated national stranding programs are conducted around the world, disease research activities and outbreak/stranding information for marine mammals traditionally have been poorly coordinated in terms of field methods, data collection, reporting, and information exchange. Because some marine mammal species are migratory and use waters within the jurisdiction of many countries and regions, health and disease assessment is particularly challenging. For example, infectious diseases may be introduced in one area and disseminated rapidly across national boundaries and ocean basins, making response coordination and communication key components of any conservation strategy.

Enhancing the capacity and support for stranding response networks and sampling programs in developing nations improves data quality and helps to ensure a timely response to emerging situations that threaten marine mammal populations.

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[47] Aguilar, A. 2000. Population biology, conservation threats and status of Mediterranean striped dolphins (*Stenella coeruleoalba*). *Journal of Cetacean Research and Management* 2, 17–26.

[48] Vidal, O. and Gallo-Reynoso, J.-P. 1996. Die-offs of marine mammals and sea birds in the Gulf of California, México. *Marine Mammal Science* 12, 627–635.

The agency will develop a Marine Mammal Stranding Response Training Strategic Plan that will lay out the goals, resources, and priorities related to marine mammal stranding response training, research, and conservation efforts, and will standardize the "stranding response tool kit and protocol" for countries seeking to formalize their stranding response, including an interactive web-based training. The tool kit will include marine mammal identification guides, training materials, necropsy tools, protective gear, and other materials tailored to the needs of individual countries. In addition, NMFS will develop a comprehensive list of Marine Mammal Stranding Response professionals in the United States (chiefly within NOAA), including veterinarians, pathologists, biologists, taxonomic specialists, disentanglement specialists, and oil spill response experts (Appendix 1, Fisheries International Affairs Objective 3) .

NMFS will convene international training workshops for individuals from international organizations and governments in Africa, Latin America, the Caribbean, the Pacific Islands, Asia, and other interested countries to provide stranding network and disentanglement training where none exist; enhance the capabilities of existing networks; and improve data collection, communication, and coordination between stranding programs, fishery observer programs, and regional networks (Appendix 1, Southeast Objective 2 and Northwest Objective 3). This training will significantly improve the response to live/dead marine mammal strandings and entangled marine mammals, data gathering and stranding investigations, necropsies, mass stranding response, epidemiology, identification of emerging diseases, oil spill response, and identification of human impacts (e.g., fishery bycatch and marine debris). Over the long term, the outcomes of these hands-on stranding training and mock disentanglement demonstrations will contribute significantly to marine mammal medicine, our understanding of the biology and threats facing marine mammals, and our ability to effectively disentangle marine mammals and respond to human-caused disasters such as oil spills.

Through the IWC's Cetacean Emerging and Resurging Disease Working Group, NMFS will continue to support efforts to increase communication and understanding of disease and pollution/contaminants; further our ability to monitor, detect, and respond to trends in marine mammal disease outbreaks across the globe; and assist in the conservation of critically endangered species.

Regional efforts

The Pacific Islands Region is examining the impact of contaminants on Hawaiian monk seals and developing vaccines and vaccination strategies should a disease outbreak occur. These scientific designs, vaccines, or protocols will be shared, refined, and implemented to assist researchers with the conservation of the critically endangered Mediterranean monk seal (Appendix 1, Pacific Islands Objective 2).

Conclusion

Because they are often highly migratory and transboundary, many marine mammals and their habitats are affected by the activities of more than one nation. Marine mammals and threats to them are thus most effectively studied and managed through international cooperation. The National Marine Fisheries Service proposes to lead capacity-building projects, champion marine mammal bycatch monitoring and reduction measures in RFMOs, develop cooperative arrangements to address these multinational threats, and lead collaborative research efforts. Cooperation may be sharing information on transboundary stocks and technologies to reduce threats to marine mammals or formal agreements to study and manage resources in international waters (e.g., RFMOs or intergovernmental agreements).

The NMFS leadership believes that these Action Plan strategies are essential to achieve NOAA's Next Generation Strategic Plan goals: (1) improved understanding of ecosystems to inform resource management decisions and (2) recovered and healthy marine and coastal species. These actions also meet the MMPA's international mandate and goals to: (1) maintain marine mammals as functioning elements of their ecosystem(s) and preserve the health and stability of the marine ecosystem, (2) reduce the adverse impacts of fishing and other practices on marine mammals to sustainable and ultimately insignificant levels, (3) recover marine mammal populations and protect essential habitats, and (4) promote international efforts to encourage research on and conservation of marine mammals.

The agency's capabilities can address emerging environmental and economic issues related to marine mammal conservation and management. The complex cultural, societal, economic, and environmental impacts associated with international marine mammal conservation and management requires a concerted, systematic, rapid, and sustained effort with international partners from the diplomatic and grassroots levels. The agency's scientific capabilities can increase understanding of marine mammal populations and threats, and its international policy capacity can offer technical expertise to develop policy options and conservation and management strategies to mitigate threats. In FY 2011, implementation of this Action Plan could have been accomplished largely through existing levels of funding; however, budget reductions in FY 2012 and additional reductions anticipated in FY 2013 have mounted a serious challenge to NMFS' ability to accomplish the Plan's goals. Therefore, an investment beyond current levels of support for research and mitigation will be required for success. The Action Plan strengthens NMFS budget planning should funds become available.

APPENDIX 1
DETAILED REGIONAL MARINE MAMMAL ACTION PLANS

Introduction

This appendix provides detailed objectives currently planned in the regions and headquarters to implement the Action Plan's strategic priorities. The objectives are actions likely to occur over the next 5 years, even without significant additional staff or money.

These objectives integrate NMFS' international work across NMFS Regional Offices, Science Centers, and Headquarters Offices (e.g., International Affairs, Science and Technology, Protected Resources); where appropriate, objectives also pertain to international and government organizations, U.S. agencies, non-governmental organizations, and academia. These partnerships can leverage limited funds for collaborative scientific research projects, support bilateral and multilateral forums, and apply the science to inform international conservation and management decisions.

Considered together, the objectives describe a comprehensive approach that includes activities in the areas of science, policy, capacity building, and government-to-government actions. The integrated approach of the Action Plan capitalizes on the diverse capabilities of NMFS, supports existing priorities, and leverages the strengths of all partners. Implementation of these objectives will advance international marine mammal conservation and management efforts. The Action Plan will be a living document with the working group continuing to refine, adjust as necessary, and implement its strategies to accomplish these objectives.

Northeast Action Plan

Objective 1: Mitigate principal threats of bycatch and ship strikes in the United States and Canada.

Species: North Atlantic right whale (other transboundary marine mammal stocks, e.g., harbor porpoise).

Threat: Bycatch and habitat degradation.

Partners: NERO, NEFSC, SERO, SEFSC, Stellwagen Bank National Marine Sanctuary, F/IA, F/PR.

Strategies

- Science: Conduct passive acoustic monitoring of right whales around the U.S./Canadian transboundary line to better define habitat use. Share information on ship traffic (e.g., AIS data) and entanglement.
- Policy: Develop with Canada an international plan to identify western north Atlantic right whale critical habitat. Work with Canada to identify additional conservation measures that should be adopted within critical habitat.
- Capacity building: Investigate the need for additional cooperative disentanglement training in Canada and consider joint research efforts to develop effective mitigation measures to reduce right whale entanglement in pot and gillnet gear.
- International government-to-government: Continue convening NMFS Northeast Region and DFO Maritime Region Species at Risk Working Group meetings (two meetings annually). Also, include right whale bycatch mitigation and critical habitat issues as part of the Canadian Bilateral discussions, and continue transboundary coordination of entanglement reporting, disentanglement efforts, and collaboration on conservation activities.

The Northeast objectives include reducing the threats of bycatch and ship strikes to North Atlantic right whales. Credit: NOAA National Marine Fisheries Service

Expected Conservation Outcome: Implementation of this objective will improve information on right whales (and other transboundary marine mammal stocks) and the threats facing them, and improve management of those threats in the United States and Canada.

Justification: The whereabouts of western north Atlantic right whales are generally not known for a large portion of the year. Passive acoustics is an effective tool to determine right whale presence, aggregation, and movements along the U.S./Canadian maritime boundary. These acoustic data may provide clues to valuable right whale habitat and fill a data void in seasons when sightings are not

available. An international and collaborative U.S.-Canada effort will result in actions to protect western north Atlantic right whale habitat on both sides of the border, mitigate ship strikes, and reduce bycatch. Current management of right whales is limited by lack of effective action to address entanglement in Canadian waters; continued engagement in bilateral fora, supported by new research findings, may lead to improved management of right whales and will support NOAA's efforts to recover this species.

Objective 2: Coordinate and improve bycatch monitoring and mitigation across the North Atlantic.

Species: All marine mammal bycatch species in the North Atlantic.

Threat: Bycatch.

Partners: NEFSC, F/IA, F/PR.

Strategies

- Science: NEFSC staff will participate in ICES Working Groups to publish a report on member nation fisheries, estimating bycatch in these fisheries, summarizing lessons learned from research, and identifying mitigation measures that can be used in U.S. domestic fisheries and foreign fisheries in the North Atlantic that export fish and fish products to the United States.
- Policy: NEFSC staff will work within the ICES Bycatch Working Group to draft recommendations for implementing or improving member nation marine mammal bycatch assessment, monitoring, and mitigation programs.
- Capacity building: Lessons and tools used in U.S. Atlantic fisheries and those identified in the ICES report will be used to recommend bycatch observer strategies and mitigation actions for specific regional fisheries.
- International government-to-government: NEFSC will attend the ICES meeting and participate in the ICES Working Group on Bycatch. F/IA staff working with F/PR, NEFSC, and NERO will prepare a resolution for consideration at North Atlantic Fisheries Organization (NAFO) that calls upon member nations to collect marine mammal bycatch data and, where possible, adopt bycatch mitigation strategies.

Expected Conservation Outcome: Implementing this objective will improve information on the bycatch of marine mammals, and identify, develop, and implement bycatch mitigation strategies in North Atlantic commercial fisheries.

Justification: The MMPA requires that nations exporting fish and fish products to the United States do not have a marine mammal incidental mortality or serious injury in excess of U.S. standards. Therefore, it is vital that NOAA share its expertise in bycatch assessment and mitigation with other North Atlantic nations through the multilateral processes of NAFO and ICES in order to promote improved management of fishery interactions with shared or high seas marine mammal stocks, including fisheries that could or do involve U.S. fishermen/vessels.

Objective 3: Convene a series of workshops on gillnet bycatch to develop and share mitigation methods and regulatory frameworks to address bycatch in artisanal gillnet fisheries.

Species: Marine mammal species globally.

Threat: Bycatch.

Partners: F/IA, F/PR, NEFSC, New England Aquarium; other partners sought.

Strategies

- Science: NEFSC staff has planned three workshops over the next 5 years. Workshop 1 (October 2011) documented the state of the art in gillnet bycatch mitigation and developed recommendations for future research and actions to mitigate bycatch. Workshop 2 (November 2011 at Society for Marine Mammalogy Biennial) identified key nations where bycatch in artisanal gillnets is a problem for marine mammals, informational needs, and initial actions that can be taken to address marine mammal bycatch in these gillnet fisheries. Workshop 3 (2012) will focus on catalyzing action to address bycatch in artisanal gillnet fisheries that pose the greatest threat to marine mammals.
- Policy: To further compliance with the MMPA, the mitigation measures developed through these workshops can be used to address bycatch in coastal gillnet fisheries where the fish and fish products are exported to the United States.
- Capacity building: A toolkit or framework developed through these workshops could be used for capacity-building discussions and/or negotiations for common mitigation requirements.
- International government-to-government: The first two workshops were international in scope; the third workshop likely will be regional and include involvement of government agencies in the chosen region. The follow-up capacity-building work in other nations/regions will assist nations in their compliance efforts with the MMPA and the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (MSRA). This toolkit also can be used to establish guidelines under the FAO to reduce the bycatch of marine mammals in commercial fisheries (discussed below).

Expected Conservation Outcome: This objective will result in a set of best practices for mitigating artisanal gillnet bycatch, a serious threat to coastal marine mammals, including several critically endangered species. These best practices can then be used in international negotiations and various capacity-building efforts, for example, the third workshop.

Justification: In 1990, the SWFSC brought scientists from around the world to La Jolla, California, to discuss fishery bycatch of cetaceans. The proceedings of this workshop are still relevant, but bycatch requirements of the MSRA and Section 101 of the MMPA require a sharper, more detailed regional focus to document international, national, and artisanal fisheries; review the information on marine mammal populations; estimate the bycatch in these fisheries; and explore possible mitigation measures. Such information will be instrumental in capacity building and may contribute to regional international agreements similar to the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas. These workshops will allow NMFS to share its expertise in bycatch assessment and mitigation with developing nations. Finally, mitigation measures identified in these workshops could provide insight into management approaches for mitigating bycatch in coastal gillnet fisheries in the United States.

Objective 4: Coordinate, collaborate, and improve humpback whale research efforts in the Cape Verde Islands, Northeast Atlantic Ocean.

Species: Humpback whales.

Threat: Bycatch and habitat loss/degradation.

Partners: NEFSC, College of the Atlantic, Allied Whale.

Strategies

- Science: Expedite the collection of humpback whale acoustic recordings and fluke identification photographs and attempt to gather humpback whale genetic samples for future analysis.
- Policy: Provide information on current regulations and guidelines from other regions of the globe that have breeding/calving humpbacks and conflicts with development and tourism (i.e., whale watching regulations, jet skis, etc.).
- Capacity building: Provide letters of support for NGO grant applications to support further research; suggest guidance to the Cape Verde government on potential negative impacts (i.e., harbor development, dredging, jet skis, whale watching etc.) that may affect humpback whales breeding and calving in these waters.
- International government-to-government: Work directly with the Cape Verde government to identify areas that could be designated marine mammal protected areas and assist it in developing management plans and regulations to address threats to humpback whales in its waters.

Expected Conservation Outcome: Implementing this objective will improve information on humpback whales and the threats facing them, and improve management of those threats in both the United States and the Cape Verde Islands.

Justification: There is a need for scientific collaboration to improve our baseline understanding of north Atlantic humpback whales and threats facing them and to improve international management of shared stocks of humpback whales.

Northwest Action Plan

Objective 1: Improve transboundary coordination of large whale entanglement reporting and response.

Species: Humpback and gray whales.

Threat: Bycatch.

Partners: NWRO, NWFSC, SWRO, AKR, F/IA, DFO-Canada, Mexico.

Strategies

- Science: Collect data on entanglement events, live sightings, and strandings. Use photo identification and genetic studies to define stock involvement. Use longitudinal studies to provide information on the rate and evidence of entanglement and survival.
- Policy: Develop and implement domestic take reduction strategies for ESA-listed humpback whales. Develop with Canada and Mexico an international plan to share information on the rate of entanglement, response to entanglement events, and survival rate of disentangled whales. Work with these nations to identify additional conservation measures that should be adopted to reduce the entanglement of large whales.
- Capacity building: Initiate a system to promote data sharing across states and nations to better define the risk. Enhance entanglement reporting to quantify the risk and support intervention (disentanglement) and mitigation.
- International government-to-government: Organize a trilateral workshop with Mexico and Canada on Disentanglement Response and Entanglement Mitigation of large whales.

Expected Conservation Outcome: By implementing this objective NMFS will determine whether humpback whale entanglement events are confined only to U.S. fisheries or if Canadian and Mexican fisheries also pose an entanglement risk. National Marine Fisheries Service will identify and implement fishery management actions to reduce the risk of entanglement, maintain sustainable fisheries harvest production, and reduce reliance on high-risk on-the-water disentanglement, and will determine whether the current level of entanglement is delaying species recovery.

Justification: Current entanglement levels of humpback whales in fixed gear fisheries may be approaching or exceeding the stock potential biological removal (PBR) level. Stock identification of whales in the NWRO/transboundary area is uncertain but both potential stocks (CA/OR/WA and Central North Pacific/SE AK) appear to be increasing. Gear and vessel mitigation options are limited in this high-value fishery. Transboundary efforts would complement domestic take reduction priority planning on the West Coast in SWRO/NWRO.

Objective 2: Continue coordination of transboundary research and recovery efforts for threatened and endangered species, specifically southern resident killer whales and several salmon stocks.

The Northwest objectives include coordinating research and recovery efforts with Canada on southern resident killer whales. Credit: NOAA National Marine Fisheries Service

Species: Southern resident killer whales.

Threat: Prey depletion, disturbance, habitat degradation/loss, disease/pollution contaminants.

Partners: NWRO, NWFSC, SWRO, AKRO, F/IA, DFO-Canada.

Strategies

- Science: Conduct research to address risk factors and data gaps identified in the SRKW ESA Recovery Plan and the SRKW SARA Recovery Strategy (Canada).
- Policy: Develop transboundary plans for vessel regulations, and recovery and management actions for runs of threatened and endangered salmon (the preferred prey of SRKW).
- Capacity building: Work with DFO-Canada to undertake capacity-building projects to implement transboundary regulations.
- International government-to-government: Continue research and management collaboration between NWFSC, NWRO, and DFO-Canada on SRKW vessel interactions, prey depletion, and distribution and movement patterns; on management and recovery of salmon stocks; and on SRKWs and salmon critical habitat. For example, NMFS and DFO-Canada are holding a series of three workshops in 2011–2012 to review available scientific information on the effects of salmon fisheries on SRKWs.

Expected Conservation Outcome: Collaboration between the United States and Canada will assist recovery of the SRKW.

Justification: SRKWs are a small population, listed as endangered under both the U.S. ESA and Canada's SARA, and recovery is uncertain. Both countries have identified similar risk factors and data gaps relevant to the population's recovery. Two main issues that are transboundary in nature are (1) regulations to minimize vessel disturbance (particularly during the summer season within both countries' designated critical habitats for SRKWs), and (2) management actions to ensure there is an adequate prey base (several salmon species, but primarily Chinook salmon) during the summer months in both critical habitats. Additionally, in 2011 NMFS issued regulations governing vessel behavior near SRKWs to minimize vessel effects. The international boundary with Canada bisects a key area where killer whales encounter concentrated recreational and commercial vessel activity. Transboundary coordination is recommended to avoid mixed messaging between the United States and Canada. Another issue is the data gap on winter distribution and habitat use patterns of SRKWs, so continued research collaboration, particularly to determine habitat use and movement patterns, is needed to meet management goals for both countries.

Objective 3: Continue coordination of transboundary research on marine mammal strandings and diseases (fund essential analyses and travel to encourage international collaboration on shared stocks).

Species: Eastern North Pacific marine mammals.

Threat: Bycatch, marine debris, vessel strikes, disease, pollution/contaminants, harmful algal blooms.

Partners: NWRO, NWFSC, AKRO, AKFSC, F/PR, F/IA, DFO-Canada.

Strategies

- Science: Collect data on stranding events and post-mortem examination to determine the incidence of human interaction; collect samples for disease detection and cause of death determination.
- Policy: Monitor current stranding events against the baseline to detect unusual events or trends that could signal new resource conflicts with fisheries or humans.
- Capacity building: Capacity building for stranding investigations is gaining momentum in Canada. Established responders in NWRO can share response strategies and expertise. Transboundary data sharing may assist the understanding of events affecting both countries.
- International government-to-government: Continue research and management collaboration between NWFSC, NWRO, and DFO-Canada on response to marine mammal strandings.

Expected Conservation Outcome: Collaborative work with Canada will enhance transboundary investigations of stranding events involving shared species or unusual mortality events, and improve the potential for management partnerships on human interactions that result in transboundary strandings.

Justification: The objective addresses multiple-level priorities on scientific exchanges and analysis on several endangered or threatened species, such as SRKW, Steller sea lions, North Atlantic and North Pacific right whales, and other species (e.g., harbor porpoises and ETP dolphins). Stranding reporting and investigation is improving on both sides of the international boundary with Canada, providing data on impacts of bycatch/marine debris, ship strikes, and contaminants. This objective would explore the potential for resource sharing in the transboundary area.

Southeast Action Plan

Objective 1: Undertake coordinated transboundary research and recovery efforts for marine mammals, especially species that are threatened or endangered.

Species: Marine mammals in the Gulf of Mexico and wider Caribbean.

Threat: Prey depletion, disturbance, habitat degradation/loss, disease, pollution/contaminants.

Partners: SERO, SESC, F/IA, F/PR.

Strategies

- Science: Conduct collaborative research with Mexico, Cuba, and Caribbean nations to identify risk factors and data gaps pertaining to marine mammals in the Gulf of Mexico and wider Caribbean.
- Policy: Develop transboundary plans and management actions for marine mammals in the Gulf of Mexico and the wider Caribbean based on identified risk factors.
- Capacity building: Advocate for regulations/guidelines for whale watching within the Specially Protected Areas and Wildlife (SPAW) protocol and undertake capacity-building projects to implement the transboundary guidelines and regulations.
- International government-to-government: Continue research and management collaborations with Cuba, Mexico, and Caribbean nations to document vessel interactions, and marine mammal distribution and movement patterns, and to evaluate management and recovery efforts. Work collectively to implement the Marine Mammal Action Plan under the SPAW protocol.

Stranding training workshop in Panama.
Credit: Nancy Daves, NOAA National Marine Fisheries Service

Expected Conservation Outcome: This collaborative work will greatly assist in understanding the threats facing marine mammals in the Gulf of Mexico and the wider Caribbean.

Justification: Information is lacking on marine mammals and the threats to them in the Gulf of Mexico and the wider Caribbean region. To better understand the threats facing marine mammals, it is necessary to conduct coordinated stock assessments or work with neighboring countries to conduct assessments of shared stocks.

Objective 2: Improve marine mammal stranding response throughout the wider Caribbean through workshops and training.

Species: Marine mammals in the Gulf of Mexico and wider Caribbean.

Threat: Prey depletion, disturbance, habitat degradation/loss, disease, pollution/contaminants.

Partners: SERO, SESC, F/IA, F/PR, non-governmental organizations, and international organizations (e.g., SPAW, Eastern Caribbean Cetacean Network, IFAW).

Strategies

- Science: Improve data collection and management for stranding events, post-mortem examination to determine the incidence of human interaction, tissue collection and analysis for disease detection, and cause of death determination.
- Policy: Facilitate an enhanced stranding response, training and equipment acquisition to ensure preparedness for stranding events, data collection, and data management. Through partnerships with SPAW, Mexico, and the Bahamas, monitor current stranding events against the baseline to detect unusual events or trends that could signal new resource conflicts with fisheries or humans and/or other anthropogenic impacts.
- Capacity building: Capacity building for stranding investigations is ongoing in the wider Caribbean. Established responders in the Caribbean can share response strategies and expertise to build greater preparedness for large-scale events (e.g., oil spills, natural disasters, disease, etc.). Transboundary data sharing may improve the understanding of events that affect the region.
- International government-to-government: Continue capacity-building collaboration among SPAW parties, including France and Spain, to enhance response to marine mammal strandings.

Expected Conservation Outcome: Collaborative stranding response throughout the wider Caribbean will help document the threats facing marine mammals in the Gulf of Mexico and the wider Caribbean.

Justification: Information is lacking on marine mammals in the Gulf of Mexico and the wider Caribbean region. In most cases, stranding data are the only data available to assess threats facing marine mammals.

Objective 3: Implement the provisions of this Action Plan under the SPAW protocol that calls for an evaluation of bycatch data and documentation of its rate and occurrence in the wider Caribbean.

Species: Marine mammals in the Gulf of Mexico and wider Caribbean.

Threat: Bycatch.

Partners: SERO, SESC, F/IA, F/PR. Technical collaboration with academic, non-governmental, and international organizations (e.g., FAO, Global By-Catch Assessment Project of Duke University and Blue Ocean Institute, IWC).

Strategies

- Science: Use observer data and other databases to provide bycatch rates and estimates from U.S. fisheries and international fisheries operating in the wider Caribbean, including fishery characterizations. Collect data on stranding events, post-mortem examination to determine incidence of human interaction, tissue collection and analysis for disease detection, and cause of death determination.
- Policy: Through the regional Fishery Management Councils, NOAA regional collaborative teams, and the SPAW Protocol, characterize fisheries in the wider Caribbean, emphasizing Puerto Rico, Cuba, and Mexico. Collect stranding data, reports of marine mammal–fishery interactions, and other pertinent data to better understand the geographic scope and intensity of marine mammal bycatch and identify areas for bycatch reduction. Work with Mexico will yield information on the potential impact of gillnet fisheries on transboundary stocks of bottlenose dolphins and other marine mammals.
- Capacity building: Several countries have established commercial fisheries catch-and-effort data collection programs and improvements should include Caribbean region–wide databases, and training programs on species identification and natural history data collection by fishermen (both commercial and recreational) and other stakeholders. Such programs should encourage fishermen to report to national authorities any incidental catches or damage to animals that are later released but have a low chance of survival, and should also encourage consistent reporting on stranded marine mammals.
- International government-to-government: The Southeast will provide support for an evaluation of data and documentation of marine mammal bycatch and depredation in the wider Caribbean. The project will quantify the magnitude of marine mammal takes (direct and bycatch) by both commercial and recreational gear and distribution of fishing effort by gear type. Information will be disseminated to appropriate technical and scientific fora on progress and barriers as well as the most problematic interactions and those causing serious injury and mortality.

Expected Conservation Outcome: This effort will evaluate and promote the mitigation of marine mammal bycatch in the wider Caribbean.

Justification: The population-level significance of marine mammal mortality or injury due to bycatch generally is unknown in the wider Caribbean region. Also, in some locations in the wider Caribbean, marine mammals are captured intentionally as bait for artisanal fishing. An improved understanding of the magnitude and impact of these events is needed. Information on marine mammal bycatch is also needed from onboard observer programs.

Southwest Action Plan

Objective 1: Work to prevent extinction of the vaquita.

Species: Vaquita (*Phocoena sinus*).

Threat: Bycatch.

Partners: SWFSC, F/IA, F/PR, SERO; Mexican agencies; and environmental NGOs.

Vaquita in the Gulf of California. Credit: Thomas A. Jefferson (Permit Oficio No. DR/488/08 Secretaria de Medio Ambiente y Recursos Naturales).

Strategies

- Science: Work collaboratively with Mexico to: (1) conduct passive acoustic monitoring of the vaquita population to detect trends in abundance, (2) design and analyze data on spatial distribution of vaquita and fishing effort and evaluate the efficacy of conservation efforts and protected areas, (3) estimate vaquita abundance and trends, and (4) develop alternative fishing gear that eliminates vaquita bycatch.
- Policy: Work collaboratively with Mexico and with gear experts to develop and test new smaller trawl nets that can reduce bycatch and be substituted for gillnets.
- Capacity building: Work collaboratively with Mexico to provide training in acoustic monitoring and analysis, provide space for visiting scientists on surveys and research expeditions, and engage in alternative gear development.
- International government-to-government: Continue scientific collaborations with the Instituto Nacional de Ecología (INE), and Secretary of Environment and Natural Resources (SEMARNAT), Mexico; and encourage renewed attention to this issue in the Canada/Mexico/U.S. Trilateral Committee of Wildlife and Ecosystem Conservation and Management, and during the U.S.-Mexus meetings. Seek continued engagement of the Marine Mammal Commission, IUCN, and IWC and the continued efforts of the Vaquita Recovery Team to develop gear alternatives and continue population assessments.

Expected Conservation Outcome: These efforts will yield improved information on vaquita distribution, abundance, and trends, and serve as a model of passive acoustic monitoring methods for other regions and coastal species, such as harbor porpoise populations in U.S. waters. Similarly, the development of alternative gear to reduce vaquita bycatch may help in mitigating bycatch of coastal small cetaceans in other regions.

Justification: The vaquita is the most endangered marine mammal species in the world, with a surviving population of only approximately 250 individuals. Scientists from the SWFSC were invited by the Government of Mexico to engage in collaborative efforts to design a monitoring and research plan using passive acoustics—the only practical method for determining whether vaquita populations are continuing to decline or whether efforts to remove gillnets are working and the population is increasing.

Objective 2: Continue efforts to reduce the bycatch of pelagic dolphins in the Eastern Tropical Pacific (ETP) purse seine tuna fishery to levels approaching zero.

Species: All ETP cetaceans with a focus on stocks of spinner and spotted dolphins impacted by the purse seine fishery for tuna.

Threat: Bycatch.

Partners: SWFSC, SWRO, F/PR, F/IA.

Strategies

- Science: Monitor trends in abundance using multidisciplinary approaches during at-sea surveys; research to evaluate hypotheses explaining the lack of recovery of ETP dolphin stocks.
- Policy: Develop and advance a management plan to further restrict dolphin mortality to meet the goals of the AIDCP, including limits on the size of the herd that can be set upon, limits on dolphin sets, and the renewal of tuna boat research. Continue to conduct skipper workshops to reduce bycatch for U.S. captains who operate in international waters.
- Capacity building: The United States will work through the Scientific Advisory Board of the AIDCP to offer space for scientists to collaboratively evaluate whether current management measures are sufficient to promote recovery of ETP dolphin stocks over the long term.
- International government-to-government: SWFSC research supports the U.S. delegation to the AIDCP. For the survey cruises, research clearance is needed from 11 countries (France, and Central American and South American countries between and including Mexico and Peru). Through the AIDCP, the United States should use the Scientific Advisory Board to develop a multinational research plan for investigating explanations for the lack of dolphin recovery.

Expected Conservation Outcome: These efforts will yield up-to-date estimates of population abundance and trends as well as information on the failure to recover ETP dolphin stocks.

Justification: Since the 1970s the SWFSC has been responsible for monitoring and conducting research on dolphins incidentally taken in the ETP purse seine fishery for tuna. This research is mandated by the MMPA, and it provides critical support to the AIDCP. A primary goal of the AIDCP is to reduce dolphin mortality in the fishery and ensure the long-term sustainability of these stocks. The SWFSC is the only entity that provides dolphin monitoring and research results to AIDCP parties. This information forms the basis for management measures, including setting annual dolphin mortality limits, while the AIDCP independent observer program monitors dolphin mortalities and provides the certification that tuna meet "dolphin-safe" labeling standards. Without the research cruises conducted by the SWFSC, the AIDCP parties would have no information about the effectiveness of current management measures or the need for new measures. Research cruises provide the data needed for these stock assessments, and research conducted by SWFSC scientists focuses on why the dolphin stocks are failing to recover despite a 99.9 percent decline in mortality. Without the abundance data obtained from cruises, the U.S. "dolphin-safe" labeling standard for tuna will be vulnerable to challenges as is currently occurring in the World Trade Organization.

Objective 3: Detect, monitor, and predict the effects of harvest and climate change on Antarctic pinnipeds.

Species: Antarctic fur seal and other Southern Ocean pinniped species.

Threat: Prey depletion, climate change, and exploitation.

Partners: F/IA, NOAA Office of International Affairs, Department of State, and research partners: UCSC, Sonoma State University, Old Dominion University, Dalhousie University, Australian Antarctic Program, Vallejos, Instituto Antártico Chileno.

Strategies

- *Science*: The NMFS U.S. Antarctic Marine Living Resources (AMLR) Program assesses the status of Southern Ocean krill and krill-dependent predators by conducting annual multifaceted collaborative land, sea, and aerial surveys. The primary objectives of the AMLR pinniped research program are to investigate factors that influence the population dynamics (especially feeding ecology, reproductive success, growth, and condition), demography, and abundance of Antarctic fur seals. Efforts are focused on, but not limited to, krill-dependent predators and the potential influence of commercial fisheries on long-term reproductive performance. Monitoring protocols have been designed to measure foraging and reproductive performance over a range of temporal scales (summer, winter, or multiyear) and spatial scales (inshore, offshore, or regional). Investigations of Antarctic fur seals, using standard protocols of the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR) Ecosystem Monitoring Program, are conducted at Cape Shirreff.
- *Policy:* The United States is one of 25 nations that regulate fishing activities in waters surrounding the southern continent under the CCAMLR. AMLR is a national program providing information needed to develop and support U.S. policy on the conservation and management of the living marine resources in the ocean areas surrounding Antarctica.
- *Capacity building:* Since it began 25 years ago, AMLR has been an international leader in collaboration, bringing together scientists and students from around the world, both in the field and at CCAMLR headquarters in Australia.
- International government-to-government: Field surveys are conducted *in situ* each year, with subsequent analyses and results presented to the international community during the CCAMLR working group meetings. The data and results collected and presented by the U.S. AMLR Program form a basis for many fisheries management decisions by CCAMLR. Commercial U.S. fishing activities are also monitored, with results again presented to and used by CCAMLR for managing fisheries resources.

Expected Conservation Outcome: Implementing this objective will improve estimates of predator biomass and demands; estimates of population abundance and trends and predictions of growth or decline; ability of CCMALR to allocate the commercial catch of krill to include the needs of krill-dependent predators; and understanding of the impacts of climate change in the Antarctic Peninsula, South Shetland region, up to South Georgia and the South Atlantic. Another outcome would be an agreement on a Ross Sea Marine Protected Area for ecosystem and living marine resource protection needed by Ross Sea marine mammals.

Justification: NOAA's Antarctic Ecosystem Research Division (AERD) has studied the ecosystem around the South Shetland Islands and the Antarctic Peninsula since the 1980s, as mandated by the AMLR Convention Act, a ratification of the international CCAMLR (CCAMLR was signed in 1980, after many Antarctic populations were decimated due to unmanaged exploitation). Today, populations of whales, penguins, seals, fish, and krill face the challenge of adapting to a rapidly changing habitat, as sea surface temperatures are rising in this ecosystem faster than in most areas of the world. Additional legislative mandates include the Convention for the Conservation of Antarctic Seals and the MMPA.

Objective 4: Increase the understanding of abundance, stock structure, morphology, life history parameters, and bycatch of short- and long-beaked common dolphins in coastal fisheries.

Species: Short- and long-beaked common dolphin (*Delphinus delphis* and *D. capensis*, respectively).

Threat: Bycatch.

Partners: SWFSC, SWRO, F/IA, F/PR.

Strategies

- Science: Based on data collected during the joint U.S.-Mexico ecosystem survey of *Delphinus*, and in collaboration with Mexico, conduct studies to estimate pregnancy rates, calf production, and timing-of-reproduction, and delineate stock structure and estimate bycatch in the nearshore waters of northern Baja California and southern California.
- Policy: Use the bycatch data of common dolphins and small cetaceans in coastal fisheries as a basis to work with Mexico to assess mitigation measures, especially in fisheries involving bycatch of shared cetacean stocks, and/or whose fish and fish products are exported to the United States.
- Capacity building: Work collaboratively with Mexico to provide space for visiting scientists on surveys and research expeditions. Also, U.S. scientists and gear experts should work together to develop effective mitigation measures that reduce the bycatch of shared cetacean stocks and cetaceans taken in fisheries where the mortality and serious injury exceed U.S. standards.
- International government-to-government: Through U.S./Mexus Bilateral strengthen scientific collaborations with Mexican colleagues at Instituto Nacional de Ecología (INE), SEMARNAT and Conapesca, SAGARPA in addition to researchers from the Universidad Autónoma de Baja California Sur.

Expected Conservation Outcome: These efforts will yield up-to-date estimates of population abundance, improve the understanding of anthropogenic impacts on coastal populations, and help establish bycatch reduction standards in compliance with the MMPA.

Justification: The SWFSC is responsible for monitoring and estimating abundance of all cetacean species (whales, dolphins, and porpoises) in the California Current Ecosystem along the U.S. West Coast. This research is mandated domestically by the MMPA and the ESA. Species and stocks with a significant portion of their distributions spanning political boundaries, such as the U.S.-Mexico border, require dedicated research efforts in order to meet these mandates. In 2009, the Ecosystem Survey of *Delphinus* Species Research Cruise was dedicated to furthering the understanding of abundance, stock structure,

and morphology and life history parameters for the short- and long-beaked common dolphin (*Delphinus delphis* and *D. capensis*, respectively). Both are important members of the California Current Ecosystem, and the range of at least one stock extends south into Mexican waters. A large and growing coastal human population in southern California impacts the Southern California Bight and a wide range of anthropogenic impacts (e.g., commercial and recreational fisheries, pollution, and ocean noise) are emerging as potential threats to *Delphinus* populations in this region. This research took a multidisciplinary approach and collected data on distribution, school size, reproduction, health, and habitat of both *Delphinus* species. Results will be used to estimate abundance, key reproductive parameters (e.g., pregnancy rates and calving interval), and contaminant concentrations as an index of health by species.

Objective 5: Improve the understanding of the global taxonomy and role of killer whales in a changing Antarctic ecosystem.

Species: Antarctic killer whales.

Threat: Climate change and prey depletion (Ross Sea toothfish).

Partners: SWFSC, NWFSC, AFSC (National Marine Mammal Lab).

Strategies

- Science: Conduct boat-based surveys to estimate abundance and observe prey preferences of different types of killer whale in the Antarctic; deploy satellite tags to monitor movement patterns; collect photogrammetry data to estimate size, energetic requirements, and morphometric differences between types; collect tissue samples for genetics, contaminants, and diets, and acoustic recordings for taxonomic revision.
- Policy: The dynamics of killer whales in the Antarctic ecosystem can be used to inform international efforts to understand the impact of prey depletion and climate change in polar ecosystems.
- Capacity building: Work collaboratively with the international community in Antarctica to access remote sites and develop study methods (e.g., tagging, sample analyses) for species of mutual interest.
- International government-to-government: Working in the Southern Ocean provides collaboration opportunities with the international community in logistics, science, and policy.

Expected Conservation Outcome: These efforts will improve the understanding of killer whale's role as the top predator in the Antarctic ecosystem. This information is the foundation of an ecosystem-based management approach in the Antarctic, which is experiencing rapid physical alterations due to climate change. Implementing this objective will improve understanding of how the population sizes, movement patterns, and foraging behavior of Antarctic killer whales change in relation to warming and climate-induced changes in prey distribution and abundance. In addition, these studies improve estimates of predator demands and potential impacts on prey populations that may be recovering (e.g., minke whales) or commercially harvested (e.g., Ross Sea toothfish).

Justification: The killer whale (*Orcinus orca*) is the top marine predator and perhaps the most widespread vertebrate species on Earth, occurring in all the world's oceans. Although currently considered to be a single species worldwide, SWFSC research in Antarctic waters suggests that there are at least three distinctly different-looking forms (ecotypes) with differential prey preferences, and these may represent

genetically different killer whale species. The role of killer whales in the Antarctic ecosystem depends on their respective population sizes, their seasonal movements in and out of Antarctic waters, and the amount and types of prey they consume. The SWFSC's research in the Antarctic seeks to answer these questions in order to understand the taxonomy and role of killer whales in marine ecosystems.

Objective 6: Prevent the extinction of the Western North Pacific population of gray whales.

Species: Western Pacific population of gray whales.

Threat: Habitat destruction, bycatch, disturbance, climate change.

Partners: Russian government, oil and gas industry, and IUCN Western Gray Whale Advisory Panel.

Strategies

- Science: Conduct boat-based surveys to estimate population size, to photo-ID individuals, and to take biopsy samples for genetic analysis. Deploy satellite tags on a select number of whales to better determine range boundaries, migratory routes, and wintering areas. Conduct genetic analyses to determine the degree of differentiation between Western and Eastern gray whale populations.
- Policy: Five female gray whales have died in Japanese fishing gear. The United States and Russia will work with Japan to develop and implement measures to reduce the bycatch of Western North Pacific gray whales.
- Capacity building: Since the inception of the collaborative research program for Western gray whales, this program has been an international collaboration of scientists and students from the United States and Russia. This work will continue to develop effective protection strategies for Western gray whales and their habitat.
- International government-to-government: The United States will continue to work within the International Whaling Commission; IUCN–Western Gray Whale Advisory Panel; CITES; Sakhalin Energy; Cetacean Research Institute, Korea; Kamchatka Branch of Pacific Institute of Geography, Russian Academy of Science; Tokyo University of Marine Science and Technology; and the Institute of Cetacean Research, Japan, to prevent the extinction of the Western gray whale.

Expected Conservation Outcome: Implementing this objective will facilitate recovery efforts by improving estimates of abundance, and individual survival; improving the understanding of geographic distribution, site fidelity patterns, genetic relationships between Eastern (recovered) and Western (critically endangered) populations; and impacts of anthropogenic activities (particularly oil and gas exploration) and bycatch.

Justification: The Western Pacific population is one of two surviving populations of gray whale. While both were brought near to extinction by commercial whaling, the Eastern population now numbers close to 20,000 individuals. However, the Western population is estimated at about 135, including perhaps 30 to 35 reproductive females, and is listed as endangered under the ESA, depleted under the MMPA, and critically endangered under the IUCN Red List. Since 1995, the SWFSC and Russian colleagues have engaged in a binational field and research program to determine population trends, estimate life history characteristics, and work together through international fora to mitigate threats (primarily oil and gas exploration).

Objective 7: Mitigate risks to large whales in the northeastern Pacific from multiple anthropogenic threats.

Species: Blue whales, fin whales, gray whales, humpback whales, right whales, and sperm whales.

Threat: Bycatch and ship strikes.

Partners: SWRO, SWFSC, NWRO, NWFSC, F/IA, F/PR, NOAA NOS (U.S. West Coast sanctuaries); DFO-Canada; Mexico.

Strategies

- Science: Assess risk to large whales, using spatially referenced whale and oceanographic data to model and predict whale density and overlaying these predictions with spatially referenced anthropogenic threat data.
- Policy: Work with national and international partners to characterize and mitigate risks to large whales. For example: (1) develop a "fixed gear guide" that can be used as an outreach tool for the general public and state, tribal, and federal agencies to identify fishing gear reported in large whale entanglement events; (2) characterize fishing gear used in the northeastern Pacific Ocean to understand effort, seasonality, and types of lines, traps, etc. that may entangle whales; (3) work with agencies that manage shipping traffic schemes to consider alternative port access routes and, if appropriate, vessel speed restrictions that reduce the risk of collisions with whales; (4) increase the capacity to respond to and necropsy whale carcasses to determine cause of death, (5) increase outreach to shipping industry and boating communities on methods to avoid and report, to the relevant agencies, collisions with large whales; and (6) characterize the risk of ship strikes to Eastern North Pacific whale populations.
- Capacity building: Work with agencies to collect information on large whale hot spots, seasonality, and habitat use, and assist in developing modeling efforts to: (1) assess the risk that fixed gear poses to large whales, and work to develop technological or management solutions to reduce the risk of large whales becoming entangled in fishing gear; and (2) assess the risk of ship strikes and consider alternatives to reduce ship collisions with whales.
- International government-to-government: Use bilateral, trilateral, and international conferences and organizations (e.g., IWC) to evaluate large whale survey data—both research-based and opportunistic. Continue collaborations with Canada and Mexico to share scientific research and policy development. Work with Canada and begin to engage Mexico in characterizing its fishing gear and the risk posed to large whales that migrate through Mexican waters. To reduce the threat of ship strikes, consider possible changes in vessel speed and routing through the IMO.

Expected Conservation Outcome: This work will promote the mitigation of risks to large whales from multiple anthropogenic threats. Most large whales are endangered under the ESA and SARA, with two of the primary threats being entanglement in fishing gear and collisions with ships. Reducing these threats is of primary interest to the United States and Canada as they seek to recover these populations. Efforts should extend to Mexico, since many of these species migrate to Mexican waters.

Justification: In the Eastern North Pacific Ocean, entanglement in fishing gear and ship strikes are known threats to large whales. Reducing these threats, particularly to endangered and threatened populations of whales, is a top priority in U.S. recovery plans. These threats are likely severely

underestimated, so fully understanding the risk (both in the United States and internationally) is key to reducing threats and recovering large whales.

A blue whale near a cargo ship in the Santa Barbara Channel off the California coast. Credit: John Calambokidis, Cascadia Research

Objective 8: Identify priority habitat for large whales in the Eastern Pacific.

Species: Blue whales, fin whales, gray whales, humpback whales, and Bryde's whales.

Threat: Habitat loss and degradation.

Partners: SWRO, SWFSC, F/PR, F/IA, Comisión Permanente del Pacifíco Sur (CPPS), UNEP.

Strategies

- Science: Generate predictions of large whale densities in the Eastern Pacific Ocean using methods such as habitat models and interpolation of sightings data. These predictions will be overlaid with areas of known threats to identify areas of concern. Multiple criteria will then be used to identify priority habitats to inform the ESA "critical habitat" designation for listed species and international efforts to designate marine protected areas.
- Policy: Identified priority habitats will be included in marine spatial planning efforts and proposed for designation as marine protected areas.
- Capacity building: Collaborate with scientists from Canada to Chile to share scientific knowledge and skills that provide the groundwork to identify priority habitat, undertake marine spatial management, and designate marine protected areas.
- International government-to-government: Through international organizations and workshops, engage international partners in characterizing priority habitats throughout the Eastern Pacific, developing conservation metrics for priority habitat areas, and evaluating marine protected areas.

Expected Conservation Outcome: These efforts will result in the identification of important large whale habitat, which can be prioritized for designation as marine protected areas and included in marine spatial management efforts.

Justification: Many species of baleen whales migrate long distances between breeding and feeding areas. Throughout their journey these species are exposed to anthropogenic threats such as entanglement in fishing gear, ship strikes, ocean noise, contaminants, and climate change. Mitigating these threats requires a transboundary, systematic spatial planning approach. Results from the habitat models facilitate the development of management strategies such as establishing marine protected areas, altering shipping routes and speeds, and designating fishing times and areas. More than 20 years of offshore large-scale surveys conducted by the SWFSC, combined with data from other national and international research programs, provide the basis to develop management methods to identify priority habitat and data gaps and, ultimately, foster the recovery of large whales.

Alaska Action Plan

Objective 1: Coordinate and improve research on marine mammals that cross international boundaries to better understand population dynamics, and the proximal causes for the population dynamics, that are critical to conservation and management.

Species: Steller sea lions, northern fur seals, ribbon seals, ringed seals, spotted seals, bearded seals, humpback whales, gray whales, bowhead whales, right whales, and beluga whales.

Threat: Climate change, prey depletion, direct harvest, oil/gas exploration, ocean acidification.

Partners: AFSC, AKRO, NWRO, F/IA, F/PR; Russian Federation; Alaska Native organizations; DFO-Canada.

Strategies

- Science: Conduct scientific research on pinnipeds and cetaceans to improve the understanding of abundance, distribution, vital rates, habitat use, and environmental covariates. Continue meeting with Russian scientists concurrent with the U.S-Russia Marine Mammal Working Group (Area V of the U.S.-Russia Environmental Agreement) to exchange information and develop collaborative research efforts on marine mammals of joint interest.
- Policy: When appropriate, use the information from these surveys to develop conservation and management measures in the United States and internationally.
- Capacity building: Share standard and unique research methodologies with Russian and Canadian biologists and provide critical information needed to manage transboundary marine mammal species.
- International government-to-government: Establish a multilateral dialog with all Arctic nations to develop a conservation strategy for Arctic marine mammals, especially for ESA-listed species. The F/IA and Department of State will work to improve mechanisms for sharing research platforms (vessels and aircraft), technology (e.g., satellite tags), and data with Russia for collaborative research on transboundary marine mammal species.

Expected Conservation Outcome: Implementing this objective will improve population assessments of marine mammals occurring in the North Pacific Ocean and the Bering, Chukchi, Beaufort, Okhotsk, and Siberian Seas, and increase understanding of marine mammal vital rates in Russia, which could improve the understanding of vital rates in the declining endangered western population of Steller sea lions and other listed species

Justification: Several marine mammal species that occur in the waters around Alaska—and that spend a significant portion of their life in the waters of other countries—are of significant conservation concern. Much information is needed on these stocks in order to develop thorough and accurate NOAA Stock Assessment Reports for marine mammal populations of Alaska. A few examples of particularly critical transboundary stock assessment issues are listed here.

- The western stock of Steller sea lions is declining rapidly, particularly in the western Aleutian Islands. It is critical to assess survival and reproduction rates of Steller sea lions in Russia, and to conduct index counts, to understand the extent of and reasons for the decline in U.S. waters.
- At this time, there are no reliable estimates of abundance, trends, or stock structure for ribbon, spotted, bearded, and ringed seals. The National Marine Mammal Laboratory, AFSC, needs to coordinate with Russia, and possibly other Arctic countries, to conduct research in the Chukchi, Beaufort, and Okhotsk Seas.

Beluga whales are circumpolar in distribution. Beluga whales inhabit the Arctic and subarctic regions of Russia, Greenland, and North America.

Objective 2: Improve understanding of marine mammal bycatch in Russian and Canadian fisheries.

Species: All transboundary marine mammal species in Russian, Canadian, and U.S. waters.

Threat: Bycatch.

Partners: AKFSC, AKRO, F/IA, F/PR; Russian Federation; DFO-Canada.

Strategies

- Science: Translate relevant literature on marine mammal bycatch in the North Pacific to document marine mammal bycatch in Russian fisheries.
- Policy: Using observer data, understand and classify the level of marine mammal bycatch in various fisheries, especially those involving shared stocks of marine mammals, or fisheries that export fish and fish products to the United States. This information is a critical component of implementation of the MMPA.
- Capacity building: Identify capacity-building needs through international meetings and workshops, and distribute promising mitigation strategies to relevant nations.
- International government-to-government: Hold an international workshop as part of the new regional fishery management organization to review and discuss options to mitigate marine mammal bycatch in North Pacific fisheries.

Expected Conservation Outcome: These efforts will improve understanding of the rate and extent of marine mammal bycatch in Russian and Canadian fisheries, as well as identify possible bycatch mitigation measures.

Justification: NOAA Stock Assessment Reports for marine mammals of Alaska should include information on bycatch in foreign fisheries. This information should be considered when managers consider conservation efforts for U.S. marine mammals, a step that traditionally has been difficult to accomplish for Russian and Canadian fisheries. Additional efforts will be made in the next 5 years to include this information in the Stock Assessment Reports for transboundary stocks such as Steller sea lions, Dall's porpoise, killer whales, humpback whales, and other large cetaceans and pinnipeds.

Pacific Islands Action Plan

Objective 1: Improve regional fisheries observer data quality to better assess the bycatch of marine mammals in the Western and Central Pacific fisheries.

Species: Marine mammal species throughout the Pacific.

Threat: Bycatch and direct removals.

Partners: PIFSC, PIRO, F/IA, F/PR; Forum Fisheries Agency, Honiara, Solomon Islands; Secretariat of the Pacific Community, Noumea, New Caledonia; national fisheries authorities and agencies of Pacific nations.

Strategies

- Science: Further refine the Fishery Observer Toolkit and improve the observer training course that will be used in preparing observers in the Western and Central Pacific fisheries.
- Policy: Use observer data to assess the level of marine mammal bycatch in fisheries, especially those involving shared stocks of marine mammals and fisheries that export fish and fish products to the United States. This information is a critical component of MMPA implementation.
- Capacity building: Work collaboratively with partners to improve and provide training and debriefing programs, and support the use of advanced technology in observer programs.
- International government-to-government: With regional fishery management partners, implement the efforts of the Joint Technical Working Group on Bycatch, part of the Kobe Process. Use multilateral and bilateral discussions to gain support for adoption of mitigation measures at the Western and Central Pacific Fisheries Commission, Pacific Cetacean Memorandum of Understanding, and other relevant regional fisheries management organizations.

Expected Conservation Outcome: These efforts will lead to high-quality data that may be used as a basis for developing effective conservation measures for protected species that are bycatch in Western and Central Pacific Ocean fisheries.

Justification: Fisheries observer data provide valuable information about the threats to marine mammals in the Pacific, and population dynamics and bycatch. However, many nations lack the capacity to effectively train observers and ensure data are of adequate quality to use in decision making. Training and guidance will improve data that could provide a basis for conservation measures.

Objective 2: Support collaboration with international monk seal program partners to enhance the scientific and conservation programs for the Mediterranean monk seal and the Hawaiian monk seal.

A juvenile monk seal risks entanglement by resting on derelict fishing gear at Pearl and Hermes Atoll in the Northwestern Hawaiian Islands Credit: NOAA National Marine Fisheries Service

Species: Mediterranean monk seal and Hawaiian monk seal.

Threat: Bycatch, prey depletion, habitat loss/degradation, disturbance, disease, pollution/contaminants.

Partners: PIFSC, PIRO, F/IA, F/PR; MOm/Hellenic Society for the Study and Protection of the Mediterranean monk seal, Fundacíon CBD-Habitat.

Strategies

- Science: Provide support to the Mediterranean Monk Seal program for the use of advanced technology for biological work, and enhancement of population assessment techniques.
- Policy: Use data to identify additional areas for marine protected area status to assist in the recovery of Mediterranean monk seals.
- Capacity building: Continue the dialogue between U.S. and foreign programs as events occur to enhance understanding of rehabilitation methods for both programs. Continue dialogue regarding conservation initiatives to share successful management techniques. Support scientific technological work to enhance population assessment techniques and genetic work.
- International government-to-government: Highlight at government-to-government levels the need for greater enforcement of existing marine protected areas and the need to work with the fishing industry to develop mechanisms for reducing the bycatch of Mediterranean monk seals in fishing gear.

Expected Conservation Outcome: These efforts will increase understanding of monk seals to inform management decisions promoting monk seal conservation.

Justification: Continued support for collaboration between NMFS staff and international research partners will increase the scientific knowledge and improve conservation efforts for these species. This collaborative effort supports NOAA's international and national goals by enhancing conservation efforts for monk seals that are endangered in foreign waters, while simultaneously supporting conservation efforts for Hawaiian monk seal. These collaborative efforts are meant to benefit the recovery of both species.

Objective 3: Enhance population assessments for transboundary stocks of marine mammals.

Species: Marine mammal species throughout the Pacific.

Threat: Bycatch, prey depletion, direct removals, disease, pollution/contaminants, harmful algal blooms, habitat degradation.

Partners: PIFSC, PIRO, SWRO, SWFSC, F/IA, F/PR; Department of State; Treasury Department; and international partners.

Strategies

- Science: Use passive acoustic monitoring with fixed sensors and mobile platforms (i.e., gliders) to assess occurrence, and photo-identification in near-shore regions of appropriate nations to evaluate species movements.
- Policy: Use information from population assessments to better manage marine mammal bycatch within the Western and Central Pacific Fisheries Commission (WCPFC). Use assessment data to calculate bycatch limits for transboundary stocks and share these data with nations that export fish and fish products to the United States. This information is a critical component of MMPA implementation.
- Capacity building: Support initiatives to incorporate traditional ecosystem knowledge of marine mammals into marine mammal management and conservation planning, and involve indigenous peoples in these efforts. Also, provide training and data-sharing capabilities for sampling and assessment programs to small island nations.
- International government-to-government: The United States through the WCPFC should continue its effort to enact a resolution that calls upon nations to provide information on marine mammal populations and bycatch, and efforts to reduce bycatch. Use multilateral and bilateral discussions to gain support for adoption of data collection measures at the WCPFC, and other relevant regional fisheries management organizations, and through the Pacific Cetacean Memorandum of Understanding.

Expected Conservation Outcome: These efforts will improve population and abundance data on marine mammals that may be used as a basis for effective conservation measures and protected species management.

Justification: Our ability to effectively take action to protect marine mammals in the Pacific is hindered by the lack of information on marine mammal stock status and threats. Support for population assessments throughout the region is crucial to fill information gaps in order to provide a basis to initiate conservation measures.

Fisheries International Affairs Action Plan

Objective 1: Identify countries that have an unsustainable harvest of marine mammals.

Species: All marine mammal species.

Threat: Bycatch, direct removals.

Partners: F/IA, F/PR, F/ST, NEFSC, SEFSC, SWFSC, NWFSC, AKFSC, PIFSC.

Strategies

- Science: Using the best available science, identify the nations and fisheries exporting to the United States that have a bycatch of marine mammals. To the extent possible, quantify the marine mammal species, abundance, and bycatch rate or estimate.
- Policy: The scientific data will be used to classify international fisheries based on their level of interaction, and to prioritize nations that are required to develop a program comparable to that of the United States.
- Capacity building: National Marine Fisheries Service will look for opportunities to assist nations with the development of their regulatory program to assess marine mammal populations and estimate and mitigate bycatch.
- International government-to-government: Consultations associated with the identification and findings required under the MMPA will require numerous bilateral discussions between the United States and import-supplying nations.

Expected Conservation Outcome: These efforts will reduce global marine mammal bycatch.

Justification: Marine mammal bycatch is the greatest threat facing marine mammals. An emerging conservation issue is the development of markets for cetacean bycatch, which often lead to direct harvest of these species. In addition, small cetaceans are often used as bait in various commercial fisheries. In many instances the potential impact of this threat on cetacean populations is either unknown or unsustainable. National Marine Fisheries Service would gather the emerging and historical data related to this issue and begin to explore mechanisms to reduce the bycatch, discourage market development for cetacean meat and products, and, especially, look for viable bait alternatives to cetacean meat and oil.

Objective 2: Reduce the bycatch of marine mammals in global fisheries.

Species: Numerous species of cetaceans and pinnipeds, including all of the critically listed marine mammals (Appendix 1) in this Action Plan.

Threat: Bycatch, direct removals.

Partners: F/IA, F/PR, F/ST, NEFSC, SEFSC, SWFSC, NWFSC, AKFSC, PIFSC.

Strategies

- Science: Using the best available science, develop FAO guidelines to mitigate and reduce the incidental entanglement, injury, and mortality of marine mammals in commercial fisheries.
- Policy: These FAO guidelines can be, in part, the standards envisioned in Section 101 (a)(2) of the MMPA.
- Capacity building: Once guidelines are complete (longer term), work with nations to undertake capacity-building projects to implement the guidelines. Additionally, as part of efforts to develop these guidelines, NOAA should continue to provide workshops or training for Large Whale Disentanglement Response and Entanglement Mitigation.
- International government-to-government: Work within FAO to garner support for an expert technical working group to develop these guidelines. Then work within the FAO Committee on Fisheries (COFI) to secure the guidelines' adoption.

Expected Conservation Outcome: Developing these guidelines will lead to a reduction in the bycatch of marine mammals in global fisheries.

Justification: Seabirds, sea turtles, and sharks all have International Plans of Action, and the guidelines to reduce sea turtle entanglement were developed with the input of scientists through FAO. These guidelines provide the basis for action within RFMOs and international agreements to reduce bycatch or address other threats facing marine mammals. Staff at F/IA should work to identify scientists and initiate discussions with FAO with the goal of developing guidelines to reduce marine mammal entanglement in fisheries. The International Plan of Action could encompass guidelines for assessment and monitoring as well as effective bycatch mitigation measures that have been developed in the United States and worldwide. A finalized FAO document for marine mammals could assist efforts to reduce bycatch in tuna RFMOs and meet the mandate of the bycatch provisions of MSRA and MMPA. Additionally, there should be follow-up workshops to the 2010 IWC workshop on Maui to continue a dialogue with countries that have participated in, or requested training in, disentanglement response and entanglement mitigation. This training will be included in the guidelines and will ultimately be part of comprehensive marine mammal response training.

Objective 3: Develop a Marine Mammal Stranding Response Training Strategic Plan, a 5-year long-term plan that outlines goals, resources, and priorities related to marine mammal stranding response training, research, and conservation efforts.

Species: Numerous species of cetaceans and pinnipeds, including all of the critically listed marine mammals (Appendix 1) in this Action Plan.

Threat: Bycatch, marine debris, disease, pollution/contaminants.

Partners: F/IA, F/PR, F/ST, NEFSC, SEFSC, SWFSC, NWFSC, AKFSC, PIFSC, PIRO, SWRO, NERO, NWRO, SERO; Hawaii Pacific University; National Institute of Standards and Technology; South Pacific Regional Environment Program.

Strategies

- Science: Develop a standardized stranding response toolkit and protocol that can be provided to countries seeking help, and include marine mammal identification guides, training materials, necropsy tools, protective gear, and other materials designed to meet individual countries' needs.
- Policy: Develop a comprehensive list of Marine Mammal Stranding Response professionals in the United States, chiefly within NOAA, and including veterinarians, pathologists, taxonomic specialists, disentanglement specialists, and oil spill response experts.
- Capacity building: As part of a capacity-building program, NMFS will: (1) transfer sampling techniques and protocols to regions to ensure data quality and continuity; (2) create open communication between NMFS programs to facilitate awareness of arising disease or pollution/contamination issues; (3) provide training and support to nascent stranding programs; and (4) support initiatives to recognize and involve cultural leaders in stranding events.
- International government-to-government: Convene international training workshops in Africa, Latin America, the Caribbean, the Pacific, and other interested countries to help guide and establish a stranding network capable of responding to live/dead marine mammal strandings and collecting important biological data.

Expected Conservation Outcome: These efforts will provide a greater understanding of the biology and threats facing marine mammals and will provide tools to effectively respond to human-caused disasters such as oil spills. Acknowledgement and involvement of native cultural practices facilitates community participation and improves relationships, which may enhance local interest in marine mammal conservation.

Justification: It is becoming vitally important to enhance the capacities and communications between stranding programs, to build or initiate stranding programs in areas having no program, or to better coordinate regional networks. This training can significantly improve stranding investigations, necropsies, mass stranding response, epidemiology, identification of emerging diseases, oil spill response, and identification of human impacts (e.g., fishery bycatch and marine debris), and can contribute to marine mammal medicine. Further, by targeting key individuals and countries, as well as empowering and training individuals from international organizations and governments, nations can reduce bycatch and address larger issues (e.g., human and climate impacts that lead to strandings, population decline, distribution changes, and deterioration of the marine environment). Organizing stranding response workshops and establishing observer capabilities are two of the most effective solutions to

bycatch. Finally, these capacity-building activities and continued bilateral engagement can eventually lead to strong partnerships that can be leveraged at international meetings such as WCPFC, International Commission for the Conservation of Atlantic Tunas (ICCAT), CITES, Convention on the Conservation of Antarctic Seals, and IWC. Supporting efforts to increase communication and understanding of disease and pollution/contaminants supports NOAA's efforts to mitigate impacts on marine mammals outside U.S. waters; improves abilities to monitor, detect, and respond to trends in marine mammals across the globe; and assists in the conservation of critically endangered species.

Objective 4: Develop a 5-year, long-term strategic plan that outlines the goals, resources, and priorities to expand the international observer training program.

Species: Numerous species of cetaceans and pinnipeds, including all of the critically listed marine mammals (Appendix 1) in this Action Plan.

Threat: Bycatch, direct removal.

Partners: F/IA, F/ST, F/PR; Alaska Sea Grant.

Strategies

- Science: Develop a standardized observer training course that can be readily used at various workshops.
- Policy: Develop a comprehensive list of funding sources and of professionals who can provide training at international locations.
- Capacity building: As part of a capacity-building program NMFS will convene on-site workshops for fisheries observer training to address IUU fishing and minimize bycatch of protected species, including marine mammals, turtles, seabirds, and sharks. This workshop will be either a part of the marine mammal stranding workshop or a separate workshop.
- International government-to-government: Initiate scientific exchange programs to fund short-term travel for NMFS marine mammal experts to share expertise, or to bring foreign marine mammal scientists/managers to the United States for workshops, symposia, and conferences related to marine mammal population assessments and bycatch estimation through observer programs.

Expected Conservation Outcome: These workshops will provide participants with the skills necessary to collect fisheries interaction data to better understand the biology and threats facing marine mammals, effectively document bycatch and direct removals, and devise mechanisms to disentangle marine mammals.

Justification: Observer training programs provide individuals and countries with the skills needed to document fisheries interactions. By empowering and training individuals from international organizations and governments, bycatch and other fisheries management issues can be addressed. Organizing observer program training workshops and establishing observer capabilities is an effective way to document and mitigate bycatch. Enhancing the capacity and support for observer programs improves data quality; helps ensure a timely response to bycatch that threatens marine mammal populations; assists in the ability to monitor, detect, and respond to trends in marine mammals across the globe; and aids in the conservation of critically endangered species.

APPENDIX 2

NATIONAL MARINE FISHERIES SERVICE INTERNATIONAL MARINE MAMMAL WORKING GROUP

Office		Working Group Members
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IA		Ryan Wulff
IA		Liz English
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PR		Janet Whaley
PR		Teri Rowles
PR		Melissa Andersen
SF		Lee Benaka
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EN		Stuart Cory
AFSC		Robyn Angliss
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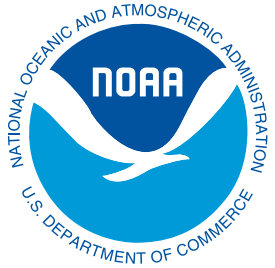

APPENDIX G

IMPROVING INTERNATIONAL FISHERIES MANAGEMENT

JANUARY 2013

REPORT TO CONGRESS

PURSUANT TO SECTION 403(A) OF THE MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT REAUTHORIZATION ACT OF 2006

January 2013

IMPROVING INTERNATIONAL FISHERIES MANAGEMENT

REPORT TO CONGRESS

Pursuant to Section 403(a) of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006

NOAA FISHERIES

Improving International Fisheries Management

Report to Congress Pursuant to Section 403(a) of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006

January 2013

U.S. Department of Commerce
1401 Constitution Avenue, N.W.
Washington, D.C. 20230

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Executive Summary

The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSRA), in amending the High Seas Driftnet Fishing Moratorium Protection Act (Moratorium Protection Act), called attention to the need for international cooperation to address fishing activities that have a deleterious effect on sustainable fisheries worldwide. Congress directed the Executive Branch to strengthen its leadership in improving international fisheries management and enforcement, particularly with regard to illegal, unreported, and unregulated (IUU) fishing, and to fishing practices such as bycatch that may undermine the sustainability of living marine resources. The Shark Conservation Act of 2010 (SCA) amended the Moratorium Protection Act to add a third focus: directed and incidental catch of sharks, especially the practice of finning, in areas beyond national jurisdiction. The Moratorium Protection Act requires the Secretary of Commerce to identify nations whose fishing vessels were engaged in these activities, and to consult with those nations on improving their fisheries management and enforcement practices.

In its 2011 Report to Congress, the National Marine Fisheries Service (NMFS), a line office of the National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce, identified six nations as having engaged in IUU fishing during the preceding 2 years: Colombia, Ecuador, Italy, Panama, Portugal, and Venezuela. This report details the consultations with those nations over the past 2 years. It also contains NMFS' certification decisions for those six nations; each was found to have taken appropriate corrective actions and is receiving a positive certification. A positive certification means that a nation has provided documentary evidence that appropriate corrective action has been taken to address the IUU fishing activities for which it was identified. A negative certification means that a nation has not taken sufficient steps to warrant receipt of a positive certification.

In this report, NMFS also identifies 10 nations as having been engaged in IUU fishing based on violations of international conservation and management measures (CMMs) during 2011 and/or 2012: Colombia, Ecuador, Ghana, Italy, Mexico, Panama, the Republic of Korea, Spain, Tanzania, and Venezuela. NMFS considered five other nations and fishing entities for identification for IUU fishing during the reporting period, but consultations indicate corrective actions have already been taken to address the fishing activities of concern, or the allegations of IUU fishing activities were refuted.

NMFS is identifying one nation, Mexico, for fishing activities involving the bycatch of protected living marine resources (PLMRs). No other nations are identified for PLMR bycatch or for shark catch on the high seas, due primarily to the restrictive timeframes and other limitations in the statute.

In addition, the report updates domestic, regional, and global efforts to combat IUU fishing, minimize bycatch of protected species, and conserve sharks. Among the most important developments during the past 2 years are the following:

- The Convention on the Conservation and Management of the High Seas Fishery Resources of the South Pacific Ocean entered into force on August 24, 2012. The organization it created has management authority over all fisheries not covered under

existing international management instruments, with a particular focus on pelagic fisheries for species such as jack mackerel and bottom fisheries for species such as orange roughy. The United States is a signatory to the Convention, and is working on ratifying the agreement.

- The Convention on the Conservation and Management of High Seas Fisheries Resources in the North Pacific Ocean was open for signature in April 2012; it will enter into force when four parties have deposited their instruments of ratification. The Convention establishes a management framework for all fisheries not already covered under existing international management instruments, with a particular focus on bottom fisheries, across the high seas areas of the North Pacific.

- On October 22, 2012, NMFS released the *International Marine Mammal Action Plan* to fulfill the United States' international obligations to protect and conserve marine mammals, reduce the impacts of human activities on marine mammals, and ensure that the agency's efforts are coordinated in a strategic fashion. The Action Plan includes seven strategic priorities to improve research and understanding of marine mammal biology, advance the conservation and management of marine mammals globally, and increase cooperation and collaboration with national and international partners.

- On September 27, 2012, the United States signed the Memorandum of Understanding (MOU) for the Conservation of Cetaceans and their Habitats in the Pacific Islands Region, an international framework under the Convention on Migratory Species (CMS). Earlier in September, the third meeting for signatories to the MOU adopted a Whale and Dolphin Action Plan for 2013–2017, and adopted a recovery plan for humpback whales for the same time period.

- NMFS has taken initial steps to implement the SCA by publishing a final rule in January 2013, covering identification and certification processes, and by collecting information on certain shark fishing practices and activities through solicitation of public input, consultation with other nations, and review of information available from regional fisheries management organizations (RFMOs).

List of Acronyms

Acronym	Full Name
ACAP	Agreement on the Conservation of Albatrosses and Petrels
AIDCP	Agreement on the International Dolphin Conservation Program
APEC	Asia-Pacific Economic Cooperation
ARAP	Aquatic Resources Authority of Panama
AUNAP	National Authority of Aquaculture and Fisheries (Colombia)
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CDS	Catch documentation schemes
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLAV	Combined list of authorized vessels (tuna RFMOs)
CMM	Conservation and management measure
CMS	Convention on Migratory Species
COFI	Committee on Fisheries of the FAO
CoP16	Sixteenth Conference of the Parties (CITES)
CPC	Contracting parties and cooperating non-contracting parties, entities, or fishing entities (ICCAT); parties, cooperating non-parties, or fishing entities (IATTC)
DMLs	Dolphin mortality limits (AIDCP)
DAS	Deputy Assistant Secretary
DOS	United States Department of State
EC	European Commission
EEZ	Exclusive Economic Zone
ESA	Endangered Species Act
EPO	Eastern Pacific Ocean
ETP	Eastern Tropical Pacific
EU	European Union
FAO	United Nations Food and Agriculture Organization
FWG	Fisheries Crime Working Group (INTERPOL)
IAC	Inter-American Convention for the Protection and Conservation of Sea Turtles
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
INCODER	Colombian Institute for Rural Development
INSOPESCA	Ministry of the Popular Power for Agriculture and Lands, Socialist Institute of Fisheries and Aquaculture (Venezuela)
IOTC	Indian Ocean Tuna Commission
IPOA-IUU	International Plan of Action to Prevent, Deter and Eliminate IUU Fishing

IUU	Illegal, unreported, and unregulated (fishing)
MCS	Monitoring, control, and surveillance
MMPA	Marine Mammal Protection Act
MOU	Memorandum of understanding
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSRA	Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006
NAFO	Northwest Atlantic Fisheries Organization
NASCO	North Atlantic Salmon Conservation Organization
NEAFC	North East Atlantic Fisheries Commission
NGO	Non-governmental organization
NMFS	National Marine Fisheries Service (a NOAA line office)
NOAA	National Oceanic and Atmospheric Administration (an agency of the Department of Commerce)
NPAFC	North Pacific Anadromous Fisheries Commission
NPFC	North Pacific Fisheries Commission
OFWG	Oceans and Fisheries Working Group (APEC)
PLMRs	Protected living marine resources
RFMO	Regional fisheries management organization/arrangement
SCA	Shark Conservation Act of 2010
SCRS	Standing Committee on Research and Statistics (ICCAT)
SEAFO	South East Atlantic Fisheries Organization
SPRFMO	South Pacific Regional Fisheries Management Organization
TED	Turtle excluder device
UN	United Nations
UNFSA	United Nations Fish Stocks Agreement
UNGA	United Nations General Assembly
USCG	United States Coast Guard
VME	Vulnerable marine ecosystem
VMS	Vessel monitoring system
WCPFC	Western and Central Pacific Fisheries Commission
WTO	World Trade Organization

I. Introduction and Background

In 2006, Congress recognized the need for international cooperation to address some of the most significant issues affecting international fisheries today: illegal, unreported, and unregulated (IUU) fishing and fishing practices that may undermine the sustainability of living marine resources. Enacted early in 2011, the Shark Conservation Act (SCA) (Pub. L. 111-348) focused on the need for enhanced international action to conserve and protect sharks. The statutory provisions aimed at eliciting international cooperation on these issues are codified as part of the Moratorium Protection Act, 16 U.S.C. 1826d-k.

Central to that statutory scheme is the requirement that the Secretary of Commerce, in biennial reports, identify nations whose fishing vessels are engaged in certain IUU fishing, bycatch, and shark fishing practices; describe U.S. consultations with the identified nations to urge appropriate actions; and certify whether such actions subsequent to identification have adequately addressed the offending activities.

In addition, the Moratorium Protection Act directs the Secretary of Commerce, in consultation with the Secretary of State and in cooperation with relevant regional fishery management councils and any relevant advisory committees, to take certain actions to improve the effectiveness of international fishery management organizations in conserving and managing stocks under their jurisdiction. These actions include urging those organizations of which the United States is a member to:

- Incorporate multilateral market-related measures against member or non-member governments whose vessels engage in IUU fishing.
- Seek adoption of lists that identify fishing vessels and vessel owners engaged in IUU fishing.
- Seek adoption of a centralized vessel monitoring system (VMS).
- Increase use of observers and technologies to monitor compliance with conservation and management measures.
- Seek adoption of stronger port State controls in all nations.
- *Adopt shark conservation measures, including measures to prohibit removal of any of the fins of a shark (including the tail) and discarding the carcass of the shark at sea.*[1]
- Adopt and expand the use of market-related measures to combat IUU fishing, including import prohibitions, landing restrictions, and catch documentation schemes.

The Secretary is also to urge other nations to take all steps necessary, consistent with international law, to adopt measures and policies that will prevent fish or other living marine resources harvested by vessels engaged in IUU fishing from being traded or imported into their nations or territories.[2]

The Moratorium Protection Act requires the Secretary of Commerce to promote improved monitoring and compliance for high seas fisheries or fisheries governed by international fishery

[1] The SCA, Pub. L. 111-348, added the language in italics.
[2] *See* 16 U.S.C. 1826i.

management agreements. The Act calls on the Secretary, to the greatest extent possible based on availability of funds, to provide assistance to nations whose vessels are involved in bycatch of protected living marine resources (PLMRs) to address such activities.[3]

The amended Act directs the Secretaries of Commerce and State to seek to enter into international agreements for shark conservation, including measures to prohibit removal of any fins and discarding the carcass at sea, that are comparable to U.S. measures, taking into account different conditions.[4]

The Secretary of Commerce submitted the first Biennial Report to Congress in January 2009, and the second Biennial Report in January 2011. Those reports and the current one survey efforts by the United States to strengthen its leadership toward improving international fisheries management and enforcement, particularly with regard to IUU fishing, bycatch of PLMRs, and certain shark fishing practices. They also describe progress in the international arena to deal with these issues. They address the status of international living marine resources and contain information on actions taken to assist other nations in achieving sustainable fisheries and minimizing bycatch and discards.

As the legislation emphasizes the importance of addressing IUU fishing, PLMR bycatch, and certain shark fishing practices, the sections below provide background information on those activities and a brief discussion of other U.S. statutes that are useful in managing U.S. fisheries responsibly and in addressing unacceptable practices in international fisheries.

A. Illegal, Unreported, and Unregulated (IUU) Fishing

The international community uses the term "IUU fishing" to describe activity that does not comply with national, regional, or global fisheries conservation and management obligations, wherever such fishing occurs. Unregulated or unreported fishing may also occur in international waters where no management authority or regulation is in place.[5]

IUU fishing activity affects fisheries of all types – from small scale to industrial. Shipment, processing, landing, sale, and distribution of IUU fish and fish products perpetuate the financial

[3] *See* 16 U.S.C. 1826k(d).
[4] *See* 16 U.S.C. 1826i(3).
[5] The MSRA's use of the term is more circumscribed and complicated; see Part II.A for definitional details. Section 402 of the MSRA contains a finding that international cooperation is necessary to address "illegal, unreported, **and** unregulated fishing" (emphasis added). On the other hand, Section 403 of the MSRA, which establishes the standards for identification and certification of nations whose vessels engage in IUU fishing, uses a disjunctive formulation of the term, referring to nations whose vessels are engaged in "illegal, unreported, **or** unregulated fishing" (emphasis added). The FAO and other international bodies generally employ the conjunctive formulation of the term in publications, plans of action, and related materials. In this report, we use the acronym "IUU fishing" without indicating whether the conjunctive or disjunctive formulation is intended, but with the understanding that where identification and certification determinations are at issue under the MSRA, the term is to be understood and employed in the disjunctive. We do not intend any particular legal meaning or consequence to flow from the use of the term in this report.

reward from illegal harvests. IUU fishing thwarts attempts by nations and international organizations to manage fisheries in a responsible manner. It also affects the ability of governments to support sustainable livelihoods of fishermen and, more broadly, to achieve food security.

Because IUU fishing activities are generally carried out covertly, monitoring and detection are difficult. This renders quantification of the problem elusive.[6] The United Nations Food and Agriculture Organization (FAO) considers IUU fishing a serious threat to fisheries, especially those of high value that are already overfished; marine habitats, including vulnerable marine ecosystems (VMEs); and food security and the economies of developing nations.[7] IUU fishing activities have widespread economic and social consequences, including depriving legitimate fishermen of harvest opportunities. IUU fishing also deprives fisheries managers of information critical to accurate stock assessments. It exacerbates the problem of discards and bycatch because vessels engaged in illegal activity are likely to engage in unsustainable fishing practices and use non-selective gear.

IUU fishing activities tend to be dynamic, adaptable, highly mobile, and increasingly sophisticated as IUU fisheries continue to find and exploit weak links in the international fisheries regulatory system. The use of flags of convenience, as well as ports of convenience, facilitates the scope and extent of IUU fishing activities.

Since IUU fishing activities are complex, a broad range of governments and entities must be involved to combat them. These include flag States, coastal States, port States, market States, international and intergovernmental organizations, the fishing industry, non-governmental organizations (NGOs), financial institutions, insurers, and consumers. Congress recognizes the importance of active U.S. involvement in international efforts to combat IUU fishing through activities such as adoption of IUU vessel lists; stronger port State controls; improved monitoring, control, and surveillance (MCS); implementation of market-related measures to help ensure compliance; and capacity-building assistance. The United States is a member of or has substantial interests in numerous international fisheries and related agreements and organizations (see Annex 1 for a list of those most relevant to this report). A discussion of the international actions the United States and its international partners are continuing to take concerning IUU fishing is provided in this report. The National Oceanic and Atmospheric Administration (NOAA) plan and priorities for combatting IUU fishing in 2012 appear in a document entitled *Leveling the Playing Field* – available online at http://www.nmfs.noaa.gov/ia/iuu/level_play_field.pdf.

[6] Estimates of the annual value of IUU-harvested fish range from 9 to 25 billion USD. MRAG and Fisheries Ecosystems Restoration Research, Fisheries Centre, University of British Columbia, "The Global Extent of Illegal Fishing," April 2008, p. 1.

[7] The FAO cites indications that IUU fishing is moderating in some areas (e.g., the northeast Atlantic Ocean) as successful policies and measures take hold. It remains widespread, however, in the EEZs of coastal States and on the high seas. FAO, "The State of World Fisheries and Aquaculture," Rome, 2012, p. 94.

Part III of this report contains certification decisions about the six nations identified in 2011 as engaged in IUU fishing, and identifies ten nations as having been engaged in IUU fishing or bycatch activities in 2011 and/or 2012.

B. Bycatch of Protected Living Marine Resources (PLMRs)

The bycatch of PLMRs, such as incidentally caught or entangled sea turtles, sharks, dolphins, and other marine mammals, is also a serious issue in international fisheries. Bycatch of PLMRs limits the ability of the United States and other nations to conserve these resources. Fisheries bycatch can lead to injury or mortality of protected species, and can also have significant negative consequences for marine ecosystems and biodiversity. The National Marine Fisheries Service (NMFS) has developed a list of PLMRs, available online at http://www.nmfs.noaa.gov/ia/iuu/msra_page/msra.html.

In enacting the MSRA, Congress recognized the importance of U.S. leadership in establishing international measures to end or reduce the bycatch of PLMRs. The United States is party to a number of international agreements related to the protection of living marine resources, as well as to many global, regional, and bilateral fisheries agreements (see Annex 1). This report, in Part VII, describes recent actions the United States has taken in these forums and bilaterally to pursue strengthened bycatch reduction measures comparable to those of the United States.

Marine Mammals. To fulfill the United States' international obligations to protect and conserve marine mammals, reduce the impacts of human activities on marine mammals, and ensure that these activities are coordinated in a strategic fashion across the agency, NMFS developed the *International Marine Mammal Action Plan*, made available to the public on October 22, 2012. The document is available online at http://www.nmfs.noaa.gov/ia/reports/immap.pdf.

The Action Plan includes seven strategic priorities to improve research and understanding of marine mammal biology, advance the conservation and management of marine mammals globally, and increase cooperation and collaboration with national and international partners:

1. Reduce the bycatch of marine mammals in international and foreign fisheries to sustainable levels.
2. Improve our understanding of climate change impacts on marine mammals.
3. Reduce the threat of prey depletion by considering predator/prey relationships under an ecosystem approach to fishery management.
4. Reduce the threat of marine debris to marine mammals by decreasing the loss of marine debris – including derelict fishing gear – into the ocean.
5. Reduce the number of vessel strikes in international and foreign waters.
6. Prevent habitat loss, degradation, and disturbance through marine spatial planning and marine protected area designation.
7. Improve our understanding of and response to the occurrence of disease and die-offs in marine mammal populations.

Over the course of the next 5 years, NMFS will be discussing and identifying ways to effectively execute the activities within the Action Plan, by reaching out to advisory panels; Federal, domestic, and international partners; conservation and scientific groups; and industry.

Seabirds. Although the statutory definition of PLMRs does not include seabirds, they are an international living marine resource for which conservation is an issue of growing global concern, and an issue on which NMFS has been actively involved internationally.[8] Section 316 of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) highlights the need for the Secretary of Commerce to work cooperatively with the Secretary of the Interior and industry, and within international organizations, to seek ways to mitigate seabird bycatch. Annex 3 to this report highlights recent efforts to protect this international living marine resource.

C. Shark Conservation and Protection

Sharks are an ancient and highly diverse group of fish that present an array of issues and challenges for fisheries conservation and management due to their biological and ecological characteristics and lack of general data reported on the catch of each species. Most sharks are apex predators. Many shark species are characterized by relatively slow growth, late maturity, and low reproductive rates, which can make them particularly vulnerable to overexploitation and slow to recover once stocks are depleted. As exploitation rates for some shark species and particularly the demand for fins have increased, concern has grown regarding the status of many shark stocks and the sustainability of their exploitation in world fisheries.

The United States continues to be a leader in promoting shark conservation and management globally through ongoing consultations regarding the development of international agreements consistent with the Shark Finning Prohibition Act of 2000, Pub. L. 106-557, and the SCA. The United States is committed to working bilaterally and multilaterally to promote shark conservation and management and to prevent shark finning, so that legal and sustainable fisheries are not disadvantaged by these activities. For example, within the regional fisheries management organization (RFMO) context, the United States has focused on efforts to improve data collection for sharks, develop species-specific conservation and management measures (CMMs), and review compliance with agreed measures.

D. Other U.S. Statutes that Address IUU Fishing, PLMR Bycatch, and Shark Conservation

In addition to the statutes already mentioned, the United States has numerous legal tools to address IUU fishing, shark conservation, and PLMR bycatch, both domestically and internationally. These include the MSA, Lacey Act, Pelly Amendment to the Fishermen's Protective Act of 1967, Marine Mammal Protection Act (MMPA), Endangered Species Act (ESA), and International Dolphin Conservation and Protection Act. Regulations under other statutes, such as the Atlantic Tunas Convention Act, ensure that U.S. fishermen are subject to the

[8] Bycatch of seabirds could not serve as the basis for identification of a nation under the PLMR provisions of the MSRA, but violations of seabird measures of RFMOs to which the United States is a party could serve as the basis for identification under the Act's IUU fishing provisions.

conservation measures adopted under international agreements to which the United States is a party, whether within or outside the U.S. Exclusive Economic Zone (EEZ). See Annex 2 for summaries of statutes and recent enforcement cases with an international nexus.

Under the MSA, comprehensive regulations govern all of the major fisheries in the EEZ, out to 200 miles from U.S. coasts. In the U.S. Atlantic EEZ (including the Gulf of Mexico and Caribbean Sea), NMFS directly manages sharks and other highly migratory species, except for spiny dogfish, which are jointly managed by the Mid-Atlantic and New England Fishery Management Councils. In the U.S. Pacific EEZ, three regional fishery management councils – Pacific, North Pacific, and Western Pacific – are responsible for developing fishery management plans for these species. The MSA requires the Secretaries of State and Commerce to seek to secure international agreements with standards and measures for bycatch reduction comparable to those applicable to U.S. fishermen.[9]

The SCA prohibits any person subject to U.S. jurisdiction from removing any of the fins from a shark (including the tail) at sea, having custody of a shark fin not naturally attached to the carcass aboard a fishing vessel, or transferring or landing any such fin.[10] In addition, it prohibits landing a shark carcass without its fins naturally attached. NMFS is developing a separate rulemaking for domestic fisheries to implement these prohibitions.

U.S. law and policy establish a number of domestic requirements designed to reduce bycatch and other harmful effects of fishing activities on PLMRs by vessels subject to U.S. jurisdiction. U.S. fishermen are subject to requirements concerning the taking of marine mammals under the MMPA, and fishing and related actions that affect species listed as endangered or threatened under the ESA.[11] In addition, the MMPA requires the Secretary of Commerce, working through the Secretary of State, to initiate negotiations for development of bilateral or multilateral agreements with other nations for the protection and conservation of marine mammals.

The International Dolphin Conservation Program Act and the Pelly Amendment to the Fishermen's Protective Act call for nations to comply or act in a manner consistent with international fisheries management measures, and provide for various types of trade-restrictive measures against nations whose vessels engage in activities that undermine the effectiveness of international fisheries conservation measures or otherwise engage in prohibited activities.[12] Section 101(a)(2) of the MMPA requires the banning of imports of commercial fish caught with

[9] *See* 16 U.S.C. 1822(h).

[10] The prohibition does not apply to individuals engaged in commercial fishing for smooth dogfish, under certain conditions and circumstances. The new shark legislation necessitated a re-evaluation of Federal management measures for this fishery, which had been scheduled to take effect in April 2012. NMFS plans to publish a rule for that fishery to implement the SCA amendments and any requirements stemming from a consultation under Section 7 of the ESA.

[11] *See* 16 U.S.C. 1361 *et seq*. and 16 U.S.C. 1531 *et seq*.

[12] *See* 16 U.S.C. 1441 *et seq.* and 22 U.S.C. 1978.

technology that results in the incidental kill or serious injury of ocean mammals in excess of U.S. standards.[13]

An important enforcement tool is the Lacey Act, which prohibits interstate and foreign trafficking in fish or wildlife taken in violation of domestic or foreign law (see Annex 2).[14] The Act also prohibits the import, export, transport, sale, possession, or purchase of any fish or wildlife taken, possessed, transported, or sold in violation of any law, treaty, or regulation of the United States or in violation of any Indian tribal law. The Lacey Act provides for both civil and criminal sanctions.

[13] *See* 16 U.S.C. 1371(a)(2). The 2011 Biennial Report (at page 44) describes a NMFS advance notice of proposed rulemaking to implement that provision with regard to the import of swordfish and other fish and fish products. NMFS expects to publish the proposed rule in 2013.

[14] *See* 16 U.S.C. 3371-3378.

II. Provisions for Identification and Certification

To implement the identification and certification provisions of the Moratorium Protection Act for IUU fishing and bycatch of protected species, NMFS published a final rule establishing procedures on January 12, 2011.[15] NMFS amended these procedures to implement the identification and certification provisions of the SCA through a final rule, which will publish in January 2013. Those procedures are described below for each of the types of identifications.

The identification of nations having fishing vessels engaged in IUU fishing activities, bycatch of PLMRs, or certain shark fishing practices is deemed to be an identification under the High Seas Driftnet Fisheries Enforcement Act. If an identified nation takes appropriate actions to address such activities, it receives a positive certification. If it receives a negative certification, sanctions under that statute may be applied, including prohibitions on importation of certain fish and fish products into the United States, denial of port privileges, and other measures, under specified circumstances. The final rule describes how recommendations will be made and any sanctions implemented, in the event a nation receives a negative certification.

A. IUU Fishing

Section 609(a) of the Moratorium Protection Act requires the Secretary of Commerce to identify a nation whose vessels are engaged, or have been engaged in the preceding 2 years, in IUU fishing, taking into account where the relevant international organization has failed to implement effective measures to end IUU fishing, or where no international fishery management organization with a mandate to regulate the fishing activity exists.

As Section 609(a) refers to activities of "vessels," a nation must have more than one vessel engaged in IUU activities during the "preceding two years" from the date of submission of the biennial report to Congress. Information concerning activities outside that time period cannot form the basis for an identification decision. In addition, activities conducted during the relevant time period that are not discovered or reported before the end of the year preceding submission of the Report to Congress cannot form the basis for an identification.
Section 609(e)(3) of the Moratorium Protection Act requires the Secretary of Commerce to publish a regulatory definition of "illegal, unreported, or unregulated fishing," including certain minimum elements. The initial regulatory definition published in 2007 was exactly the same as those minimum elements, but in January 2011 NMFS amended the definition by adding the italicized text below, to make it more consistent with United Nations General Assembly (UNGA) Resolution 61/105 on sustainable fisheries. The IUU fishing definition codified at 50 CFR § 300.201 includes:

- fishing activities that violate conservation and management measures required under an international fishery management agreement to which the United States is a party, including *but not limited to* catch limits or quotas, capacity restrictions, and bycatch reduction requirements;

[15] The Moratorium Protection Act's identification and certification procedures are codified at 50 CFR § 300.200 *et seq.*

- overfishing of fish stocks shared by the United States, for which there are no applicable international conservation and management measures or in areas with no applicable international fishery management organization or agreement, that has adverse impacts on such stocks; and
- fishing activity that has *a significant* adverse impact on seamounts, hydrothermal vents, cold water corals *and other vulnerable marine ecosystems* located beyond *any* national jurisdiction, for which there are no applicable conservation or management measures, *including those* in areas with no applicable international fishery management or agreement.

Also in January 2011, the SCA amended the definitional guidelines in the Moratorium Protection Act to add "shark conservation measures" to the first element of the definition, consistent with the new legislation's focus on encouraging other nations to join the United States in protecting sharks, including by prohibiting the practice of finning. On July 10, 2012 (77 Fed. Reg. 40553), NMFS published a proposed rule that would add that phrase to paragraph (1) of the definition in 50 CFR § 300.201. In the proposed rule, NMFS offered other amendments to the IUU fishing definition, and clarified the agency's intention to apply the definition more broadly than in the past. For example, NMFS will consider a nation's actions or inactions, such as failure to comply with applicable data reporting requirements, in determining whether to identify the nation as having been engaged in IUU fishing. NMFS will also consider identifying nations that are non-members to an international fishery management agreement but whose fishing activities undermine conservation of the resources managed under that agreement. Another basis for identification will be fishing by foreign-flag vessels in U.S. waters without authorization by the United States. NMFS believes that these activities, which jeopardize the ability of the United States to manage its fisheries sustainably and unfairly disadvantage U.S. fishermen, fall within the statutory guidelines for the definition of IUU fishing. NMFS will publish a final rule that includes these changes in January 2013.

At the beginning of the identification process under the current regulations, NMFS gathers from many sources information that it believes could support a determination that a nation's vessels have been engaged in IUU fishing. NMFS then seeks corroboration or refutation from that nation and encourages it to take action to address the activity. In deciding whether to make such an identification, NMFS considers whether the nation is implementing and enforcing measures comparable to those implemented by the United States to address the pertinent activity. The 2011 final rule describes the types of measures that a nation might take to prevent, deter, and eliminate IUU fishing activities.

The regulations also detail the notification and consultation process. After NMFS provides a preliminary positive or negative certification to a nation identified for having vessels engaged in IUU fishing, an identified nation has the opportunity to respond with additional information before the final certification is issued. The rule lists factors NMFS considers, including corrective actions by the identified nation, the effectiveness of those actions in addressing and deterring IUU fishing, and whether measures comparable to those of the United States have been implemented and are being effectively enforced.

B. Bycatch of PLMRs

Section 610(a)(1) of the Moratorium Protection Act requires the Secretary to identify a nation for bycatch activities if:

- fishing vessels of that nation are engaged, or have been engaged during the preceding calendar year, in fishing activities or practices in waters beyond any national jurisdiction that result in bycatch of a protected living marine resource, or beyond the exclusive economic zone of the United States that result in bycatch of a protected living marine resource shared by the United States;
- the relevant international organization for the conservation and protection of such resources or the relevant international or regional fishery organization has failed to implement effective measures to end or reduce such bycatch, or the nation is not a party to, or does not maintain cooperating status with, such organization; and
- the nation has not adopted a regulatory program governing such fishing practices designed to end or reduce such bycatch that is comparable to that of the United States, taking into account different conditions.

The first prong of Section 610(a) thus contains an even tighter timeframe for identification than the comparable provision for IUU fishing in Section 609(a) – just the preceding calendar year – and shares the restriction that an identification cannot be based on the activities of a single vessel.

The current regulations define "bycatch" to mean "the incidental or discarded catch of protected living marine resources or entanglement of such resources with fishing gear" (50 CFR § 300.201). For purposes of the Moratorium Protection Act (Section 610(e)), the term "PLMR":

- includes non-target fish, sea turtles, or marine mammals that are protected under U.S. law or international agreement, including the MMPA, ESA, Shark Finning Prohibition Act, and Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), but
- does not include species, except sharks, managed under the MSA, the Atlantic Tunas Convention Act, or any international fishery management agreement.

In evaluating information on bycatch of PLMRs, NMFS takes into account the extent of the bycatch and its impact on the sustainability of the PLMR, as well as actions taken by the nation to address the bycatch, information refuting the allegations, and participation in cooperative research designed to address bycatch. The current regulations include the types of measures nations and international bodies could take that would be effective in ending or reducing bycatch. NMFS examines whether an international organization exists that can regulate the fishery in which the bycatch occurred and whether it has adopted measures that could end or reduce PLMR bycatch, as well as the nation's relationship to that body and its implementation of measures addressing bycatch.

A similar notification and communication process applies prior to identification for PLMR bycatch activities as for IUU fishing. Within 60 days of submission of the biennial report identifying a nation for such activities, NMFS will initiate consultations for the purpose of

entering into bilateral and multilateral treaties, and will also seek agreements through the appropriate international organizations to protect PLMRs from the activities upon which the identification was based. Again, there is a preliminary certification process and opportunity for the identified nation to respond before the final positive or negative certification is made. The current regulations set forth the factors NMFS will consider in making the determination.

C. Shark Conservation and Protection

In the 2006 legislation, shark conservation fell implicitly within the definition of "IUU fishing" (which included all violations of RFMO measures, including those geared toward shark conservation), and explicitly within the PLMR definition. As mentioned above, the SCA amended the guidelines for defining IUU fishing to specify that violation of shark conservation measures is included. That Act also requires the Secretary of Commerce to identify a nation whose vessels are engaged, or have been engaged during the preceding calendar year, in fishing activities or practices on the high seas that target or incidentally catch sharks, and the nation has not adopted a regulatory program for the conservation of sharks, including measures to prohibit removal of any of the fins of a shark (including the tail) and discarding the carcass of the shark at sea, that is comparable to that of the United States, taking into account different conditions.

Under the final rule to implement the above provisions, which will publish in January 2013, NMFS will take into account all relevant matters, including the history, nature, circumstances, extent, and gravity of the fishing activities that target or incidentally catch sharks in areas beyond any national jurisdiction, when determining whether to identify nations for these activities. The notification and consultation procedures, as well as those for certification of an identified nation, are very similar to those for IUU fishing and bycatch activities.

The SCA required that the Secretary of Commerce begin making identifications no later than January 4, 2012. NMFS solicited information from the public on such activities in areas beyond any national jurisdiction in the Federal Register notice cited in Part III. NMFS has also started collecting and analyzing information that could help the agency determine which nations may have vessels engaging in fishing activities or practices on the high seas that target or incidentally catch sharks and may have a regulatory program for the conservation of sharks that is comparable to that of the United States.

III. Identification and Certification under Sections 609 and 610

A. Identifications

1. The Identification Process

The Secretary of Commerce has delegated authority to identify nations under the Moratorium Protection Act to the NOAA Assistant Administrator for Fisheries. In preparation for development of the list of nations that are recommended for identification, NMFS published a Federal Register notice soliciting information on IUU fishing, PLMR bycatch activities, and shark fishing on the high seas (77 Fed. Reg. 19226, March 30, 2012).

Fishing in Violation of International Measures. The first prong of the IUU fishing definition covers activities that violate measures required under an international fishery management agreement to which the United States is a party. NMFS gathered information on incidents where RFMO compliance measures may have been violated. The process began with a search of publicly available RFMO materials, including annual reports, compliance committee meeting summaries, and IUU vessel lists. NMFS also searched United States Coast Guard (USCG), foreign government, press, and NGO reports.

Based on the analysis of all available information, NMFS determined 15 nations to be of interest for having vessels that allegedly engaged in violation of international measures during the relevant time period (2011 and 2012) (see Part III. A. 2 and 3). Through diplomatic channels, NMFS contacted these nations to verify information regarding alleged IUU fishing activities by their vessels. From the responses of five of the 15 nations and fishing entities and from other sources, NMFS collected information that either refuted the allegations or showed that corrective actions had been taken to address all of the IUU fishing activities of concern (see Part III. A. 3). Information provided by the remaining nations failed to demonstrate that sufficient corrective action had been taken to address all of the activities of concern.

In a case where action taken by a nation is pending against a vessel, but no resolution has been reached to exonerate or sanction the vessel, NMFS considered the activities of the vessel as a foundation for identification. NMFS also considered the activities of a vessel as a basis for identification when the agency was unable to ascertain the reason a case against the vessel had been closed.

Detailed information on the ten nations identified for this type of IUU fishing appears below in Part III.A.2; information on nations and fishing entities of interest that were not identified is found in Part III.A.3.

Overfishing of Shared Stocks. The second prong of the definition of IUU fishing includes overfishing of stocks shared by the United States in areas without applicable international measures or management organizations. As of June 30, 2012, NMFS has assessed the following four stocks as both overfished and shared by U.S. and foreign fleets: North Atlantic albacore, Atlantic blue marlin, western Atlantic bluefin tuna, and Atlantic white marlin. Since these stocks are managed by an international management organization, the International Commission for the

Conservation of Atlantic Tunas (ICCAT), NMFS is not identifying any nation as conducting this type of IUU fishing in 2011–2012.

Destructive Fishing Practices on VMEs. During the reporting period, NMFS found no nations that conducted IUU fishing activities under the third prong of the IUU fishing definition. Currently five RFMOs have the competency to manage bottom fishing: the Northwest Atlantic Fisheries Organization (NAFO), North East Atlantic Fisheries Commission (NEAFC), South East Atlantic Fisheries Organization (SEAFO), Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR), and South Pacific Regional Fisheries Management Organization (SPRFMO). Each of these organizations, as well as one in formation (North Pacific Fisheries Commission, NPFC), have measures to protect VMEs from bottom fishing activities, in accordance with the 2006 UNGA Sustainable Fisheries Resolution (61/105) and reflecting guidance from the FAO's International Guidelines for Deep Sea Fisheries.[16] Nations fishing in accordance with the rules of these organizations, by definition, would not meet the criteria for IUU fishing identification under the Moratorium Protection Act.

The Southwest Atlantic Ocean and the Indian Ocean are the only areas of the high seas where bottom fishing is not being managed under an RFMO.[17] To avoid identification under the Moratorium Protection Act, States with vessels known to be fishing in these areas in 2011 and 2012 must have had measures in place to prevent significant adverse impacts to known or likely VMEs. Several States, including Australia, the Cook Islands, New Zealand, the Republic of Korea, the Russian Federation, Spain, and the United Kingdom, as well as the European Commission (EC), have reported to the UN and the FAO on measures taken in high seas areas in accordance with the 2006 UNGA Sustainable Fisheries Resolution.

In response to the 2009 UNGA review of Resolution 61/105, the FAO maintains a list of vessels authorized for bottom fishing on the high seas. In 2011 and 2012, only Korea reported having authorized vessels to bottom fish, although several European Union (EU) nations and the Cook Islands had previously reported having authorized vessels for bottom fishing on the high seas. All of those nations have informed the UN, and confirmed through consultations with NMFS, that all fishing activities were being conducted in accordance with Resolution 61/105. NMFS therefore concludes that they would not qualify as IUU fishing.

NMFS will continue to work with international partners to strengthen implementation of and compliance with existing RFMO management measures. NMFS will also continue to support scientific research to identify VMEs on the high seas and gear modifications to reduce the impact of bottom-tending gears on vulnerable habitats.

PLMR Bycatch Activities. Identification of nations for bycatch activities under Section 610(a)(1) of the Moratorium Protection Act may be based only on current activities of fishing vessels of that nation, or on activities in which those vessels have been engaged during the calendar year preceding submission of the biennial report to Congress in January. Qualifying activities are further restricted to those that result in the bycatch of PLMRs where the relevant

[16] The SPRFMO and NPFC measures, at this point, are non-binding.

[17] The Southwest Indian Ocean Fisheries Commission has not yet established conservation measures to control bottom fishing.

international conservation organization has failed to implement effective measures to end or reduce such bycatch, or the nation is not a party to or a cooperating partner with such organization and the nation has not adopted and implemented a regulatory program governing such fishing practices that is comparable to that of the United States, taking into account different conditions.

Over the past 2 years, NMFS has collected significant amounts of information on bycatch activities from numerous sources, including government and academic studies, relevant international organizations, NGOs, and the media. NMFS' team of subject matter experts examined the bycatch in question, its impact on the affected PLMR, and any relevant regulations or management measures.

Based on analysis of all available information, NMFS determined one nation, Mexico, to be of interest for having vessels that allegedly engaged in PLMR bycatch, and therefore considered it for identification. Through diplomatic channels, NMFS contacted Mexico to verify information about alleged PLMR fishing activities by its vessels. Mexico has not yet responded to NMFS' inquiries. Detailed information on these fishing activities appears in Part III.A.2.

The identification of only one nation for PLMR bycatch activities is due to the "preceding year" limitation within the Moratorium Protection Act (described above) rather than significant reduction in PLMR bycatch in global fisheries. For example, a number of nations self-report bycatch of PLMRs to RFMOs or other international organizations, but those data are not generally available in time for action under the Act. Many nations publish bycatch reports and corresponding analyses in the year after the data are collected, or even later. International organizations and journal publications often report these data several years after they receive the information.

NMFS will continue to collect information for possible identification of nations for PLMR bycatch under the provisions of the Moratorium Protection Act. To support this work, NMFS will collaborate with international partners to improve reporting and collection of bycatch incidents within relevant international conservation organizations. While some RFMOs collect bycatch information, reporting is often voluntary. Most RFMOs that do collect data have not standardized their data collection. Those that do have standards often receive data from nations that do not use these standardized formats, which creates significant gaps in the technical information available and reduces the ability of these organizations to better address bycatch issues.

NMFS will continue to be a leader bilaterally, multilaterally, and globally to reduce bycatch of PLMRs. NMFS has long-standing outreach and assistance programs with a number of nations, through cooperative research or other capacity-building activities, to reduce and mitigate bycatch (see Part IX for examples). NMFS intends to continue to support existing capacity-building efforts, where appropriate, and to initiate additional programs with other nations based on the nature of their PLMR bycatch interactions, need for assistance, and willingness to work cooperatively with the United States. NMFS will also continue to promote comprehensive CMMs through international organizations to reduce bycatch of PLMRs, by working with international partners to improve assessment of the impact of fisheries on bycatch taxa, support

research into gear modifications and alternative gear types, and develop management measures to reduce bycatch.

Shark Fishing Activities. Identification of nations under the new provisions of the SCA may be based only on activities occurring on the high seas during the calendar year preceding submission of the biennial Report to Congress; thus for the 2013 Report the activities must have occurred during 2012. During the past 2 years, NMFS has analyzed information from the websites of many international organizations: the FAO, ICCAT, Inter-American Tropical Tuna Commission (IATTC), Western and Central Pacific Fisheries Commission (WCPFC), Indian Ocean Tuna Commission (IOTC), NAFO, General Fisheries Commission for the Mediterranean, SEAFO, and CCAMLR. A number of nations reported catching sharks, but none of the activity met the SCA criteria because it took place prior to 2012. Normally, nations report the prior year's catch to RFMOs. For example, at the 2012 annual meeting of ICCAT, the catch reported by members was for 2011. A further complicating factor is that the location of the catch of sharks is not reported; NMFS cannot discern whether the catch occurred on the high seas or within EEZs. Therefore, NMFS does not have any applicable data for shark catch on the high seas and is not identifying any nation under Section 610(a)(2) of the Moratorium Protection Act.

2. Nations Identified

Colombia.[18] Colombia is being identified for having a number of vessels that reportedly violated IATTC resolutions in 2011 and/or 2012. Three Colombian vessels, the *Nazca*, *Cabo de Hornos*, and *Maria Isabel C*, finned sharks and discarded the carcasses at sea before the point of first landing, in violation of Resolution C-05-03. Colombia responded that shark finning was illegal under Colombian law (Resolution 1633, June 19, 2007) and that the Government is working to harmonize shark regulations throughout the region. Colombia has been conducting public outreach and education efforts with fishing captains and crews to stress the importance of shark conservation.

The *Cabo de Hornos*, *Sea Gem*, and *Sandra C* discarded salt bags or plastic trash at sea in 2011, contravening Resolution C-04-05. Colombia indicated that a review of this allegation was underway.

Since Colombia has not yet resolved the cases of shark finning and discarding trash at sea, it is being identified.

Other information and fishing activities that did not form the bases of identification. The *Dominador I* and *Marta Lucia R* allegedly fished in the Eastern Pacific Ocean (EPO) in 2011 without being on the Regional Vessel Register. These vessels comprised one of the bases for Colombia's 2011 identification. Colombia has since taken corrective action by not renewing the vessels' fishing licenses and confining the vessels to port. The following seven vessels allegedly discarded tuna in 2011 in violation of Resolution C-11-01: the *American Eagle*, *Grenadier*, *Amanda S*, *Nazca*, *Cabo de Hornos, Sandra C*, and *Sea Gem*. A total of 17 sets had discards

[18] The sources of information on Colombian fishing activities are the IATTC Compliance Report for 2011 (COR-03-04a Revised) and letters from Carlos Urrutia, Ambassador to the United States, dated November 19, 2012, and December 10, 2012.

amounting to 22.4 tons of tuna. Colombia stated that the former national fishing authority had prohibited discarding of fish bycatch when the fish were unlikely to survive. Colombia stated that the technical criteria in the IATTC Field Manual may be contradictory in determining whether fish may be discarded, as the resolution (C-11-01 paragraph 16) allows for discarding of fish considered unfit for human consumption. Colombia implied that these vessels discarded small tunas that were crushed (and thus unfit for human consumption), a practice not accurately reflected by the observers. Colombia stressed that it will be important for the IATTC to review and adjust these criteria to avoid confusion. In addition, three Colombian vessels, *Sandra C*, *Sea Gem*, and *Maria Isabella C*, searched for fish and/or deployed or recovered fish aggregating devices in the high seas area during the 2011 closure, in alleged violation of Resolution C-11-01. Given that interpretive differences exist regarding this measure and its application, the United States will work with IATTC and member states to reach consensus on its interpretation.

Ecuador.[19] Ecuador is being identified based on a number of Ecuadorian-flagged vessels that reportedly violated IATTC resolutions in 2011 and/or 2012.

The *Drennec* finned 14 sharks and discarded the rest of the animal in violation of Resolution C-05-03.

The following 11 vessels discarded salt bags or plastic trash at sea in 2011 in violation of Resolution C-04-05: the *Drennec*, *Lucia T*, *Rodolfo X*, *Zalbidea J*, *Monteneme*, *Yolanda L*, *Don Mario*, *Carmen D*, *Rosa F*, *Yelisava*, and *Ugavi Dos*.

On November 28, 2011, the fishing vessel *North Queen* traveled from Manta to Guayaquil without communicating a transit waiver to the IATTC Director, so the IATTC does not know whether Ecuador granted the waiver as required by Resolution C-09-04.

The following seven vessels had interactions with sea turtles in 2011 without fully complying with the provisions of Resolution C-04-05, in that they failed to release the turtles: the *Gloria A*, *Via Simoun*, *Lucia T*, *Malula*, *Esmeralda C*, *Julia D*, and *Guayantuna I*.

In January 2012, the *Julia D* made 13 sets less than a mile from a data buoy, in violation of Resolution C-11-03.

The following 16 vessels discarded tuna in 2011 in violation of Resolution C-11-01: the *Rocio*, *Charo*, *Rosa F*, *Julia D*, *Medjugorje*, *San Andres*, *Rossana L*, *Panchito L*, *Don Ramon*, Via *Simoun*, *Cap. Berny B*, *Pacific Tuna*, *Dona Roge*, *Esmeralda C*, *Sansun Ranger*, and *Ciudad de Portoviego*. A total of 57 sets had discards amounting to a total of 216.1 tons of tuna.

It does not appear that Ecuador has begun investigating seven of the 11 vessels that discarded salt bags, the *North Queen*, the seven vessels that did not release sea turtles, or the *Rocio*. Other cases are still under investigation by Ecuador. Since none of the cases are resolved, Ecuador is being identified.

[19] The sources of information on Ecuadorian fishing activities are the IATTC Compliance Report for 2011 (COR-03-04a Revised) and a letter from Ing. Guillermo Morán V., Deputy Minister of Aquaculture and Fisheries, dated November 7, 2012.

Other Information. In its November response to NMFS, Ecuador included a list of potential infractions from the IATTC Secretariat, including infractions of which NMFS had not been aware. Specifically, the IATTC requested that Ecuador investigate overcapacity issues involving the *Doña Roge* and *Ricky A*, and the *Julia D* and *Sansun Ranger*, for fishing in the "Corralito" area during a closure.

Ghana.[20] Ghana is being identified for failing to manage its fishing vessels consistent with CMMs adopted by ICCAT. The United States is specifically concerned about the following: data reporting and fleet control deficiencies, including data not submitted and data submitted late (Recommendation 05-09); overharvest of species, specifically the record of extensive overharvest of bigeye tuna (Recommendation 11-01); non-compliance with fleet capacity provisions (Recommendations 04-01 and 11-01); and Ghana's failure to implement effective measures to prohibit at-sea transshipments (Recommendation 06-11). With regard to capacity, Ghana needs to phase out two more bait boats or four purse seiners to meet ICCAT capacity-limitation requirements.

While Ghana has prohibited at-sea transshipments, further evidence of the implementation and effective enforcement of these regulations is needed. Ghana has been overfishing bigeye tuna since quotas were first imposed in 2004. ICCAT first identified Ghana for overfishing in 2009. NMFS believes that Ghana needs to show progress in compliance with ICCAT recommendations by implementing the agreed payback plan for the overharvest of bigeye tuna and improving data collection. In addition, improvement in the accuracy of Ghana's catch estimates is required to improve the ICCAT assessment of bigeye tuna stocks.

Other information and fishing activities that did not form the bases of identification. NMFS is also aware of allegations from Liberian authorities that three Ghanaian-flagged vessels were suspected of conducting fisheries-related activities in Liberian waters without proper authorization in 2011 and 2012. Liberia reports that a Ghanaian-flagged, ICCAT-registered purse seine vessel was observed fishing in Liberia's EEZ in November 2012, a violation of ICCAT Recommendation 03-12, which requires that ICCAT Contracting Parties ensure that their vessels do not conduct unauthorized fishing within areas under the national jurisdiction of other States. In addition, Liberia notes that an analysis of automatic identification system tracks from two Ghanaian refrigerated transport vessels suggests unauthorized transshipment activity in Liberian waters in 2011 and 2012, in violation of the ICCAT program for transshipment (Recommendation 06-11). Since these issues are being handled bilaterally between Ghana and Liberia, NMFS is not considering this information as a basis of identification, but will ask Ghana about it during the consultation.

Italy.[21] Italy is being identified for continued driftnet fishing in violation of ICCAT Recommendation 03-04. While Italy has made great progress in reducing illegal driftnetting

[20] The sources of information on Ghanaian fishing activities are the ICCAT Letter of Concern to Ghana, dated February 21, 2012; Ghana's response to the Letter of Concern from the Fisheries Commission in the Ministry of Food and Agriculture, dated October 3, 2012; and a letter from the Liberian Ministry of Agriculture to the Ghanaian Ministry of Food and Agriculture, dated December 5, 2012.

[21] The sources of information on Italian fishing activities are Pew report Doc. No. COC-307/2011 and a letter from Dr. Francesco Saverio Abate, General Director, Maritime Fisheries and Aquaculture, dated November 8, 2012.

practices through enforcement actions against individual vessels and adoption of new laws to better address these activities, at least 18 new infractions were observed during the relevant time period. Several EC inspections in Italy in 2011 noted driftnet infractions of EC and ICCAT regulations. The inspectors found illegal nets on docks and listed a number of vessels either with driftnets or with gear typical of driftnet fishing, including nets longer than permitted and with mesh size larger than permitted. EC inspectors also concluded that logbooks suggested under-reporting and the capture of prohibited species while using driftnets. This information indicates that some vessels are still using longer and larger-mesh nets than the legal limits, in violation of ICCAT Recommendation 03-04.

Italy subsequently investigated and sanctioned the vessels with driftnet violations in 2011, including suspension of fishing licenses. Italy also relayed that during 2011, the Italian Coast Guard performed 69,000 vessel checks (17,000 at sea and 52,000 in port), resulting in documentation of 3,132 infractions (2,668 administrative and 464 criminal), of which 96 related to driftnets. During 2012 (data through October 31, 2012), with half of 2011's financial resources, the Coast Guard performed 42,000 vessel checks (11,000 at sea and 31,000 in port), resulting in documentation of 2,168 infractions (1,881 administrative and 287 criminal), of which 18 related to driftnets. Each violator was fined 4,000€; in 10 cases, suspension of the fishing license for 30 days to 3 months was implemented.

However, concerns remain over the use of driftnets by Italian-flagged vessels. Given that the illegal driftnet use by Italian-flagged vessels has been a long-standing issue, and driftnet violations were again observed during the relevant time period, NMFS is identifying Italy in the 2013 Biennial Report to encourage Italy to end illegal driftnet use and to continue monitoring, surveillance, and control of the Italian fishing fleet.

Other information and fishing activities that did not form the bases of identification. An Italian fishing vessel, the *Santa Maria Carmela Madre*, was seized by the Italian Coast Guard on June 15, 2012, and discovered with 25 tons of bluefin tuna that, according to some accounts, was undersized. The Italian government provided documentation of action taken against the *Santa Maria Carmela Madre*, an official account of the seizure of the fish and purse seines. NMFS understands that fines will be administered (pending judicial decisions). In addition, the maximum number of points possible was imposed on the fishing license. Since the Government of Italy took corrective action against this vessel, it was removed from consideration as a basis for Italy's identification.

Korea (Republic of).[22] The Republic of Korea is being identified for failing to apply sufficient sanctions to deter its vessels from engaging in fishing activities that violate conservation and

[22] The sources of information on Korean fishing activities are CCAMLR-XXX/BG/26 Rev. 1, October 10, 2011; CCAMLR-XXX/BG/38, October 19, 2011; CCAMLR-XXX, ISSN 1031-3184, paragraph 9/13, November 2011; a letter from Joon-suk Kang, Director General of the Distant Water Fisheries Bureau, Ministry for Food, Agriculture, Forestry and Fisheries, dated November 30, 2012; a letter from the Liberian Ministry of Agriculture to the Deputy Director of the Distant Water Fisheries Bureau, dated December 4, 2012; CCAMLR COMM CIRC 12/08, January 13, 2012; CCAMLR COMM CIRC 12/80, July 2, 2012; Report of the Standing Committee on Implementation and Compliance (Hobart, Australia, October 24-26, 2012, advanced copy); and the ICCAT Letter of Concern to the Republic of Korea, February 21, 2012.

management measures required under an international fishery management agreement. Specifically, NMFS is concerned that Korea is not effectively controlling its nine fishing vessels currently authorized to fish in the CCAMLR Convention Area. On February 23 and 24, 2011, the Korean fishing vessel *Insung No.7* set fishing gear in CCAMLR Division 58.4.2 Subarea E. According to a Korean Government investigation, the master set the gear after he knew that the catch limit had already been exceeded. The set resulted in an illegal catch of 35.5 tons of toothfish, estimated by Korea to be worth 710,000 USD, and exceeding the Division's catch limit by 339 percent. Korea imposed a fine of approximately 1,300 USD and a 30-day suspension of the vessel's distant water fishing authorization. Korea also reported that the vessel master's license might be suspended for 30 days.

At the 2011 CCAMLR meeting, however, many delegations, including the United States, were of the view that Korea's sanctions against the operator, vessel, and master were inadequate, given the seriousness of the illegal activity. CCAMLR's Standing Committee on Implementation and Compliance (SCIC) proposed placing the *Insung No. 7* on the Contracting Party IUU Vessel List, but Korea blocked its inclusion. Although Korea agreed at the 2011 CCAMLR meeting to withdraw three of its vessels from the CCAMLR toothfish fishery for the 2011–2012 fishing season as a concession, this decision does not rectify the inadequacy of Korea's enforcement measures to address future violations.

In responses to outreach letters, Korea recognized the need for a stronger mechanism for administrative sanctions against its vessels engaged in IUU fishing. The Government of Korea further indicated that it is currently undertaking amendment of the relevant law to strengthen sanctions against IUU fishing activities. Korean officials expect the amendment will be promulgated during the first half of 2013. In reviewing the text of Korea's proposed amendment, NMFS is concerned that the potential new sanctions are insufficient to deter IUU fishing activities.

For example, NMFS believes that the pending amendment raising the maximum fine for a third violation from approximately 4,660 USD to 18,450 USD by itself is not enough of a disincentive to discontinue such profitable illegal activity. This is particularly relevant as NMFS understands that in the case of the *Insung No. 7* the vessel owner was allowed to retain the 710,000 USD in proceeds from the illegal harvest. The pending amendment does not appear to give Korea the ability to seize the illegal catch or its proceeds. In contrast, a U.S. fishing vessel charged with a similar violation would be subject to more stringent sanctions, including seizure of the illegal product or its proceeds. Thus, even if the pending amendment takes effect, it will most likely be insufficient to deter Korean vessels from violating measures adopted under an international fisheries management agreement.

Given Korea's current lack of ability to effectively control its fishing vessels authorized to fish in the CCAMLR Convention Area, the minimal sanctions it places on vessels found to be conducting IUU fishing, and the CCAMLR allegations described above, NMFS is identifying Korea. During the subsequent consultation, NMFS will encourage Korea to take stronger actions against IUU fishing activities, including passage of legislation to employ stronger sanctions.

Other information and fishing activities that did not form the bases of identification. On December 4, 2011, New Zealand CCAMLR inspectors boarded the Korean vessel the *Hong Jin 701* while in the CCAMLR Convention Area. Two violations were alleged: failure to mark

buoys and similar objects floating on the surface (CM 10-01), and failure to carry a license and make it available for inspection (CM 10-02). In July 2012, the *Hong Jin 701* was included on the Draft Contracting Party IUU Vessel List for consideration by the Commission.

The Republic of Korea advised CCAMLR that it had undertaken a thorough investigation and concluded that correct marking of fishing gear aboard the *Hong Jin 701* had been completed. It also reported that the allegation about failure to provide the license had been the result of miscommunication between the inspectors and the vessel's master. The master provided a copy of the license in Korean; however, the inspector did not understand the Korean language and reported that there was no fishing license on board the vessel. Thus, the *Hong Jin No. 701* was not included in the vessel list forwarded to the Commission.

CCAMLR's SCIC, reviewing information relating to transshipment reports during 2011–2012, noted that a Korean vessel had failed to provide 14 transshipment reports, in violation of CM 10-09, paragraph 2. Korea responded to SCIC that it had no intention of not complying with the conservation measure and ensured that an issue such as this would not happen again. Since Korea is working within CCAMLR to resolve this issue, NMFS is not considering this information as a basis of identification, but will ask Korea about it during the consultation.

NMFS is also aware of allegations from Liberian authorities that Korean-flagged vessels were suspected of fishing in Liberian waters without proper authorization in 2011 and 2012. Liberia reports a Korean-flagged, ICCAT-registered purse seine vessel was observed fishing in Liberia's EEZ in November and December 2011, and again in February to May 2012, in violation of ICCAT Recommendation 03-12. Since these issues are being handled bilaterally between Korea and Liberia, NMFS is not considering this information as a basis of identification, but will ask Korea about it during the consultation.

NMFS noted reports from the 2011 ICCAT meeting that Korean nationals may have been involved in the at-sea transshipment of Atlantic tropical tunas harvested by large-scale purse seine vessels operating in the Gulf of Guinea. Such transshipments are prohibited by Recommendation 06-11, which stipulates that only longline vessels under special conditions may engage in at-sea transshipment operations. Korea has an obligation under Recommendation 06-14 to investigate reports that its nationals may be engaged in IUU fishing activities (as defined in Recommendation 11-18) and to take appropriate action in response to any verified IUU fishing activities. In addition, ICCAT requires that its members provide timely reports to the Commission of such investigations and any actions that result. These matters were also highlighted in the Letter of Concern sent by ICCAT to Korea in 2011.

Regarding this matter, the Korean Government explained that it officially warned the person in question not to be engaged in IUU fishing activities. The Korean government investigated the individual and the company allegedly involved in the illegal at-sea transshipment, and has the legal authority to take measures against those who are implicated in IUU fishing activities, including revocation or suspension of relevant licenses and authorizations.

Mexico.[23] **IUU Fishing Identification.** Mexico is being identified for IUU fishing based on the activities of several Mexican-flagged fishing vessels that reportedly violated IATTC resolutions in 2011 and/or 2012. These violations include one vessel, the *Atún VII*, which finned sharks and discarded the carcasses at sea, in violation of Resolution C-05-03. Eight Mexican vessels discarded salt bags or plastic trash at sea, violating Resolution C-04-05: the *Atún VII*, *Azteca 5*, *Bonnie*, *Buenaventura I*, *Cartadedeces*, *Chac Mool*, *Maria Luisa*, and *Nair*. Five vessels (the *Arkos I Chiapas*, *Atún VI*, *Azteca 10*, *Azteca 2*, and *Maria Rosana*) violated sea turtle bycatch mitigation measures by failing to release turtles, in violation of Resolution C-04-05. The *Nair II* and *El Dorado* discarded tuna in violation of Resolution C-11-01; a total of four sets had discards amounting to 7 tons of tuna.

Mexico reports the allegations against these vessels are currently under investigation by the competent administrative authority, which will apply corresponding sanctions as necessary. Mexico, however, did not provide further information on the status of the investigations and is therefore being identified.

Other fishing activities that did not form the bases of the IUU fishing identification. Eight Mexican vessels transited without communicating a transit waiver to the IATTC Director, so the IATTC did not know whether Mexico had granted the waivers per Resolution C-09-04. Mexico confirmed that these vessels had authorization to transit during the off season; the information was sent to the IATTC Director. These transits did not contribute to the bases of identification for IUU fishing.

Bycatch of PLMRs Identification. Mexico is the first nation identified under the Moratorium Protection Act for PLMR bycatch. In 2012, its vessels engaged in bycatch of a shared PLMR without a regulatory program that is comparable in effectiveness to that of the United States. Specifically, 438 loggerhead sea turtles stranded, dead, along 43 kilometers of the shoreline of Playa San Lazaro, Baja California Sur in July and August 2012, according to Mexican Wildlife Law Enforcement. In October 2012, the Mexican Fisheries Research Institute published a report on bycatch reduction trials in the gillnet fishery in Baja California Sur. During six days of research trials, 88 loggerhead sea turtles were captured, indicating that local fleets likely have high bycatch rates. Considering the outcomes of this study, the absence of any harmful algal blooms or pollution incidents in the area at that time, and other available evidence, the United States believes bycatch from the gillnet fishery is the cause of the July strandings. More alarming, based on previous research studies, the 438 turtles that stranded are likely indicative of

[23] The sources of information on Mexican IUU fishing activities are the IATTC Compliance Report for 2011 (COR-03-04a Revised); a letter from Lic. José Guadalupe Trujillo Jimenez, Director General, Office of Planning, Programming, and Evaluation, National Commission on Aquaculture and Fishing, dated November 1, 2012; the INAPESCA 2012 technical report “A Biotechnological Evaluation of Alternative Fishing Methods in the Coastal Fishery of the Gulf Of Ulloa B. C. S. to Avoid Accidental Capture of Non-Target Species. Preliminary Actions”; the news article "Loggerhead turtle deaths up dramatically off Baja Mexico --report," E&E News PM, November 15, 2012, by Laura Petersen found at http://www.eenews.net/eenewspm/2012/11/15/archive/9?terms=loggerhead; and the SEMARNAT Internal/External Meetings Report on Loggerhead Sea Turtle Caretta caretta in Baja California Sur, October 26, 2012.

a much larger number of turtles that drowned due to entanglement but that did not subsequently wash up on shore.

NMFS contacted the Government of Mexico immediately after learning of this stranding event in early December 2012, to request more information on the event and on Mexico's regulatory program for the management of bycatch of loggerhead sea turtles in the gillnet fishery. Mexico sent a detailed response to NMFS on its fisheries management authority, but did not include explicit information on regulatory measures to address this specific bycatch issue. NMFS believes that the regulations Mexico provided are not comparable in effectiveness to U.S. regulations for bycatch of North Pacific loggerheads. The Hawaiian long-line fleet is one of the major fleets in U.S. waters that interact with North Pacific loggerheads, which NMFS recently listed as endangered under the ESA. This fleet is required to have 100 percent observer coverage, and the fishery is closed after only 34 interactions with turtles. NMFS does note that other Mexican agencies besides the fisheries authority have been engaged in loggerhead conservation efforts, including convening stakeholder meetings as well as conducting ongoing research. These agencies, however, have no authority to manage the target fishery, and thereby are unable to end or reduce the bycatch in question.

Panama.[24] Panama is being identified because several Panamanian-flagged vessels reportedly violated IATTC resolutions in 2011 and/or 2012. The *Delia* finned a shark and discarded the carcass prior to the point of first landing, in violation of Resolution C-05-03. Three vessels (the *Delia*, *Connie Jean Two*, and *El Marquez*) discarded salt bags or plastic trash, in violation of Resolution C-04-05. The *Contadora I* and *Delia* discarded tuna in violation of Resolution C-11-01; a total of 14 sets had discards amounting to 22.8 tons of tuna.

Panama stated that the *Connie Jean Two* and *Delia* are currently involved in judicial processes. An administrative proceeding was opened on the *Connie Jean Two* on July 5, 2012, and is in the evidentiary stage. A preliminary investigation of the *Delia* resulted in charges being filed on July 5, 2012, although it is unclear whether they cover all three allegations against the vessel; the proceeding is in the evidentiary stage. No information was received on investigations of the *Contadora I* and *El Marquez*.

Since two cases remain open (*Connie Jean Two* and *Delia*) in Panama's judicial process, and the status of the two others (*Contadora I* and *El Marquez*) are unknown, Panama is being identified.

Other information and fishing activities that did not form the bases of identification. The *Chung Kuo 242*, *Gilontas 168*, and *Gilontas 777* were accused of fishing in the EPO while not listed on the Regional Vessel Register. Panama informed NMFS that these vessels had reflagged to Fiji or Vanuatu. Since these vessels are no longer flagged to Panama, they do not form part of the basis of identification.

[24] The sources of information on Panamanian fishing activities are the IATTC Compliance Report for 2011 (COR-03-04a Revised) and a letter from Giovanni Lauri, General Administrator, dated December 10, 2012.

Spain.[25] Spain is being identified because two Spanish-flagged vessels engaged in fishing activities that violated CMMs required under an international fishery management agreement. One vessel allegedly violated NAFO conservation and enforcement measures; the other, an IATTC conservation and management recommendation. Spain is currently investigating both vessels.

On February 3, 2012, Canadian NAFO inspectors boarded the *Pescaberbes Dos* in Division 3L of the NAFO Regulatory Area and reported that approximately 134.7 tons of product was not labeled, as required by NAFO measures (Chapter IV, Article 24.1), and that approximately 30.2 tons of Greenland halibut product was not marked as having been harvested in NAFO Subarea 2 and Divisions 3KLMNO, a separate requirement (Chapter IV, Article 24.1). Spanish inspectors confirmed the violation related to the labeling of boxes. Spain explained that initial infringement proceedings against the vessel's owner have begun.

On August 18, 2011, the *Albacora Uno* allegedly discarded a ton of skipjack tuna in violation of IATTC Resolution C-11-01, which requires vessels to retain all catch of skipjack tuna. Spain is seeking information to determine the accuracy of the allegation. Spain notes everything to date seems to indicate the alleged violation did in fact take place. If so, Spain says appropriate sanctions will be put in place after official proceedings conclude.

Since the proceedings against the *Pescaberbes Dos* and *Albacora Uno* are not resolved, Spain is being identified.

Other information and fishing activities that did not form the bases of identification. The *Pescaberbes Dos* was boarded on April 24, 2011, in Division 3M, by Canadian NAFO inspectors who reported that the vessel had an improper stowage plan, an infringement of NAFO measures. According to follow-up information provided to the NAFO Secretariat, this apparent infringement was not confirmed during a port inspection in Vigo, Spain because the stowage plan submitted to national inspectors properly indicated the location and amount of each species; the case was closed.

On June 25, 2012, Canadian NAFO inspectors boarded the *Patricia Sotelo* in Division 3N of the NAFO Regulatory Area and reported a discrepancy between recorded redfish catch and the amount of redfish actually held on board the vessel. Spain's investigation, after full weighing of the cargo, found no discrepancies between the amount of redfish declared and the amount found in the hold. EC and Canadian inspectors participated in the port inspection. Spain maintains the at-sea inspection was improperly carried out.

[25] The sources of information on Spanish fishing activities are a report by Canadian NAFO inspectors (available online at http://www.dfo-mpo.gc.ca/international/mcs-citations-eng.htm); a letter from Carlos Dominguez Diaz, Secretary-General of Fishing, Department of Agriculture, Food, and the Environment, dated November 6, 2012; the IATTC Compliance Report for 2011 (COR-03-04a Revised); Apparent NAFO Infringements and Disposition in 2011, April 2012; and reports available online at http://www.stopillegalfishing.com/sifnews_article.php?ID=85 and http://www.stopillegalfishing.com/sifnews_article.php?ID=82.

On April 5, 2012, Mozambican fisheries inspectors boarded the *Doniene* and allegedly found evidence that the vessel had fished in Liberian waters without proper authorization between September 2011 and January 2012, in violation of ICCAT Recommendation 03-12, which requires that ICCAT Contracting Parties ensure that their vessels do not conduct unauthorized fishing within areas under the national jurisdiction of other States. In addition, the master of this vessel allegedly did not cooperate with fisheries officers from the Ivory Coast during an inspection in February 2012, in violation of ICCAT Recommendation 97-10.

Spain investigated the allegations and found irregularities, but determined the irregularities were not the fault of the vessel. Spain explained that Liberian authorities, at some point, had notified the EC that the *Doniene* had been fishing in the Liberian EEZ during 2011, using a license obtained in a fraudulent manner. In the course of Spain's investigation, the owner of the *Doniene* provided documentation that Liberia had decided to validate the vessel's licenses retroactively for 2011 and 2012. A press release issued by the Liberian Government, dated August 23, 2012, confirms the negotiated settlement of the case. The allegation of the master's failure to cooperate, Spain explained, was based on the master's refusal to allow original documents to be removed from the vessel, but he did show the documents to the inspectors. This issue has now been resolved through the cooperation of the Spanish and Liberian Governments.

Lastly, a Singaporean inspection report alleges three Spanish nationals were documented as senior officers aboard the *Pion*, a Honduran-flagged vessel listed on the CCAMLR Non-Contracting Party IUU Vessel List. CCAMLR Conservation Measure 10-08 requires Contracting Parties to take appropriate measures to verify whether any of their nationals are engaged in, responsible for, or benefiting from IUU fishing activities, and to take appropriate action in response to any such verified activities. In its response to NMFS' request for additional information, the Spanish Government explained it is vigorously investigating these allegations, including through extensive international consultations. Spain stated that it will proceed to apply appropriate sanctions on these citizens once roles have been verified.

Tanzania.[26] Tanzania is being identified because four of its vessels undermined the effectiveness of CCAMLR conservation measures. All four vessels are currently listed on the CCAMLR Non-Contracting Party IUU Vessel List. Information obtained by the United States suggests that these vessels may have engaged in IUU fishing in 2012. The *Wutaishan Anhui 44*, listed in 2008, was observed inside CCAMLR Division 58.4.1 on January 20, 29, and 30, 2012, apparently flagged by Tanzania (Zanzibar). During the January 20 incident, this vessel contacted a CCAMLR-authorized fishing vessel concerning their fishing lines being entwined, thus indicating the *Wutaishan Anhui 44* was fishing in the Convention Area. This vessel was observed by Australian authorities on April 24, 2012, in the vicinity of Christmas Island, northwest of Australia, still flagged by Tanzania with the same external markings. French authorities then sighted this vessel hauling unmarked bottom-set gillnet in CCAMLR Subarea 58.6 on July 3, 2012. This time, the vessel was displaying the name *Huiquan* and a different international radio call-sign, still claiming Tanzanian registry with a homeport of Zanzibar.

[26] The sources of information on Tanzanian fishing activities are CCAMLR COMM CIRCs 12/21 (February 9, 2012), 12/28 (February 24, 2012), 12/30 (February 27, 2012), 12/40 (April 11, 2012), 12/77 (June 24, 2012), 12/92 (July 30, 2012); and the CCAMLR Non-Contracting Party IUU Vessel List (CM 10-07) 2003-2013.

Australian authorities note that this vessel has a long history of association with IUU fishing under other names including the *Yangzi Hua 44, Paloma V*, and *Trosky*.

The *Shaanxi Henan 33*, placed on the vessel list in 2004, was observed by Australian authorities on May 16, 2012, in the vicinity of Christmas Island, apparently flagged by Tanzania (Zanzibar). Australian authorities note that, while this sighting was outside the Convention Area, this vessel has a long history of association with IUU fishing inside the Area, and continues to undermine conservation measures established by CCAMLR.

The *Huang He 22*, placed on the vessel list in 2003, was observed by Australian authorities on April 1, 2012, in the vicinity of Christmas Island, displaying international radio call sign 5IM487, which is a Tanzanian-allocated call sign. French authorities sighted this vessel in CCAMLR Subarea 58.6 on July 1, 2012. At the time of the sighting, the vessel was underway with fishing gear visible on the deck and displaying the same external markings as before. Australian authorities note that this vessel has been sighted on four occasions since 2004 and suspected of violating CCAMLR conservation measures. This vessel has been listed on the IUU vessel list under nine other names: the *Corvus, Galaxy, Ina Maka, Black Moon, Red Moon, Eolo, Thule, Magnus* and *Dorita*. This vessel is also reported as having been flagged to the Democratic People's Republic of Korea, Panama, Sierra Leone, Equatorial Guinea, Saint Vincent and the Grenadines, and Uruguay.

The refrigerated cargo vessel *Baiyangdian* was observed inside CCAMLR Division 58.4.1 area on January 28, 2012. Inconsistencies between information provided by the captain and other sources, as well as the captain's lack of willingness to communicate with Australian authorities, raised concerns that the vessel may have been engaged in IUU fishing by supporting vessels suspected of IUU fishing activities in the CCAMLR Convention Area. These concerns were reinforced when this vessel was observed on April 1, 2012, under tow by the CCAMLR-listed IUU vessel *Huang He 22* in the vicinity of Christmas Island. As a result, the vessel was added to the CCAMLR IUU vessel list in accordance with Conservation Measure 10-07.

Venezuela.[27] Records from the IATTC indicate a number of Venezuela's fishing vessels reportedly violated IATTC resolutions in 2011. These violations include two vessels (the *Ventuari* and *Cayude*) that finned sharks and discarded the carcasses at sea, in violation of Resolution C-05-03. The *Don Francesco, La Rosa Mistica*, and *Taurus I* discarded salt bags or plastic trash at sea, in violation of Resolution C-04-05. The *Don Francesco* and *Curimagua* violated sea turtle bycatch mitigation measures by failing to release turtles, in violation of Resolution C-04-05. The *La Rosa Mistica, Amazonas,* and *Canaima* illegally discarded tuna, in violation of Resolution C-11-01, in a total of six sets amounting to 25 tons of tuna.

Other information and fishing activities that did not form the bases of identification. Six vessels searched for fish and/or deployed or recovered fish aggregating devices in the high seas area during the 2011 closure, in violation of Resolution C-11-01: the *Falcon, Cayude, Orinoco II*, *Curimagua*, *Ventuari*, and *Canaima*. Given that interpretive differences exist regarding this

[27] The source of information on Venezuelan fishing activities is the IATTC Compliance Report for 2011 (COR-03-04a Revised).

measure and its application, the United States will work with IATTC and member states to reach consensus on its interpretation.

3. Nations and Fishing Entities "of Interest" Not Identified

Guatemala.[28] IATTC Records indicate a number of Guatemala's fishing vessels may have violated IATTC resolutions in 2011. Eight longline vessels are alleged to have fished in the EPO without being on the Regional Vessel Register, and one vessel is alleged to have transited without submitting a transit waiver to the IATTC Director.

The eight longline vessels that allegedly fished in the EPO without being on the Regional Vessel Register in violation of Resolution C-11-05 are: the *Anthony, Buen Samaritano, Capitan Caleb, Cylberik, El Pescador, Fernando, Henry*, and *Santidad y Poder*. Guatemala responded that it does not consider the fishing activities of these vessels to be within the authority of the Convention because none of the vessels exceeds 24 meters in total length, so they should not be subject to Resolution C-11-05. Further, Guatemala clarified that these vessels are licensed only for dorados and sharks.

On December 10, 2011, the *La Peña* traveled from Manta to Guayaquil without communicating a transit waiver to the Director. NMFS understands that Guatemala conducted an administrative process against the vessel resulting in a sanction that was communicated to the IATTC Secretariat on March 28, 2012. Although the vessel made a continuous transit without fishing, it was fined approximately 2,500 USD for failure to apply for a transit exemption.

Since Guatemala sanctioned the *La Peña* for transiting without a waiver and explained that the longline vessels are not required to be included on the Regional Vessel Register because of their length and licensure, Guatemala is not being identified.

Japan.[29] Reports indicate that two vessels flagged to Japan may have engaged in IUU fishing activities during 2011 or 2012. On April 17, 2012, the *Daito Maru No. 8* was observed working gear and retaining catch inside the Cape Verde EEZ without proper authorization, in violation of ICCAT Recommendation 03-12. Cape Verdean maritime officials, operating from the *USS Simpson* and supported by a USCG law enforcement detachment, boarded the vessel, which was actively engaged in fishing and targeting tuna east of Fojo Island, Cape Verde. The boarding team found 15,000 pounds of illegal catch on board. Japan explained that the vessel had proper authorization to fish tuna species, but noted the authorization did not allow retention of other species. Cape Verde later released the vessel with a warning since it was the vessel's first offense. Japan determined the cause of the allegation stemmed from confusion regarding Cape Verde's legal requirement mandating vessels have authorization to retain all species. To prevent a recurrence of this situation, the Japan Tuna Fisheries Association and the Cape Verdean

[28] The sources of information on Guatemalan fishing activities are the IATTC Compliance Report for 2011 (COR-03-04a Revised) and a letter from Dr. Fraterno Díaz Monge, Director of Fisheries and Aquaculture Regulation, Ministry of Agriculture, Livestock and Nutrition, dated October 31, 2012.

[29] The sources of information on Japanese fishing activities are e-mail correspondence from the USCG, 17 APR – AMLEP – JA F/V Seizure in CV EEZ, April 17, 2012; a letter from Masanori Miyahara, Deputy Director General, Fisheries Agency, dated December 12, 2012; CCAMLR-XXXI/BG/06, September 24, 2012; and WG-SAM-12/06, June 20, 2012.

Government concluded a contract on August 2, 2012, which stipulates that the amount of by-catch species may not exceed 15 percent of total catch.

According to CCAMLR records, the *Shinsei Maru No.3* did not meet the minimum separation distance for research hauls while operating in Small-scale Research Unit 48.6E, a potential violation of Conservation Measures 41-04 and 41-01. Japan's investigation concluded there were two instances where research hauls in the area apparently did not meet the minimum separation distance of 3 nautical miles. One instance was due to a data entry error, which will be corrected when Japan submits the proper information to the CCAMLR Secretariat. The other incident related to a separation distance of 2.87 nautical miles, which Japan considered to be an honest mistake with no malicious intent. As such, Japan did not deem this a serious violation requiring punitive action in accordance with Japanese law.

In summary, Japan put measures in place to prevent a recurrence of the situation regarding the catch of non-target species in the EEZ of Cape Verde, in compliance with ICCAT Recommendation 03-12. Japan also explained that one research haul within the CCAMLR Convention Area was improperly recorded. As Japan had only one potential vessel for identification (the *Shinsei Maru No.3*) and has either provided information refuting allegations or taken appropriate corrective action to address all other reported IUU fishing activities, it is not being identified in the 2013 Biennial Report to Congress.

Russian Federation.[30] RFMO records indicate that three vessels flagged to the Russian Federation engaged in IUU fishing activities during calendar year 2011. Two vessels allegedly violated conservation and enforcement measures of NAFO and one vessel allegedly violated conservation measures of CCAMLR.

On March 6, 2011, Canadian NAFO inspectors boarded the *Severnaya Zemlya* in Division 3O of the NAFO Regulatory Area and reported that the vessel had previously conducted a directed fishery for a species for which bycatch limits apply (cod in Division 3L), an infringement of NAFO's conservation measures. Russia's response was that the trawl in question, although set in Division 3L, had not made contact with the seabed in 3L; the trawl hauling itself took place exclusively in Division 3M, which was open for cod fishing. Nonetheless, Russia issued "strong written warnings" for the activity characterized by Russia as an "indirect violation."

On May 21, 2011, Canadian NAFO inspectors again boarded the *Severnaya Zemlya*, this time in Division 3N of the NAFO Regulatory Area, and reported that the vessel had improperly labeled product. Russia responded that the product was stacked in a way that exposed some of the labels to contact with crew members' clothing and footwear, resulting in partially rubbed-off markings on only ten bags.

On December 27, 2011, Canadian NAFO inspectors boarded the *Novaya Zemlya* in Division 3L of the NAFO Regulatory Area and reported that, while fishing redfish and Greenland halibut,

[30] The sources of information on Russian fishing activities are a report by Canadian NAFO inspectors (available online at http://www.dfo-mpo.gc.ca/international/mcs-citations-eng.htm); a letter from A.V. Fomin to O.V. Rykov in response to a letter from NMFS; CCAMLR COMM CIRC 12/11, January 18, 2012; CCAMLR COMM CIRC 12/80, July 2, 2012; and the Report of the Standing Committee on Implementation and Compliance (Hobart, Australia, October 24-26, 2012), advanced copy.

2.052 tons of cod had been caught and retained on board. The inspectors noted that the Russian Federation had closed its 3M cod fishery on April 22, 2011, making retention of cod a violation of NAFO measures. Russia's response asserted that the cod retained was less than the 5 percent bycatch allowed both in individual trawls and in total amounts. The vessel had changed fishing positions to avoid bycatch, as required by NAFO rules. Russia ordered the ship owners to adopt additional measures to minimize the risk of bycatch, but pointed out that there is no consensus among NAFO Parties as to allowable bycatch on board after directed fishing is closed.

On December 3, 2011, New Zealand CCAMLR inspectors boarded the *Chio Maru No. 3* while in Subarea 88.1B of the CAMLR Convention Area. Two violations were alleged: failure to mark buoys and similar objects floating on the surface (CM 10-01) and discharge of offal (CM 26-01). As of July 2012, the *Chio Maru No. 3* had been included on the Draft Contracting Party IUU Vessel List for consideration by the Commission. Russia has advised that it has taken action to prevent a recurrence of the alleged violations: the vessel will not be permitted to fish in the Convention Area in 2012-2013, and the offal grinding machinery has been decommissioned. The CCAMLR Standing Committee on Implementation and Compliance removed the *Chio Maru No. 3* from the draft IUU vessel list. Russia did provide notification of another vessel intending to operate in place of the *Chio Maru No. 3*, but NMFS has found no documented ownership ties between the *Chio Maru No. 3* and the Russian vessel replacing it in the fishery.

Other Information. Lastly, a Singaporean inspection report alleges two Russian nationals were documented as senior officers aboard the *Pion*, a Honduran-flagged vessel listed on the CCAMLR Non-Contracting Party IUU Vessel List. CCAMLR Conservation Measure 10-08 requires Contracting Parties to take appropriate measures to verify if any of their nationals are engaged in, responsible for, or benefiting from IUU fishing activities, and to take appropriate action in response to any such verified activities. Russia provided information concerning the two Russian nationals alleged to be senior officers aboard this vessel. Russia emphasized the information provided by Singapore does not allow for positive identification of crew members. Russia states it intends to review the information and take necessary measures in every case of confirmed violations in accordance with Russian laws.

Russia is not being identified because it took appropriate corrective action against the vessel found with violations in the CCAMLR Convention Area. In addition, Russia provided information refuting the allegations made against the two vessels in the NAFO Convention Area.

South Africa.[31] Records from CCAMLR indicate that two vessels flagged to South Africa may have violated CCAMLR Conservation Measures in 2011 or 2012.

Occasional incidents of the disposal at sea of inorganic waste were reported from observers on the *El Shaddai* and *Koryo Maru No. 11*, in violation of Conservation Measure 26-01. Hooks

[31] The sources of information on South African fishing activities are the Report of the Standing Committee on Implementation and Compliance 2012; CCAMLR-XXXI/BG/06, September 24, 2012; WG-SAM-12/06, June 20, 2012; and a letter from Pheobius Mullins, Assistant Director, Pelagic and High Seas Fisheries Management, dated December 12, 2012.

were also observed in the offal discarded from the *El Shaddai*, as well as the disposal of fishing gear at sea. The *El Shaddai* and *Koryo Maru No. 11* also allegedly failed to comply with all of the requirements of Conservation Measure 25-02 to minimize the incidental mortality of seabirds in longline gear. It was reported that the *El Shaddai* did not use a bird exclusion device during hauls in Subareas 58.6 and 58.7. The *Koryo Maru No. 11* reportedly had streamer lines shorter than the required length and did not achieve the required tag overlap statistic per Conservation Measure 41-01. Nor did this vessel meet the required ratio of one research haul to three commercial hauls while operating in SSRU 58.4.1G, nor meet the minimum separation distance for research hauls while operating in SSRU 48.6D and 48.6G. These are potential violations of Conservation Measures 41-01, 41-04, and 41-11.

South Africa explained that it immediately informed the vessels that their licenses would be revoked or suspended if further infringements were noted. South Africa's Department of Agriculture, Forestry, and Fisheries mandated full briefing and debriefing meetings with the operators of these vessels to keep them abreast of applicable conservation measures. The Department also designed a compliance adherence reporting form that includes all the CCAMLR Conservation Measures addressing waste disposal, seabird mitigation measures, and general fishing operations. By mandate, this form is to be completed and submitted weekly by the National Scientific Observer to the Department to ensure that the vessels fully adhere to CCAMLR Conservation Measures.

South Africa is not being identified because it took appropriate measures to prevent future IUU fishing activities.

Taiwan.[32] USCG boarding and inspection reports on four fishing vessels registered to Taiwan and fishing in the WCPFC Convention Area noted that the vessels failed to maintain sufficient records of catch and catch-related data. Based on the reports on the *Horng Yih Fwu 368, Jia Feng Tsair*, *Shin Yu Fu No. 26*, and *Kuen Fa Chen 888*, all of which indicated the vessels did not maintain sufficient records of catch and catch-related data, the United States requested that Taiwan provide details or copies of its laws or regulations that specify the requirements for maintaining catch and catch-related data.

Taiwan is not being identified because it took appropriate corrective actions to address all of the above described IUU fishing activities. Taiwan investigated and provided information on sanctions placed on the *Horng Yih Fwu 368*, *Shin Yu Fu No. 26*, and *Kuen Fa Chen 888*. The vessels' fishing licenses and the masters' professional licenses were suspended for 2 to 4 months. According to Taiwan, it has not received an official notice regarding the *Jia Feng Tsair*. The sanctions placed on the vessels and masters demonstrate Taiwan's commitment to ensuring that its vessels maintain sufficient records of catch and catch-related data per its regulations. In addition, Taiwan demonstrated that its regulations pertaining to vessels catching tuna and tuna-like species are adequate to comply with WCPFC measures, and include requirements for maintaining catch and catch-related data, as well as sufficient penalties for violations.

[32] The source of information on Taiwanese fishing activities is a letter from James Sha, Director General, Fisheries Agency, Council of Agriculture, dated November 14, 2012.

Taiwan also explained that it regularly holds professional training workshops focused on completing logbooks, carrying valid fishing permits, and maintaining operational VMS. Taiwan noted it has held seven professional training workshops, attended by more than 250 fishing vessel masters or owners, since September 2012.

B. Certifications

NMFS identified six nations in the 2011 Report to Congress as having vessels engaged in IUU fishing activity: Colombia, Ecuador, Italy, Panama, Portugal, and Venezuela. Each incident of IUU fishing involved an alleged violation of the rules of an international fishery management organization in 2009 or 2010. Under Section 609 of the Moratorium Protection Act, the Secretary of Commerce must certify biennially in the Report to Congress whether an identified nation has taken appropriate corrective action to address the activities for which it has been identified. A positive certification means that a nation has provided documentary evidence that appropriate corrective action has been taken to address the IUU fishing activities for which it was identified. A negative certification means that a nation has not taken sufficient steps to warrant receipt of a positive certification. Under a negative certification, the United States may take certain measures, including prohibiting imports of certain fish or fish products from that nation and denying that nation's fishing vessels port privileges and entry into navigable waters of the United States. The NOAA Assistant Administrator for Fisheries has been delegated the authority to make those determinations.

After notifying the six nations of their identifications early in 2011, the U.S. Government consulted extensively with those governments, through face-to-face meetings, teleconferences, and correspondence, through late 2012. The six governments provided information that falls into several categories:

- For each of the acknowledged violations, the nations took punitive action against the vessels or persons (captains or vessel owners) involved. The sanctions included fines, revocation of licenses, and forfeiture of catch and gear. For example, Colombia denied renewal of the fishing licenses for the two vessels fishing in the IATTC Convention Area without being on the Regional Vessel Register, and Panama instituted substantial fines against two of its vessels found to be violating IATTC measures.

- As applicable and pertinent, the nations produced documentation of laws and regulations designed to combat IUU fishing, including measures that had recently been enacted or amended to give the nations more authority over their fishing fleets. For example, Italy passed a decree to help combat IUU fishing activities, including illegal driftnet use, by providing for stricter penalties and immediate suspension of the fishing license.

- In a few instances, nations did not provide evidence disputing the allegations of violations by their vessels in time to prevent their identification in the 2011 Report to Congress, but during the consultation period offered credible evidence and explanations, based on investigations, that the vessels had not actually violated international measures.

The rest of this section sets out in detail the information supplied by the identified nations about corrective actions taken – including penalties, withdrawal of fishing authorizations, and new

fisheries management laws adopted – and NMFS' positive certification decisions for each nation. This process, as in past cycles of identifications and certifications, is continuing to work as Congress intended: it is promoting compliance with international fisheries measures

1. Colombia

Bases for 2011 Identification. Colombia was identified in 2011 because several of its vessels fished in a manner that violated CMMs of the IATTC during calendar year 2009. According to the IATTC's Compliance Report, Colombian-flagged vessels did not adhere to the IATTC purse seine closure periods in place for tuna conservation in 2009 because Colombia had instituted a modified version of the closure period, which included Individual Vessel Closures of 49 days for Class 6 vessels. This violated IATTC Resolution C-09-01, which states that all purse seiners must stop fishing in the EPO for a period of 59 days during one of two specified periods in the 2009 fishing season. This resolution also requires applicable vessels to be in port during the closure or carry an observer from the On-Board Observer Program if the vessel was in transit during the closure.

In addition, two vessels flagged to Colombia fished in the IATTC Convention Area in 2009 and 2010 without being on the IATTC Regional Vessel Register, in violation of IATTC Resolutions C-00-06 and C-02-03. Resolution C-00-06 requires that any vessel fishing for tuna and tuna-like species in the EPO must be included on the IATTC Regional Vessel Register. Resolution C-02-03 establishes national capacity limitations in the purse seine fishery and requires that any active purse seine vessel be included on the Regional Vessel Register and be within these capacity limits. The *Marta Lucia R* made four trips and the *Dominador I* six trips in 2009 without being on the IATTC Regional Vessel Register, because the capacity currently allocated to Colombia by the IATTC is not sufficient to accommodate these vessels.

Notification and Consultation. Colombia was notified through a diplomatic note from DOS, dated January 11, 2011, and a letter from Russell Smith, NOAA's Deputy Assistant Secretary (DAS) for International Fisheries, dated January 10, 2011, regarding its identification as a nation whose vessels engaged in IUU fishing activity. The Ministry of Foreign Affairs and Ministry of Agriculture and Rural Development were the primary entities within the Republic of Colombia involved in the consultation. The following lists the key communications between Colombia and the United States during the consultation:

- U.S. and Colombian government officials initially met via video conference to discuss the illegal activities of the Colombian vessels identified in the 2011 Report to Congress on March 4, 2011.

- The Republic of Colombia provided written information to NMFS on March 22 and December 28, 2011.

- U.S. and Colombian officials met several times throughout 2011 and 2012, often on the margins of IATTC meetings. U.S. and Colombian government officials met at the Colombian Embassy in Washington, D.C., on November 15, 2011, to discuss Colombia's efforts to address its capacity issues within IATTC with Vice Minister Patti Londoño.

- The U.S. Government sent a preliminary certification letter to Colombia on October 2, 2012, stating that a negative certification would be issued to Colombia unless it could demonstrate that appropriate corrective action had been taken regarding the two vessels fishing without authorization in the IATTC Convention Area. The Colombian Ambassador to the United States responded to the preliminary certification letter on November 8, 2012, stating that the Government of Colombia had revoked the fishing authorizations of the *Marta Lucia R* and *Dominador I* and supplied the decrees documenting this action.

Fisheries Management Measures. Other actions taken by the Government of Colombia include:

- The Colombian Institute for Rural Development (INCODER) adopted a resolution for tuna conservation for 2010 that reflected 2010 closure requirements of IATTC Resolution C-09-01. INCODER subsequently adopted a resolution for tuna conservation for 2011 that reflected the closure requirements of IATTC Resolution C-11-01, which establishes IATTC requirements for tuna conservation for 2011–2013.

- Colombia passed Decree No. 4181 of 2011 on November 3, 2011, which created the National Authority of Aquaculture and Fisheries (AUNAP). The decree transfers authority over fisheries and aquaculture, as well as activities in promotion, research, regulation, registration, monitoring, and surveillance, from INCODER to AUNAP. The creation of the new fisheries agency is expected to give the government improved control over fisheries activities and better ensure that actions can be taken to address IUU fishing activities of Colombian vessels in the future.

- On March 1, 2012, Colombia enacted Decree No. 0444, which adopted a regulatory framework so that Colombia can apply IATTC measures to regulate its capacity through the inclusion or exclusion of vessels on the IATTC Regional Vessel Register.

- Colombia adopted Resolution No. 0653 on September 7, 2012, which commits to adopting measures for the sustainability of tuna and related species in the EPO within the IATTC's purview; prohibiting the unloading in Colombian ports of tuna and related species caught in violation of the resolution; implementing control and monitoring measures to ensure compliance with the resolution; and applying sanctions upon failure to comply with it.

- Resolution No. 0761, adopted October 17, 2012, consistent with Decree No. 0444 and Resolution No. 0653, authorized AUNAP to deny requests for the renewal of the fishing licenses for the *Marta Lucia R. and Dominador I* since they are not listed in the IATTC's Regional Vessel Register. The vessels have been in port for the off season and have not fished since July 29, 2012.

Certification. In summary, NMFS concluded that the Government of Colombia took corrective action for each of the IUU activities noted in the 2011 Report to Congress. The Government adopted resolutions so that its vessels will comply with IATTC closure periods and tuna

conservation measures. Colombia has also generally expressed its commitment to conservation measures ensuring sustainable fisheries, both in writing and during in-person meetings. Colombia adopted a decree authorizing the application of IATTC measures to regulate its domestic fishing capacity and a resolution providing for increased fisheries enforcement.

Regarding the *Marta Lucia R. and Dominador I*, the Government of Colombia adopted a decree authorizing denial of the vessels' fishing licenses since they are not included on the IATTC Regional Vessel Register; the vessels have been in port and have not fished since July 2012.

On the basis of this information, NMFS has determined that the Government of Colombia has taken appropriate corrective action to address the IUU fishing activities for which it was identified in the 2011 Report to Congress, and positively certifies Colombia in this report.

NMFS is, however, identifying Colombia in this report for IUU fishing activities conducted by Colombian-flagged vessels during 2011 and/or 2012 (see Part III.A.2).

2. Ecuador

Bases for 2011 Identification. Ecuador was identified in the 2011 Report to Congress because several of its vessels violated CMMs established by the IATTC. Several purse seine vessels flagged to Ecuador fished in the IATTC Convention Area in 2009 without authorization, in violation of Resolution C-00-06 and Resolution C-02-03. The *Ocean Lady* made five fishing trips in 2009 before being added to the IATTC Regional Vessel Register in March 2010. The *Cap. Tino B.* made two fishing trips in 2009 before being included on the IATTC Regional Vessel Register in April 2009. The *Tuna I* made three fishing trips in 2009 without being on the IATTC Regional Vessel Register.

Several other vessels made sets during the purse seine closure in 2009, in violation of IATTC Resolution C-09-01. The *Ocean Lady* failed to adhere to the 2009 closure, while the *Ingalapagos* allegedly made short trips during the 2009 IATTC closure period without an observer. The *Lizi* allegedly made two sets in the "Corralito" closed area in violation of Resolution C-09-01. The measure states that the fishery for yellowfin, bigeye, and skipjack tuna by purse seine vessels bound by a certain area is closed from September 29 to October 29. At the time of the 2011 Report to Congress, NMFS was aware, unofficially, that the vessel (reported there as the *Lizy*) had been absolved of the alleged infraction, but Ecuador had not provided details of the investigation.

The *Tarqui* increased its well volume capacity, in violation of IATTC Resolution C-02-03, which prohibits increasing the capacity of any existing purse seine vessel unless purse seine vessels of equal or greater capacity are removed from the IATTC Regional Vessel Register.

Notification and Consultation. Ecuador was notified through a diplomatic note from DOS, dated January 11, 2011, and a letter from DAS Smith, dated January 10, 2011, regarding its identification as a nation whose vessels engaged in IUU fishing activity. The Ministry of Agriculture, Livestock, Aquaculture and Fisheries was the primary entity within the Government of Ecuador involved in the consultation. The following lists the key communications between Ecuador and the United States during the consultation:

- On January 18, 2011, U.S. officials met with Ecuadorian officials from the Ministry of Foreign Affairs and Trade Integration and the Ecuadorian Embassy in Washington, D.C., to discuss Ecuador's identification.

- On March 22, 2011, Dr. Rebecca Lent, Director of the NMFS Office of International Affairs, headed the U.S. delegation in a meeting at the Ecuadorian Embassy in Washington, D.C., with representatives from the Ministry of Foreign Affairs and Trade Integration, the Ministry of Agriculture, Livestock, Aquaculture and Fisheries, Embassy officials, and industry representatives.

- U.S. and Ecuadorian officials from the Ministry of Agriculture, Livestock, Aquaculture and Fisheries met on the margins of the 11th Meeting of the IATTC Working Group on Fleet Capacity on April 25, 2011; the 12th Meeting of the IATTC Permanent Working Group on Fleet Capacity on October 24, 2011; and the 83rd Meeting of the IATTC in June 2012.

- The Government of Ecuador provided materials to NMFS in March, June, October, and December 2011, and in June 2012.

- On February 22, 2012, U.S. officials met with Iván Prieto, Vice Minister of Aquaculture and Fisheries, at the Ecuadorian Embassy in Washington, D.C. The U.S. delegation gave Mr. Prieto a document at the meeting outlining remaining questions and requests.

- The U.S. Government sent a preliminary certification letter to Ecuador on October 2, 2012, stating that it had not received sufficient documentation to determine that appropriate corrective action had been taken to address the activities of two of Ecuador's vessels and requested further information from Ecuador.

- The Government of Ecuador responded on November 7, 2012, with additional information on the two vessels, including further corrective actions that had been taken.

Vessel-Specific Actions. Ecuador's fishery resources agency assumed responsibility for the late notification to the IATTC for the *Ocean Lady* and *Cap. Tino B* and put corrective measures in place to handle and process future IATTC correspondence. The official responsible for the filing error was given a one-year suspension without pay. All documents related to the IATTC must now be forwarded to the Ecuadorian Department of Projects and International Cooperation to be processed and tracked until completion, including verification of a vessel's status on the IATTC Regional Vessel Register before issuing fishing permits.

In January 2011, the General Director of Fisheries ordered a preliminary writ of penal administrative proceedings against the owner and captain of the *Ocean Lady* for failing to adhere to the 2009 IATTC closure periods. According to Resolution JP-007-11, each was fined 1,000 USD, the vessel was ordered to comply with the closure periods in 2011, and the vessel was not allowed to take a 30-day trip during the closures, which is normally granted to Class 4 vessels per Resolution C-09-01. Ecuador submitted documentation of payment of the fine imposed on the captain of the *Ocean Lady*.

Ecuador has explained that it granted the *Tuna I* authorization to fish in the EPO without being on the IATTC Regional Vessel Register within the context of a protracted capacity dispute involving another vessel, the *Roberto M*. This situation arose when the *Roberto M*, while flagged to Ecuador, was detained in Panama due to outstanding debts and was subsequently sold at auction and reflagged to Panama in 2004. Ecuador claims that the subsequent reflagging of the *Roberto M* (now renamed *Tunapesca*) was done improperly, without the necessary consent of Ecuador. As a result, Ecuador maintains a claim to the capacity associated with this vessel within the context of the IATTC Regional Vessel Register. At the time of the sale and reflagging of the *Tuna I*, there was no common understanding among IATTC members regarding whether, and under what circumstances, fishing capacity reflected in the IATTC Regional Vessel Register would be deemed to have been transferred with the sale of a vessel to another flag. The uncertainty surrounding the facts and circumstances is reflected in the fact that the same vessel is listed twice on the IATTC Regional Vessel Register under different names (*Roberto M* and the *Tunapesca*) with different flags (Ecuador and Panama).

Throughout the dispute, Ecuador has maintained its claim to the *Roberto M* and its capacity. In 2007, the Ecuadorian Undersecretary of Fishery Resources decided to exercise Ecuador's claim to this capacity by requesting that the IATTC Secretariat place two vessels on the IATTC Register in place of the *Roberto M*, thus allowing use of the claimed fishing capacity. This request was denied by the IATTC Director, who explained that removing the vessel from the register would require the consent of both Ecuador and Panama. Ecuador claims that, since the *Tunapesca* continues to fish while the dispute continues, yet Ecuador was denied access to the same capacity by the IATTC, an injustice has occurred. The Director referred the matter to the Commission, but thus far the Commission has been unable to resolve the dispute between the two nations.

Ecuador notes that it has presented this case to the IATTC on an annual basis in hopes of obtaining some sort of resolution. The Commission has discussed this case, but so far has not found a means of resolving the dispute. The IATTC is in the process of setting up an ad hoc dispute resolution panel to consider and resolve cases such as this one, but has been unable to agree on terms of reference for the panel. Ecuador notes that it has pressed to streamline this process within the IATTC and convened a meeting of the Latin American member nations in March 2012 to analyze the terms of reference for the ad hoc group. Ecuador also notes that it attempted to resolve the dispute through diplomacy with Panama, by inquiring whether Panama received authorization of a capacity transfer from Ecuador and whether Panama granted, authorized, assigned, or distributed that capacity.

Ecuador has stated that the *Ingalapagos* completed a short transit consisting of a night voyage from Manta, where it unloaded fish, to its home port of Guayaquil to complete maintenance work. The vessel arrived in Manta on July 31, 2009, unloaded its catch, and sailed to Guayaquil on August 3, 2009, in the evening, arriving there on August 4 at 10:10 pm. The vessel sailed without nets. The sailing permit was granted by Ecuador's maritime authority but was not reported to the fisheries authority. Ministerial Decision No. 099-09, No. 0001-2011 stated that there was no record in the General Fisheries Department that the shipper or owner had requested an observer from the IATTC or the National Program, or that the vessel was going to move without nets, thus violating the provisions of the Ministerial Decision; a fine was imposed. Ecuador submitted documentation that the fine had been paid.

Ecuador investigated the *Lizi* and found that on October 24–25 and 27–28, 2009, the *Lizi* sailed through the closure area, which is not prohibited unless fishing for yellowfin, bigeye, or skipjack tunas occurs. During review of VMS data, Ecuador noted that the vessel did not stop to fish on those days as the speed was determined to be between 12 and 14 knots; monitoring each hour showed there was no break in speed or direction during the period inside and outside of the closure area. Ecuador claimed there was no violation in this case. Based upon review of the small amount of logbook and VMS data provided, NMFS determined that the *Lizi* steamed into the closure area but did not fish, as its speed appeared to be consistent at 12 knots. In addition, the vessel made two sets immediately outside of the closure area, which were reflected in the logbook. Given this information, NMFS concludes that the *Lizi* did not engage in IUU fishing activities.

In the late 1990s, large differences were discovered in the conversion factor used to determine capacity, so the IATTC began using cubic meters for capacity determinations. The *Tarqui*, which allegedly increased its capacity without authorization, had its capacity converted to cubic meters and was found to have a smaller capacity than originally calculated, but the owner claimed he should be able to keep the difference. The 1980 Shipping Certificate of Inspection and Measurement for the *Tarqui* stated the hold capacity was 226.74 cubic meters. On April 18, 2012, the Ecuadoran Navy carried out measurement of the *Tarqui*'s holds and found the vessel to have a 430 cubic meter capacity. On June 15, 2012, the Government of Ecuador issued a statement reiterating the Navy findings and presuming the *Tarqui* has not complied with IATTC Resolution C-02-03. An Administrative Fishing Investigation was thereby ordered to be brought against the vessel owner. In November 2012, the Directorate of Fisheries Control ordered the *Tarqui* to return to Manta to carry out an additional inspection and verify the actual dimensions and hold capacity of the vessel. The Government of Ecuador determined that the *Tarqui* increased both its length and capacity and sanctioned the vessel with a 2920 USD fine, which has been paid.

Additional Information. The *Miry Ann D* increased its capacity, contrary to Resolution C-02-03, but this vessel did not form the basis of Ecuador's identification in 2011 since the United States received the information after identifications had been made. The Director General of Fisheries issued a preliminary writ on February 17, 2010, to the owner and captain of the *Miry Ann D* indicating that the vessel added fish holds that increased capacity. The *Miry Ann D* was found to have expanded its fish holds, which the owner should have cleared through the Directorate General of Fisheries prior to modification. A fine of 5,000 USD was imposed on the owner and captain, along with suspension of fishing activities for 45 days. The United States received documentation of payment of the fine. In addition, documentation was sent by the Ecuadorian Naval Force that the *Miry Ann D*, according to its 45-day suspension of fishing activity, did not leave the Port of Manta between March 31, 2010, and May 13, 2010.

Fisheries Management Measures. The Government of Ecuador passed three fisheries-related resolutions on October 12, 2011. These resolutions implemented additional Ecuadorian fishing regulations and laws to prevent overfishing and excess capacity, and to promote sustainable use of the resource. Resolution 405 regulates the construction, expansion, or import of new commercial and/or artisanal fishing vessels to maintain control over Ecuador's fishing capacity. It also establishes the National Registry of Fishing Vessels, administered by the Under Secretariat of Fishery Resources, which will include all operational commercial and artisanal

fishing vessels, listing of their registration number, port of registry, and fishing license. As of April 1, 2012, fishing licenses cannot be issued to vessels not on the National Registry of Fishing Vessels. Resolution 407 establishes regulations for longline fishing mother ships, including criteria they must meet to be issued an annual fishing license. Resolution 408 establishes regulations for the use of fish aggregating devices on Ecuadorian-registered purse seine vessels operating in the EPO.

Certification. In summary, the Government of Ecuador took corrective action for, or provided information challenging the basis of, each of the IUU fishing activities noted in the 2011 Report to Congress. With regard to the *Ocean Lady* and the *Cap. Tino B*, Ecuador's fishery resources agency assumed responsibility for the late notification to the IATTC and put corrective measures in place to handle and process future IATTC correspondence. For violations of closure periods, the *Ocean Lady*'s owner and captain were fined, and the vessel's fishing activities were restricted. Ecuador investigated the case of the *Lizi* and determined that IUU fishing did not take place; NMFS agrees with Ecuador's assessment based upon a close examination of the circumstances and documentary evidence provided.

Given that the denial of the inclusion of the *Tuna I* on the IATTC Regional Vessel Register occurred within the context of a dispute within the IATTC regarding unresolved issues concerning the interpretation of IATTC requirements, and that Ecuador's decision to authorize this vessel to fish was made within the context of that dispute and consistent with claims to the corresponding capacity, NMFS feels that actions regarding this vessel should be excluded from consideration when making Ecuador's certification determination. Rather, this case should be resolved multilaterally, such as within the context of an IATTC ad hoc working group on capacity, to clarify relevant requirements for the transfer of capacity, or alternatively resolved bilaterally between the Governments of Ecuador and Panama. The Government of Ecuador has previously stated that it will abide by the findings and decisions of an IATTC working group on this matter and has demonstrated a commitment toward resolving this issue.

The *Ingalapagos* paid the fine issued to the vessel for making a short trip without an observer. The *Tarqui* was sanctioned and paid the fine for increasing its capacity without authorization.

Ecuador has addressed the IUU fishing activities of other vessels engaged in violations of IATTC rules through investigations and issuance of fines and appropriate penalties upon a finding of non-compliance. On the basis of this information, NMFS has determined that the Government of Ecuador has taken appropriate corrective action to address the IUU fishing activities for which it was identified in the 2011 Report to Congress, and positively certifies Ecuador in this report.

NMFS, however, is identifying Ecuador in this report for IUU fishing activities of Ecuadorian-flagged vessels during 2011 and/or 2012 (see Part III.A.2B).

3. Italy

Bases for 2011 Identification. Italy was identified under the Moratorium Protection Act in 2009 for several different violations of ICCAT requirements, including driftnet use. The United States determined that Italy took appropriate corrective action for each of the violations for which it was identified in 2009 and issued a positive certification in the 2011 Report to

Congress. Italy was then re-identified in that report for ICCAT driftnet violations by different vessels in the 2009–2010 period. A number of Italian vessels were found to be driftnet fishing in 2009 and 2010 in violation of ICCAT Recommendation 03-04, which requires contracting parties and cooperating non-contracting parties, entities, or fishing entities (CPCs) to prohibit the use of driftnets for fisheries of large pelagic species, including swordfish and bluefin tuna, in the Mediterranean. Although these vessels were sanctioned through seizure of catch and nets and imposition of fines, the United States decided to re-identify Italy in the 2011 Report since driftnet violations continued to be carried out by Italian-flagged vessels, including repeat offenses by the same vessels.

Notification and Consultation. Italy was notified through a diplomatic note from DOS, dated January 11, 2011, and a letter from DAS Smith, dated January 10, 2011, regarding its identification as a nation whose vessels engaged in IUU fishing activity. The Maritime Fisheries and Aquaculture Division under the Ministry of Agriculture, Food and Forestry was the primary entity within Italy involved in the consultation. The following lists the key communications between Italy and the United States during the consultation:

- U.S. Embassy Rome officers met with Fisheries Director General Dr. Francesco Saverio Abate and other Italian officials on July 20, 2011, to initiate consultations under the Moratorium Protection Act. During that meeting, and in subsequent follow-ups, information regarding Italian fisheries-related laws was conveyed.

- A U.S. delegation met with the EC IUU Unit of the Directorate-General for Maritime Affairs and Fisheries on February 14, 2012, in Brussels. The discussion focused on the discussions the EC has had with Italy regarding implementation of the 2009 Court of Justice ruling regarding the continued use of illegal driftnets by Italian vessels.

- U.S. Government officials met with Dr. Abate and other Italian officials in Rome on March 21, 2012, to discuss updates to Italian fisheries laws and Italy's efforts to combat IUU fishing.

- The Government of Italy sent information regarding vessel sanctions and new decrees and resolutions to NMFS on March 5, 12, and 30, 2012, and May 28, 2012.

- The U.S. Government sent a preliminary certification letter to Italy on October 2, 2012, stating that it had not received sufficient documentation to determine that appropriate corrective action had been taken to address the activities of Italy's vessels and requested further information from Italy.

- The Government of Italy responded on November 8, 2012, with additional information on enforcement implementation and sanctions of vessels for IUU fishing activities and on the 2012 reports of EC inspections in Italian ports.

Fisheries Management Measures. During 2011 and 2012, the Government of Italy passed a number of new decrees designed to address IUU fishing.

The July 1, 2011 Decree states that fishermen with licenses for both longline and *ferrettara* (small-mesh driftnets) may have only one type of gear on board. The chosen gear type must be reported to the Maritime Authority, which then issues a certificate that fishermen can show enforcement authorities. The decree was designed to prevent violators caught with pelagic species on board from claiming they were caught with longline when they were actually caught with driftnets. Fishermen contested the decree before the Regional Court of Lazio, which suspended it on September 7, 2011. The decree was reexamined in an appeals court in January 2012, with a final ruling in March 2012 in favor of the Government. According to Italian officials, this closes a legal loophole and makes enforcement easier for the Coast Guard, since it can be carried out in port. The Coast Guard was instructed to enforce the decree immediately. A review by the Italian Government of the logbooks of 55 fishing vessels fitted with both longline and *ferrettara* gear covering the period of January 1 through September 30, 2012, shows that no driftnets were used.

The September 21, 2011 Decree limits *ferrettara* use within 3 miles of the coast and stipulates that nets cannot be longer than 2.5 kilometers and mesh size cannot exceed 100 millimeters. The Italian Government has stated that driftnets exceeding the length or mesh limits are seized and destroyed by authorities at the violator's expense; in addition, fish found to be illegally caught are seized by authorities and distributed to charity. This decree was also contested before the Regional Court, reexamined in April 2012, and eventually upheld. The Italian Coast Guard did not find any infractions related to driftnets in October through December of 2011; a review of a sample of logbooks (from 30 vessels) from January 1 through September 30, 2012, shows that no driftnets were used with the exception of two vessels that were not shown to be fishing for pelagic species.

Legislative Decree No. 4/2012, issued on January 9, 2012, entered into force on February 2, 2012. This decree implements EC provisions on combating IUU fishing activities. With regard to serious infractions, the decree reformed sanctions by doubling minimum sanction amounts to 2,000€ and maximum amounts to 12,000€ relating to administrative violations (including the use or possession of illegal driftnets); authorizing immediate and permanent seizure of fishing equipment (including driftnets) that does not comply with Italian and EC regulations; authorizing immediate suspension of fishing licenses for 3 to 6 months in cases of use or possession of driftnets that do not comply with Italian and EC regulations; authorizing permanent revocation of fishing licenses in cases of a second offense for the use or possession of driftnets that do not comply with Italian and EC regulations; and introducing a system for assigning points to the fishing license and captain in cases of serious infractions (including those related to use or possession of driftnets).

On February 29, 2012, two Ministerial Decrees were signed that established administrative procedures to apply the point system for serious violations and to impose permanent suspension and/or revocation of the fishing license and captain's qualification. The decrees were published in the Official Gazette of the Italian Republic (No. 103) on May 4, 2012.

Vessel-Specific Actions. Italian officials have indicated that its Coast Guard addressed IUU fishing in 2010 and 2011 by applying the rules in force prior to adoption of the new decrees. As an example, two fishermen were sanctioned for fishing with *ferrettara* more than 10 miles from the coast in 2010. Each appealed, but since they were caught in the act, they were ordered to pay an administrative fine of 2,000€ each, their authorizations for *ferrettara* were withdrawn for 3

months, and the driftnets were confiscated. Two other fishermen were sanctioned for keeping driftnets on board in excess of the maximum allowable length. The individuals willfully and knowingly possessed the additional nets for commercial fishing purposes and were both repeat offenders who had been fined within the past 5 years for the same violation. The individuals were fined 4,000€, the nets were confiscated, and their fishing licenses were suspended for 15 days.

Additional Information. Three inspections by EC personnel were conducted in 2012 (two unannounced in May and July 2012, one announced in September 2012) in Sicily, Ponza, and Palermo. No driftnets were found during the inspections.

Through the National Fishing Control Center, Italy has stated that it will work to strengthen the police forces working on fisheries issues (Coast Guard, Customs, state police) by centralizing the functions of these groups related to fisheries enforcement.

In early 2013, the new state-of-the-art supply vessel, the *Bruno Gregoretti*, is expected to launch to assist with fisheries monitoring activities. In 2013, Italy is planning to revise national and local monitoring plans using a risk-based strategy, which will take into account intelligence information, findings and recommendations from EC officials, and any regulatory updates.

Certification. In summary, the Government of Italy adopted new decrees to increase its ability to combat IUU fishing, specifically with regard to illegal driftnets. Fishermen are no longer able to carry *ferrettara* and longline gear on board at the same time, and new dimensions have been established for *ferrettara* gear, including limiting how far from the coast it can be used. Sanctions were placed on vessels using illegal driftnets. In addition, Decree No. 4/2012 implements the EC provisions on combating IUU fishing activities. NMFS believes implementation of these measures constitutes corrective action for the illegal use of driftnets.

On the basis of this information, NMFS has determined that the Government of Italy has taken appropriate corrective action to address the IUU fishing activities for which it was identified in the 2011 Report to Congress, and positively certifies Italy in this report.

The United States, however, remains concerned over the use of driftnets by Italian-flagged vessels and has received information regarding IUU fishing activities conducted by the Italian fleet during 2011 and 2012 (see Part III.2.A).

4. Panama

Bases for 2011 Identification. NMFS identified Panama in 2011 because several of its vessels violated the IATTC purse seine closure periods in 2009, in violation of IATTC Resolution C-09-01, and one vessel fished without being on the IATTC Regional Vessel Register. The *Julie L* made at least one set in the high seas closure area in 2009. The *La Parrula* made at least 30 sets in two trips during the IATTC 2009 purse seine closure. The *Sirenza I* was not in port at the beginning of the 2009 purse seine closure. The *Tunamar* made one trip in May 2009 without being on the IATTC Regional Vessel Register, in violation of Resolutions C-00-06 and C-02-03.

Notification and Consultation. Panama was notified through a diplomatic note from DOS, dated January 11, 2011, and a letter from DAS Smith, dated January 10, 2011, regarding its

identification as a nation whose vessels engaged in IUU fishing activity. The Aquatic Resources Authority of Panama (ARAP) was the primary entity within the Government of Panama involved in the consultation. The following lists the key communications between Panama and the United States during the consultation:

- On February 9 and 17, 2011, Giovanni Lauri, General Administrator of ARAP, sent letters to DAS Smith outlining the legal actions that had been taken with regard to the *La Parrula*, *Julie L*, and *Tunama*, and refuting the fishing allegations against the *Claudia L* (ex *Sirenza I*).

- U.S. officials met with Panamanian officials from ARAP and the Merchant Marine and an industry representative on the margins of the 11th Meeting of the IATTC Working Group on Fleet Capacity on April 26, 2011, to further discuss Panama's identification. Following this meeting, Panama sent a number of follow-up documents.

- Dr. Lent met with Mr. Lauri on the margins of the 12th Meeting of the IATTC Permanent Working Group on Fleet Capacity on October 24, 2011. The discussion focused on updates from Panama regarding its identified vessels. Panama sent documentation and updates through the U.S. Embassy in Panama following this meeting.

- On February 29, 2012, Mr. Lauri sent a letter to NMFS, giving updates and further details on the cases involving the *La Parrula*, *Julie L*, *Tunamar*, and *Templario I*.

- On June 27, 2012, the U.S. delegation met with Mr. Lauri and Raúl Delgado, Deputy Director General of Inspection, Monitoring and Control, on the margins of the 83rd Meeting of the IATTC to discuss updates to the cases of the vessels for which Panama was identified.

- On December 10, 2012, Panama sent a letter to NMFS with updates on the *Julie L*, *Tunamar*, and *La Parrula*.

Vessel-Specific Actions. ARAP convened administrative proceedings against the *Julie L* in both 2010 and 2011. The final resolution declared that the *Julie L* had committed a violation of Panama's Administrative Resolution No. 1791. The General Director of Inspection, Supervision and Control sanctioned the *Julie L* with a fine equivalent to 1.125 million USD and ordered the suspension of any processing related to the vessel (e.g., so the vessel cannot change owners) until the fine is paid. The owners of the vessel filed an appeal, resulting in a final penalty of 500,000 USD, payable in installments. The *Julie L* made an initial payment on September 12, 2011, of 40,000 USD and monthly payments of 20,000 USD through September 2012. NMFS is following this case and has requested evidence from ARAP of payment of the last installment once it is made.

Resolution No. 80 of July 29, 2010, fined the *La Parrula*, and the Merchant Marine canceled the vessel's registration on September 6, 2010, through Resolution No. 2604. Representatives for the vessel filed an appeal before the Panamanian Supreme Court of Justice in October 2010. Following the Supreme Court's ruling, the vessel owner was ordered to pay a fine of 704,930 USD. Collection of the fine has been referred to the appropriate department; however, the *La*

Parrula left Panama's registry, evading its obligations. Because of the actions of the vessel, Panama noted that it would also seek to have this vessel added to IUU vessel lists of RFMOs to which Panama is a contracting party to prevent this vessel from engaging in any future IUU fishing activities. NMFS views the steps taken as appropriate corrective action to address the IUU fishing activities of this vessel. The vessel re-flagged to Ecuador on January 19, 2012, according to the IATTC Regional Vessel Register.

ARAP opened an administrative process on the *Claudia L* (formerly the *Sirenza I*) to determine whether it engaged in IUU fishing. Upon investigation, ARAP determined that the vessel observed the closure period from August 1 to September 28, 2009, by ceasing fishing activities and anchoring in port. In concluding its investigation, the Government of Panama refuted the allegations against the *Claudia L*.

The *Tunamar* made one trip in May 2009 before being added to the IATTC Regional Vessel Register on July 2, 2009. The Directorate General of the Merchant Marine placed restrictions on the *Tunamar* so that ownership could not be transferred or cancelled during the administrative proceedings. Final Resolution DGIVC No. 0013 of April 20, 2011, imposed a fine equivalent to 1.335 million USD. After an appeal, the final punitive resolution (No. ADM/ARAP 083), issued on August 11, 2011, sanctioned the vessel for 500,000 USD, payable in installments. The *Tunamar* made an initial payment on September 13, 2011, of 40,000 USD and monthly payments of 20,000 USD through October 2012. NMFS is following this case and has requested evidence from ARAP of payment of the last installment.

Additional Information. The *Templario I* made two sets in one fishing trip during the second purse seine closure of 2010 in the EPO. NMFS was not able to include the activities of the *Templario I* as part of the rationale for Panama's identification in January 2011, because NMFS received the information after making those identifications. NMFS later learned, according to the Government of Panama's report of the official administrative proceedings, that there was confusion as to how the ship owners interpreted the closure period: they thought it did not include January 18, 2011, since the closure was from November 18, 2010 *until* January 18, 2011. The IATTC observer on board reportedly indicated in the file that the vessel and crew complied with IATTC rules. ARAP found no elements that warranted a penalty and therefore exonerated the vessel of the charges brought against it, warning it to carry out the closure period correctly in the future.

Fisheries Management Measures. Panamanian Resolution No. 110, of October 27, 2011, temporarily denies authority to approve new applications for International Fishing Licenses for international service vessels until investigations of vessels that have allegedly been involved in IUU fishing are complete. The measure applies to vessels that operate outside of Panama's EEZ.

Certification. The Government of Panama took corrective action for, or provided information challenging the basis of, each instance of IUU fishing noted in the 2011 Report to Congress that led to Panama's identification. To address the activities of the *Julie L* and *Tunamar*, Panama sanctioned each vessel with fines of 500,000 USD. Evidence of payment of the fines (up to October 2012) has been provided. The Government of Panama fined the *La Parrula* and is trying to collect the fine. The vessel, however, has left Panama's registry. Panama is recommending the vessel be added to the IUU vessel lists of RFMOs to which Panama is a party. The Government of Panama investigated the *Claudia L* and determined that it did not commit

IUU fishing because it had ceased fishing activities and anchored in port during the period in question.

On the basis of this information, NMFS sent the Government of Panama notice of a preliminary positive certification determination on October 2, 2012. NMFS has determined that the Government of Panama has taken appropriate corrective action to address the IUU fishing activities for which Panama was identified in the 2011 Report to Congress, and positively certifies Panama in this report.

NMFS, however, is identifying Panama in this report for IUU fishing activities conducted by Panamanian-flagged vessels during 2011 and/or 2012 (see Part III.A.2).

5. Portugal

Bases for 2011 Identification. NMFS identified Portugal in 2011 because two of its vessels had fished in a manner that violated NAFO conservation and enforcement measures during 2010. The *Franca Morte*, inspected at sea and in port, used smaller than the required mesh size on two of the four panels of the fishing trawl. The *Aveirense* was found in the NAFO Regulatory Area on March 10, 2010, and in port on July 12, 2010, in apparent infringement of NAFO measures because of an obstruction in the mesh in the cod end of the net.

Notification and Consultation. Portugal was notified through a diplomatic note from DOS, dated January 11, 2011, and a letter from DAS Smith, dated January 10, 2011, regarding its identification as a nation having vessels engaged in IUU fishing activity. The Ministry of Agriculture was the primary entity within the Government of Portugal involved in the consultation. The following lists the key communications between Portugal and the United States during the consultation:

- The Government of Portugal provided information, dated January 20, 2011, responding to its identification.

- U.S. and Portuguese government officials, along with a representative from the Directorate-General for Maritime Affairs and Fisheries, met via video conference to discuss the illegal activities of the Portuguese vessels identified in the 2011 report on February 10, 2011.

- Documentation from Portugal was sent on March 29 and August 17, 2011, and on March 9, 2012, regarding vessel updates, sanctions, and payment of fines.

Vessel-Specific Actions. To address the violation of the *Franca Morte*, Portugal instituted the following corrective actions: the illegal trawl net was confiscated and declared forfeited; the captain paid a fine of 600€, standard for a first offense; and the shipping company paid a fine of 1,250€. The value of the confiscated net was approximately 25,000€.

According to the Government of Portugal, the owner and captain of the *Aveirense* were fined for an obstruction of the mesh in the cod end of the vessel's net. The owner paid a fine of 1,350€,

while the captain paid a penalty of 1,000€. In addition, the owner forfeited the equipment used to commit the violation.

Certification. In summary, the Government of Portugal took corrective action against the two vessels found to be using illegal fishing gear in 2010 in the NAFO Conservation Area, which included seizure of the illegal gear and fines placed on both the vessel owners and captains. On the basis of this information, NMFS sent the Government of Portugal notice of a preliminarily positive certification determination on May 24, 2012. NMFS has determined that the Government of Portugal has taken appropriate corrective action to address the IUU fishing activities for which Portugal was identified in the 2011 Report to Congress, and positively certifies Portugal in this report.

6. Venezuela

Bases for 2011 Identification. NMFS identified Venezuela in 2011 based on two of its vessels that fished in violation of IATTC conservation and management measures during 2009. According to the IATTC's Compliance Report, Venezuelan vessels did not adhere to the IATTC purse seine closure periods. The *Don Francesco* made 19 sets during the 2009 purse seine closure, which violated IATTC Resolution C-09-01. The *Athena F* made a transit trip without an observer during the closure period in 2009 in violation of C-09-01.

Notification and Consultation. Venezuela was notified through a diplomatic note from DOS, dated January 11, 2011, and a letter from DAS Smith, dated January 10, 2011, regarding its identification as a nation whose vessels engaged in IUU fishing activity. The Ministry of the Popular Power for Agriculture and Lands, Socialist Institute of Fisheries and Aquaculture (INSOPESCA) was the primary entity within Venezuela involved in the consultation. The following lists the key communications between Venezuela and the United States during the consultation:

- On January 3, 2011, INSOPESCA sent a letter to Dr. Lent in response to the pre-identification letter the United States sent on October 29, 2010.

- INSOPESCA provided further written information, dated June 10, 2011, responding to Venezuela's identification in January 2011.

- On December 28, 2011, INSOPESCA provided a response to questions posed from the United States in its October 2011 letter.

- The U.S. Government sent a letter dated February 23, 2012, to Venezuela requesting additional information to make a certification determination and reminding Venezuela that those determinations would be published in the 2013 Report to Congress.

- On July 27, 2012, INSOPESCA sent a letter to NMFS responding to the questions in the letter dated February 23 from the United States, and providing further information on corrective actions Venezuela had taken with regard to the two vessels.

Vessel-Specific Actions. Venezuela investigated the case of the *Don Francesco* and determined that the vessel fished during the 2009 closure period; the owner of the vessel admitted that its captain fished in violation of the IATTC measure. Venezuela imposed a fine, issued a formal notice to the owner that a recurrence of this type of activity would result in the indefinite suspension of the fishing permit, and required the vessel captain and fishing captain to take a training course to avoid their exclusion from the list of qualified captains.

The fine for the *Don Francesco* was proposed as approximately 7,500 USD. The sanction would also entail a 6-month suspension of authorizations, including the fishing permit and authorization for the vessel to set sail. The suspension of authorizations would go into effect as of the date the fine is paid. The owner of the *Don Francesco* received a notice from INSOPESCA, dated May 18, 2011, to appear for a hearing. The ship owner filed an appeal with the Ministry of Agriculture and Land, which was turned down; the owner's representative then submitted an administrative appeal to the Supreme Court of Venezuela, where the case awaits ruling. The United States has requested that the Government of Venezuela keep it apprised of the ruling of the Supreme Court.

The *Athena F* transited, but did not fish, according to the investigation by Venezuela, as the vessel had no cargo upon arrival in port and traveled without a fishing captain on board. Venezuela classified the incident as an administrative mistake and sent a warning letter to the vessel owners urging them to be more careful in performing their activities. Venezuela also warned the owners that, if this type of activity occurs again, INSOPESCA will apply sanctions such as a fine, suspension of fishing, revocation of fishing, or seizure or disposal and destruction of fishery resources associated with the illegal act and the gear used.

Certification. The Government of Venezuela took corrective action for the two vessels identified for IUU fishing in the 2011 Report to Congress. In the case of the *Don Francesco*, Venezuela proposed the following sanctions: a fine, suspension of fishing, and the requirement that the captains attend a training course. The owner of the vessel has since appealed and the case currently resides in the Supreme Court of Venezuela. The Government of Venezuela investigated the allegations surrounding the *Athena F* and classified the incident as an administrative mistake. Venezuela issued a warning letter to the vessel owners urging them to be more careful in performing their activities. Venezuela also warned the owners that if transiting without an observer occurs again, INSOPESCA will apply sanctions.

On the basis of this information, NMFS sent the Government of Venezuela notice of a preliminarily positive certification determination on October 2, 2012. NMFS has determined that the Government of Venezuela has taken appropriate corrective action to address the IUU fishing activities for which it was identified in the 2011 Report to Congress, and positively certifies Venezuela in this report.

NMFS, however, is identifying Venezuela in this report for IUU fishing activities conducted by the Venezuelan fleet during 2011 and/or 2012 (see Part III.A.2).

IV. State of Knowledge on the Status of International Living Marine Resources

Section 607 of the Moratorium Protection Act requires an accounting of the state of knowledge on the status of international living marine resources shared by the United States or subject to treaties or agreements to which the United States is a party, including a list of all fish stocks that are classified as overfished, overexploited, depleted, endangered, or threatened with extinction by any international or other authority charged with their management or conservation.[33] NMFS has updated the list that was cited in the 2011 Report to Congress, including a re-organization by species group and links to the latest (as of mid-summer 2012) status reviews of species. For each species, the table now shows the status of each stock, the organization(s) that made the assessment, and applicable treaties. The revised list is available online at http://www.nmfs.noaa.gov/ia/iuu/msra_page/msra.html.

The list includes resources over which an international treaty or agreement, to which the United States is a party, has explicit conservation or management authority; has in place measures designed to control fishing mortality; or has directed the collection of fisheries data, including bycatch, to inform assessments of status. It also includes other resources shared by the United States, including U.S. territories, on which a directed fishery exists or which are taken as bycatch that are significant either in absolute numbers or because of the sensitivity of the international living marine resources, such as seabirds, sea turtles, marine mammals, or sharks, but which are not subject to an international treaty or agreement to which the United States is a party. The list no longer contains some fish species for which no directed fishery or bycatch issue exists.

[33] The term "international living marine resources," as described in this sentence, is much more inclusive than the term "protected living marine resources." The latter includes only non-target species protected under U.S. law or international agreement that, except for sharks, are not managed under the MSA, the Atlantic Tunas Convention Act, or any international fishery management agreement.

V. International Actions to Address IUU Fishing

Global international organizations have acted in recent years to create many tools to combat IUU fishing and promote sustainable fisheries. This Part updates the descriptions of these activities in the 2011 Report to Congress.

Food and Agriculture Organization. Established in 1945, the FAO has a mandate to raise levels of nutrition and standards of living, improve agricultural productivity, and better the condition of rural populations. Today, the FAO is the largest autonomous agency within the UN system with 192 member nations plus the EU and one associate member (Faroe Islands). The FAO employs 1,600 professional staff and 2,000 general services staff.

The FAO's Committee on Fisheries (COFI), established in 1965, constitutes the only global intergovernmental forum other than UNGA where major international fisheries and aquaculture problems and issues are examined and recommendations addressed to governments, regional fisheries bodies, NGOs, fish workers, and the international community on a worldwide basis. COFI is also a forum in which global agreements, binding and non-binding, are negotiated.

In 1995, the FAO concluded development of a Code of Conduct for Responsible Fisheries, a landmark set of guidelines arranged in six substantive chapters providing guidance on all phases of sustainable fisheries from scientific research to management to fishing operations to post-harvest practices and trade, including fresh water fisheries and aquaculture. Upon its completion, NMFS hailed the Code as a new "global ethic for the conduct of fisheries," and immediately embarked on the development of its implementation plan for the Code. NMFS revised and updated that implementation plan in January 2012; it is available online at http://www.nmfs.noaa.gov/ia/reports/nmfs_imp_plan.pdf. The Code continues to organize the work and budget of the FAO's Department of Fisheries and Aquaculture.

In recognition of the rapid extent to which IUU fishing was undermining attainment of national, regional, and global fisheries management goals, in 2001 COFI endorsed the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU). The IPOA-IUU is a voluntary instrument that FAO members are to implement through national plans of action. The United States finalized its national plan of action in 2004. Under the IPOA-IUU, each State is to self-assess its laws, policies, and practices. The IPOA-IUU also provides specific sets of tools for flag States, coastal States, port States, market States, and RFMOs to deal with IUU fishing. The IPOA-IUU is described more fully in the 2009 Report.

With active involvement of the United States, the FAO has promoted actions to address IUU fishing activities by conducting studies, disseminating information, offering capacity building and institutional strengthening, and providing a global forum for States to formulate appropriate instruments. Since the 2011 Report to Congress, the FAO Secretariat presented to the 30th Session of COFI a paper on progress in combating IUU fishing through a number of initiatives discussed in this Part: adoption of the FAO Agreement on Port State Measures; training workshops to assist developing nations in implementing that Agreement; compiling a global record of fishing vessels; and developing criteria for evaluating flag State performance.

Other UN activities. IUU fishing activities have also been addressed by a number of other international bodies, including UNGA in its annual Sustainable Fisheries Resolutions, the UN Open-ended Informal Consultative Process on Oceans and the Law of the Sea, meetings of the parties to the United Nations Fish Stocks Agreement (UNFSA), and others. In fact, the annual UNGA resolution has an entire chapter devoted to IUU fishing. Among other things, it calls attention to IUU fishing as one of the greatest threats to marine ecosystems, urges States to take effective measures to deter IUU fishing, and reaffirms the need to strengthen the international legal framework for intergovernmental cooperation to combat IUU fishing.

At the UN Conference on Sustainable Development (Rio + 20), the United States advocated for inclusion of significant text on ocean, coastal, and fisheries issues, one of the sections that received the most attention. Paragraph 168 contains a commitment to enhance actions to protect VMEs from significant adverse impacts, including through the effective use of impact assessments. Paragraph 170 recommits nations to eliminate IUU fishing, as advanced in the Johannesburg Plan of Implementation. It calls for implementation of national plans under the IPOA-IUU, urges adoption of measures to deprive States and vessel owners of the benefits of IUU fishing, and promotes capacity building in developing nations for systems to combat IUU fishing. NOAA sponsored a side event at the U.S. Center, where panelists and audience members debated how these commitments might actually be carried out by the international community.

Asia-Pacific Economic Cooperation (APEC). APEC's Oceans and Fisheries Working Group (OFWG) has been addressing the negative impacts of IUU fishing in the APEC region for more than a decade, including a project co-sponsored by Canada and the United States to identify economic impacts. More recently, through the efforts of the United States and others in the OFWG, the APEC Food Security Ministerial Meeting in Kazan, Russia, issued a declaration re-emphasizing the importance of food security to APEC membership and, among other key actions, agreed to focus on combating IUU fishing and associated trade. At a meeting in Vladivostok in September 2012, APEC Leaders reaffirmed those commitments. The OFWG is responsible for carrying out the fisheries provisions. The United States is working with OFWG partners, including the Russian Federation, Indonesia, and Taiwan, to develop capacity building and other activities relative to IUU fishing.

European Union–United States Joint Statement. As two of the three top seafood importers in the world, the EU and the United States recognized their responsibility to protect the oceans' vital food and biodiversity resources in a historic statement pledging bilateral cooperation to combat IUU fishing. On September 7, 2011, NOAA Administrator Dr. Jane Lubchenco and Maria Damanaki, EU Commissioner for Maritime Affairs and Fisheries, signed a statement undertaking to work together to support adoption of effective management measures in regional and international organizations, promote tools that prevent IUU operators from benefiting economically from their illegal activities, exchange information on IUU activities, and promote the sustainable use of fisheries resources while preserving marine biodiversity. In 2012, U.S. and EU officials met on two separate occasions to continue planning their joint efforts against IUU fishing by identifying specific activities, dates, and points of contact, and through extensive discussion of regional and global fisheries issues. They created a staff-level working group to coordinate their respective efforts to combat IUU fishing.

The sections in this Part focus on particular approaches (such as port and flag State control measures) and specific tools (such as monitoring, vessel lists, and a global record of fishing vessels) that are being developed and implemented to deter IUU fishing activities.

A. Port State Measures

The reason IUU fishing continues despite decades of effort to curb the problem is the economic incentive that makes such activities cost-effective and financially viable for many fishermen and, indeed, investors. Removing or disrupting the economic drivers of IUU fishing promotes eradication of this global activity.

1. 2009 Agreement

One of the greatest achievements in the battle against IUU fishing in the past several years is completion of the Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, adopted by the FAO Conference in 2009. The objective of the Agreement is to combat IUU fishing through the establishment of minimum standards for port State controls, including through eliminating "ports of convenience" that have served as safe havens for IUU vessels and as portals for illegally harvested fish and fish products to enter the stream of commerce. By recognizing the key role that ports play in the movement of IUU fish around the world, and the necessity for international cooperation and information sharing, the Agreement ensures that States will commit to taking measures to strengthen their ports to combat IUU fishing. By eliminating, or at least reducing, the ability of IUU product to find a market, the Agreement will also strengthen the competitive position of legally harvested U.S. product, both within our domestic market and abroad. The minimum standards established for parties to the Agreement are described in the 2011 Report.

The United States signed the treaty on the day of its adoption; there are 23 signatories. The Agreement will enter into force 30 days after deposit of the 25th instrument of ratification, acceptance, approval, or accession. Thus far four instruments have been deposited, by Burma, the EU, Norway, and Sri Lanka. To build capacity among developing nations to implement the treaty, Australia, Canada, Norway, the Republic of Korea, the United States, and the IOTC have financed a 3-year program of workshops, the first of which was convened in Thailand in April 2012 for nations in Southeast Asia.

The Obama Administration sent a ratification package to the Senate in November 2011 and implementing legislation to both Houses of Congress the following month. In July 2012 the Senate Commerce Committee reported favorably on S. 1980, and the House Committee on Natural Resources reported favorably on H.R. 4100, but the 112th Congress did not act on the legislation. Ratification and implementation of the treaty will strengthen U.S. efforts to make the Agreement an effective tool in the global effort to combat IUU fishing.

2. RFMO Actions

While many RFMOs have adopted port State measures, frequently in conjunction with the measures that establish their IUU vessel lists, the Agreement, as a global, legally binding instrument, has the potential to fill in many of the existing gaps that enable IUU fishermen to

profit from their activities. Many of the RFMOs are considering proposals to adopt or amend existing port State measures to be consistent with the minimum standards set forth in the Agreement. The new SPRFMO Convention includes a provision on the responsibilities of port States.

At its November 2012 meeting, ICCAT adopted a U.S. proposal, co-sponsored by Canada, the EU, and Norway, that establishes minimum standards for inspections in port, replacing a scheme adopted in 1997. The new recommendation obliges port States to designate and publicize their ports where foreign fishing vessels may land or transship fish; calls for advance notice from such vessels seeking to enter those ports; provides that the port State must decide whether to grant entry to such vessels in light of the information received; and requires inspection of at least 5 percent of landing or transshipment operations by foreign vessels once in port. This represents a significant step in using port State measures to combat IUU fishing and brings ICCAT's rules into greater harmony with requirements of the Agreement.

Pending in ICCAT is a draft proposal that goes even further toward carrying out the Agreement. It is tailored with respect to ICCAT's structure, scope, and definitions so that it would fall clearly within ICCAT's mandate and take into account operational issues. ICCAT has been unable to finalize this more comprehensive arrangement, due to internal implementation concerns on the part of some ICCAT members. The strengthened port inspection standards agreed in 2012 are viewed as an important interim step while these concerns are addressed.

In 2012, CCAMLR adopted revisions to its port inspection scheme to include vessels carrying Antarctic species other than toothfish and to increase consistency with the measures and standards of the Agreement. The United States and the EU had first proposed revisions to the scheme in 2010, and worked with other CCAMLR members to devise acceptable revisions.

CCAMLR became the first RFMO to require that its members license a vessel to fish in the Convention's most important fishery (for toothfish) only if the vessel has a number issued by the International Maritime Organization. As the only global, unique vessel identifier, this number, along with associated information, is crucial in tracking vessel movements from fishing ground to port.

The United States supports adoption by the WCPFC of a port State measures scheme, but recognizes there are many complex issues in tailoring the scheme to the unique circumstances of the western and central Pacific nations and territories, as well as the fleets and ports in the region. After offering proposals in 2011 and 2012 to establish comprehensive port State measures, the EU introduced a scaled-down proposal for a port State inspection scheme; it failed to win agreement at the 2012 meeting.

B. Market- and Trade-Related Measures

Trade and market measures reduce opportunities for IUU fishing activities in a number of ways: by precluding or impeding access to markets for IUU products in a manner consistent with international law; by tracking movements of fish products to identify those involved in harvesting, transshipping, and marketing of IUU catch; by monitoring changes in the pattern of trade to identify flag, port, and market States that can contribute to effective implementation of

CMMs; and by improving information on fishing mortality. Successful market measures are often based on information gathered from trade-tracking programs or catch documentation schemes (CDSs) – systems that can verify the origin, weight, and species composition of catch and indicate whether the catch was taken in accordance with the conservation and management regime in force. The United States is enhancing its ability to carry out global and regional fisheries trade-tracking programs through the International Trade Data System, an electronic "single window" for reporting all imports and exports. NMFS is working with U.S. Customs and Border Protection and other Federal agencies to build this system. See page 26 of the U.S. Treasury's December 2011 Report to Congress.

1. Global Forums

The United States routinely raises the issue of preventing trade or import of IUU-caught fish and living marine resources, whose sustainability is threatened by international trade, in both bilateral consultations and multilateral meetings and negotiations, as discussed throughout this report. In addition, the United States has pushed in the World Trade Organization (WTO) and other trade-related bodies for reduction of subsidies that contribute to overcapacity and illegal fishing activities.

Convention on International Trade in Endangered Species. CITES is an international agreement among 176 member nations, with the purpose of ensuring that international trade in wild animals and plants does not threaten their survival. Species covered by CITES are listed in different appendices according to the level of protection needed. Appendix I includes species threatened with extinction; it is the highest form of protection under CITES and essentially prohibits international commercial trade in listed species, including their parts and products. Species listed in Appendix II are not necessarily threatened with extinction, but they may become so if international trade is not regulated. International trade in Appendix II species is permitted if the exporting nation is able to make findings that the specimen was legally acquired and that the export will not be detrimental to the survival of the species. Appendix III includes species protected by a CITES party that has requested assistance from other CITES parties to control and monitor international trade of the species. Any CITES party may add a native species to Appendix III unilaterally, provided that party has domestic laws to protect the species. The U.S. Fish and Wildlife Service is the lead agency with responsibility for implementing CITES in the United States, under the authority of the ESA. Based on its expertise, NOAA provides guidance on marine issues.

The 16th meeting of the Conference of the Parties to CITES (CoP16) will take place in March 2013, in Bangkok, Thailand. There, CITES parties will consider several proposals to list shark species, as described at length in Part VIII of this report. Also before CoP16 are proposals to list manta rays in Appendix II (by Brazil, Colombia, and Ecuador), and to uplist freshwater sawfish from Appendix II to Appendix I (by Australia). One of the priorities for the United States is adoption of a resolution regarding the provisions for trade in specimens taken "in the marine environment not under the jurisdiction of any State" that are listed in Appendix I or II of the Convention. Within CITES, trade in these specimens is referred to as "introduction from the sea."

World Trade Organization (WTO). The United States wants to strengthen disciplines on subsidies that contribute directly to overcapacity and indirectly to IUU fishing. Unfortunately, very little activity occurred during the past 2 years in the WTO Doha Round of negotiations; the most recent plenary session of the Rules Negotiating Group, the forum for negotiating rules on the provision of fisheries subsidies, occurred in April 2011. Despite calls by WTO members including the United States to keep the trade talks alive, the future of the Doha Round is uncertain.

FAO. In 2005, the FAO adopted ecolabeling guidelines covering wild-caught fish and generally providing that fish and fish products should be harvested in a sustainable manner (see 2011 Report). COFI's Sub-Committee on Aquaculture recently adopted the first global guidelines for aquaculture certification. The guidelines, which are non-binding, set minimum standards for animal health, food safety, the environment, and socioeconomic issues relating to aquaculture workers. COFI endorsed the Aquaculture Certification Guidelines, as well as Guidelines for the Ecolabelling of Fish and Fish Products from Inland Fisheries, in January 2011.

Taken together, these three sets of guidelines establish minimum standards for the labeling of all fish available in the marketplace, whether wild-caught or farmed, whether marine or freshwater product. Assuming that IUU product is not likely to have been sustainably harvested, the ecolabeling guidelines have the effect of denying markets to such product. If the guidelines are followed in full, certification will enable consumers in retail markets to know whether the shrimp or fish they are considering buying was raised without damaging the environment, whether the fish farm worker was paid a fair wage, and whether the shrimp or fish is free of contamination. The guidelines will benefit consumers as well as individuals working in connection with domestic and international seafood markets.

2. RFMO Actions

ICCAT undertakes an annual review of fishery-related activities in its Convention Area for members and non-members, which can result in the identification of nations for diminishing the effectiveness of CMMs under the ICCAT recommendation concerning trade measures. In 2011, ICCAT identified nine members for lack of reporting and agreed to send to 27 members "letters of concern" noting specific issues that needed correction. In 2012, ICCAT identified or maintained identification of seven members and one cooperating party for lack of reporting and other infractions. ICCAT will also send letters of concern to 26 members and one cooperating party calling their attention to lesser infractions.

ICCAT has adopted a number of measures in recent years to support its annual compliance review. At the 2011 meeting, ICCAT adopted a measure, to be implemented in 2013, requiring CPCs to submit information on how they are meeting data reporting requirements. In cases where yearly catch and effort data are not reported completely, CPCs will be prohibited starting the following year from retaining the species in question until the data are sent to ICCAT.

The United States strongly supported moving toward electronic implementation of ICCAT catch and trade documentation programs. In 2012, ICCAT agreed to begin the transition from a paper-based bluefin tuna CDS to an electronic program in May 2013. The agreement allows for paper documents to be accepted until the end of February 2014. The program is expected to enable

verification of the legitimacy of products in near real-time; reduce the burden associated with a paper-based system on the seafood industry, governments, and the ICCAT Secretariat; and make it more difficult to falsify catch documents. In addition, at the 2012 meeting, ICCAT agreed to consider a series of steps for potential development of new catch certification schemes. An intersessional meeting to begin this work will be held in 2013.

The WCPFC has been discussing a CDS for several years, but with little progress. At its 2012 meeting, the Commission finally adopted terms of reference for a working group, which is expected to meet in 2013.

CCAMLR has had a CDS for trade in toothfish since 1999. A nation involved in the harvest or trade of toothfish can obtain status as a non-contracting Party cooperating with CCAMLR by participating in the CDS, thus allowing CCAMLR members to import toothfish from that nation. In 2011, CCAMLR revoked that status from Singapore because it had not fully implemented the CDS nor provided sufficient response to communications from the Secretariat and members. The Commission also noted with concern that IUU-listed vessels were using ports in Singapore. At the 2012 CCAMLR meeting, Singapore expressed its commitment to fighting IUU fishing and reported on port inspections undertaken in 2011–2012, denial of port access for one IUU vessel, and additional steps it will take by 2014 that would enable it to fully implement the CDS. CCAMLR will consider Singapore's request for reinstatement of its status when those steps are complete.

C. Monitoring, Control, and Surveillance

1. Information Sharing and Coordination

International information sharing and coordination aimed at deterring IUU fishing take many forms: cooperation among national authorities to enforce regional and global measures, assistance to developing nations in protecting their own natural resources, and RFMO procedures to facilitate information sharing on enforcement matters.

NOAA and the USCG work closely with enforcement agencies from Canada, Japan, the Republic of Korea, and the Russian Federation to enforce the North Pacific Anadromous Fisheries Commission (NPAFC) prohibition on directed fishing for anadromous stocks in the high seas areas of the North Pacific Ocean. NPAFC enforcement activities also contribute significantly to implementation of the UN global moratorium on large-scale high seas driftnet fishing. NPAFC members coordinate multilateral air and surface patrols to utilize enforcement resources more efficiently. Each spring the parties discuss current enforcement efforts, coordination of enforcement plans, and sharing of resources for the remainder of the calendar year. In 2011, parties conducted 120 ship patrol days and 388 aerial patrol hours in the Convention Area. In 2012, the totals were 153 ship patrol days and 370 aerial patrol hours.

The United States and the Chinese Governments have worked since 1993 to ensure effective implementation of the UN global driftnet moratorium in the North Pacific Ocean, pursuant to the terms of a memorandum of understanding (MOU) that established procedures for law enforcement officials of either nation to board and inspect U.S.- or Chinese-flagged vessels suspected of driftnet fishing. The MOU also established a shiprider program allowing Chinese

enforcement officials to embark on USCG assets during driftnet patrols. These officials facilitate boarding and inspection of suspected Chinese driftnet vessels intercepted by the USCG. In FY 2012 the USCG conducted a number of patrols and boarded 30 vessels in support of the WCPFC High Seas Boarding and Inspection Procedures. On July 27, 2012, a team from the USCG Cutter *Rush* boarded the foreign fishing vessel *Da Cheng*. *Rush* boarding team members identified several violations of WCPFC measures, including that the vessel had been fishing with more than 10 miles of large-scale driftnets. The boarding team also noted questionable registry documents indicating the vessel was Indonesian-flagged. The vessel had 30 metric tons of albacore tuna on board, in addition to 6 metric tons of shark carcasses and fins. Indonesia formally denied registry of the vessel, which prompted the U.S. Government to assimilate the vessel to "without nationality" status. After determining that Chinese citizens were operating the vessel, the U.S. Government arranged for transfer of the *Da Cheng* to a Chinese enforcement vessel for further investigation, according to the MOU process.

In the North Atlantic, the USCG Cutter *Juniper* patrolled the NAFO Regulatory Area September 21-26, 2012. Before departure, the *Juniper* command staff and NAFO-designated U.S. inspectors attended an operations brief hosted by Canada's Department of Fisheries and Oceans in St. John's, Newfoundland. The *Juniper* also carried a Canadian NAFO inspector, who trained the USCG crew on inspection procedures and NAFO forms. During the patrol, the *Juniper* inspected three NAFO contracting party vessels. In addition to this patrol, the United States continued during 2011 and 2012 to work closely with Canada in the North Atlantic by embarking USCG boarding officers as shipriders on Canadian Coast Guard vessels.

The United States continues to expand its partnerships with island nations in the western and central Pacific Ocean to assist with enforcement in that area. The United States and Samoa signed a shiprider agreement in June 2012, bringing the total number of such agreements in the region to nine. In FY 2012, the USCG conducted 121 boardings under bilateral enforcement agreements with seven Pacific Island Nations: Cook Islands, Federated States of Micronesia, Kiribati, Republic of the Marshall Islands, Nauru, Palau, and Tuvalu, with 21 violations documented. Of these, four stemmed from WCPFC measures, while 17 were infractions of national laws applicable within the EEZ of Pacific Island Nations. (See Annex 2 for additional examples of U.S. assistance to coastal States that may lack adequate resources to enforce their national fisheries laws and regulations.)

NOAA and the USCG are collaborating with the U.S. Navy and the Pacific Command to enhance maritime domain awareness and assist Pacific Island Nations in exercising sovereignty over their natural resources, by merging USCG authorities with Department of Defense resources, a program called the Oceania Maritime Security Initiative. This program was expanded in April 2012 through an MOU among the three agencies that articulates the Defense Department's authority to support USCG operations such as embarking USCG and partner-nation shipriders onboard naval assets to conduct fisheries boardings.

RFMOs continue to improve their requirements for information sharing that will enhance compliance with their management measures. ICCAT's reporting obligations include trade data, lists of authorized vessels, bycatch interactions, VMS data, information from at-sea and in-port inspections, bilateral access agreements, and other compliance and enforcement information. A notable activity is the integration of ICCAT's centralized VMS reporting requirements for the

eastern Atlantic and Mediterranean bluefin tuna fishery with the program of high seas boarding and inspection in that fishery. VMS signals are shared with ICCAT members participating in boardings and inspections.

The WCPFC recognized the need for procedures for charter arrangements, to ensure they do not promote IUU fishing activities or undermine CMMs. Accordingly, the Commission adopted a requirement that Commission members and participating territories provide basic information to the Commission regarding chartered vessels. The measure also stipulates that only vessels listed on WCPFC records and registers, and not on any IUU vessel list, are eligible for charter. In 2012 the Commission agreed to keep this charter notification scheme in place for 3 years while it works to improve it.

The IOTC in 2012 adopted a prohibition against large-scale driftnets within the IOTC Area, consistent with the UN moratorium, and a requirement that parties report annually on MCS actions relating to large-scale driftnet fishing on the high seas and within the IOTC area.

2. MCS Network and INTERPOL

The United States is one of the founding members of the International Monitoring, Control and Surveillance Network (MCS Network), and currently serves as host to its Secretariat. NOAA participates in the MCS Network as one mechanism for sharing information and experience with fisheries law enforcement professionals from other nations to monitor the increasingly complex harvesting and marketing of fish around the world.

The MCS Network, with support from donor nations and members, has transitioned from host-government sponsorship toward an arrangement with the International Seafood Sustainability Foundation, which will give the Network greater independence and flexibility. Network members met in Chile in March 2012, where they agreed to revised terms of reference and a business plan. The organization, with a new chairperson and executive director, continues to be housed in a NMFS office and sponsored in part by NMFS.

The Network hosted the Third Global Fisheries Enforcement Training Workshop in Maputo, Mozambique, March 21–25, 2011, and is planning the next such workshop to be held in Central America in 2013.

As part of an effort to recognize innovations in MCS technology, tools, methods, and processes, the Network, with FAO sponsorship, launched a “Stop IUU Fishing Award” contest, open to all stakeholders, at the 2012 COFI meeting. Winners will make presentations at the 2013 workshop. Additional information on the MCS Network is available online at http://www.imcsnet.org.

In early 2012, the International Criminal Police Organization (INTERPOL) held an Environmental Crimes Summit in Bangkok, Thailand, where participants decided to establish an ad hoc Fisheries Crime Working Group (FWG). The FWG plans to conduct several test studies over the next 2 years to assess INTERPOL’s ability to combat fisheries crimes. A NMFS special agent serves as vice-chair of the FWG.

3. Vessel Lists

The United States is engaged at various RFMOs in discussions about the listing and delisting of vessels from IUU vessel lists, by providing intelligence information regarding the vessels' activities, as well as advice regarding application of relevant criteria.

In 2011, ICCAT expanded the scope of the authorized vessel list from vessels above 20 meters to those 12 meters and above, and strengthened provisions on port inspection of IUU vessels. Based on the negative (IUU) list, which is reviewed annually, members and cooperating parties are to take necessary measures not to support those vessels, including prohibiting imports, landings, or transshipments of ICCAT species.

IUU fishing continues to be a problem in the CCAMLR Convention Area. During 2010–2011, five vessels were reported to have engaged in IUU fishing in the Convention Area, while three IUU-listed vessels were sighted outside the Area. At the 2011 meeting, the Commission agreed to remove two vessels from the Contracting Party IUU Vessel List. One member blocked consensus on the addition of one of its vessels to the list.

Three vessels were reported to have engaged in IUU fishing in the Convention Area during the 2011–2012 fishing season and were also sighted outside the Area. Three other vessels reported to be associated with IUU fishing were also sighted in the Convention Area during the 2011–2012 fishing season. Of these six, four were reported to be using gillnets fixed to the bottom with anchors or weights, a fishing method considered to result in significant bycatch. A refrigerated cargo vessel was added to the Non-Contracting Party IUU Vessel List, for providing support to IUU vessels in the Convention Area. CCAMLR members did not reach consensus on the removal of a vessel from the Non-Contracting Party IUU Vessel List or the addition of any vessels to the Contracting Party IUU Vessel List at the 2012 meeting.

The WCPFC, in implementing its conservation measure governing the Record of Fishing Vessels and authorizations to fish, established a temporary register of non-member carrier and bunker vessels, which allowed non-member carriers and bunkers to operate in the WCPFC Area subject to a number of conditions, including VMS participation. This interim list will expire in early 2013, at which time non-member carrier and bunker vessels will no longer be allowed to operate in the WCPFC Area. The impending ban has provided an incentive for carriers and bunkers to become flagged to WCPFC members, cooperating non-members, and participating territories, and for flag States of carriers and bunkers to become cooperating non-members of the WCPFC. In 2012, the WCPFC did not identify any additional vessels for inclusion on its IUU Fishing List for 2013, and removed one of the four vessels on the list. The United States has been leading intersessional work on a proposal by Tonga to take account of coastal States' interests in decisions to place a vessel on, or remove it from, the IUU vessel list, but no action was taken during the 2012 meeting.

NAFO continues to maintain a list of vessels that have conducted IUU fishing in its Regulatory Area. NAFO shares IUU vessel sightings with other RFMOs operating in the Area, particularly with NEAFC, as the two RFMOs are adjacent, share much of the same membership, and manage groundfish stocks that are susceptible to IUU fishing by the same vessels. NAFO and NEAFC have agreed to recognize each other's IUU vessel lists. This allows membership from both

organizations to act in concert to restrict port access by IUU-listed vessels and to "delist" vessels as appropriate. During 2011 and 2012, the United States has continued to work with NAFO to enhance at-sea inspection provisions and to conduct joint NAFO/NEAFC patrols. NAFO also continued to revise catch reporting, labeling, and stowage provisions to improve and facilitate monitoring and inspection activities both at sea and in port.

4. Global Record of Fishing Vessels

The FAO initiative to compile a Global Record of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels is intended to provide a tool to prevent, deter, and eliminate IUU fishing and related activities. A global database where information from many sources will be gathered will make it more difficult and expensive for vessels and companies acting illegally to do business. A "technical consultation" developed recommendations for consideration by COFI in 2011 to launch the Global Record. Eventually, all vessels 10 gross tons or 10 gross registered tons or more, or 12 meters or more, will be included (an estimated 725,600 vessels). In the first phase, 2011–2013, the largest vessels will enter the record (i.e., 100 gross tons or 100 gross registered tons or more, or 24 meters or more). There are estimated to be around 185,600 of these vessels. In 2011, NMFS funded an FAO training workshop in Central America on the tools and capabilities necessary to contribute national vessel registry information effectively to the Global Record.

The five tuna RFMOs are engaged in a related effort to develop a combined list of authorized vessels (CLAV), including the assignment of unique vessel identifiers. The executive secretaries of the tuna RFMOs convened a second workshop on the CLAV system at the FAO in June 2012. The workshop agreed to host the new CLAV system at the IOTC or the IATTC. The workshop recommended that the terms and conditions for use of the CLAV system and exchange of information be incorporated in an MOU agreed by the FAO and the tuna RFMOs.

5. Remote Sensing Technology, Observers, and Inspections

NMFS promotes the adoption of VMS provisions by RFMOs and flag States. Currently NMFS monitors 5,100 U.S. fishing vessels required to carry VMS equipment, as well as several foreign vessels under settlement or plea agreements. U.S. enforcement personnel assist in crafting RFMO conservation measures requiring VMS use, and provide training on the use of VMS in fisheries enforcement.

The IATTC took an important step toward improving the amount and quality of scientific data provided to the Commission by mandating a minimum of 5 percent observer coverage on all longline vessels greater than 20 meters length overall, effective January 1, 2013. The primary function of the observers will be to record the catches of targeted fish species, species composition, and any available biological information, as well as any interactions with non-target species such as sea turtles, seabirds, and sharks. The United States remains concerned that coverage may need to be increased to ensure adequate data on catch and bycatch in the IATTC longline fisheries. The recent resolution specifies that in 2014 the Commission will review the preliminary results of implementation, and after consulting with the Scientific Advisory Committee consider expanding the level of observer coverage. The United States has been a

strong advocate for development of longline observer programs for the tuna RFMOs and is very pleased that the IATTC has taken this first step.

At the 2012 annual meeting, ICCAT adopted a U.S. proposal that significantly expands and strengthens its rules on transshipment at sea and in port. It closes loopholes in the previous measure by eliminating a broad exemption for vessels under 24 meters; expanding coverage to all ICCAT species wherever transshipped; allowing observer verification of the fishing vessel's logbook and transshipment authorization; and requiring data to be provided on ICCAT-managed species by stock and on species caught in association with ICCAT species. These changes will enhance data quality for scientific and compliance purposes, and will help eliminate any incentive for vessels to circumvent ICCAT rules by transshipping outside the ICCAT Area.

In addition, ICCAT improved its MCS provisions for the eastern Atlantic and Mediterranean bluefin tuna fishery, including mandatory use of stereoscopic cameras in the transfers during caging and farming operations. ICCAT agreed to hold another meeting of its Working Group on Integrated Monitoring Measures in 2013, to consider revising its VMS recommendation, further developing a comprehensive high seas boarding and inspection scheme, using unique vessel identifiers, and improving chartering rules.

The WCPFC Convention requires that all vessels fishing for highly migratory fish stocks on the high seas in its Convention Area participate in a VMS operated by the Commission. The system has been largely operational for the last few years, and will be fully applied to all vessels by the end of 2013. In 2012, the WCPFC took the additional step of expanding its VMS to include, at the request of any coastal State member, waters under the member's national jurisdiction. Because most coastal State members apply their own national VMSs to vessels authorized to fish in their waters, this change is not expected to expand the number of vessels collectively covered by VMSs in the region, but it will make VMS information for those vessels more broadly available. Specifically, it will give coastal State members, including the United States, access to near real-time vessel position information – in their respective waters – for foreign vessels authorized to fish on the high seas or in the waters of other coastal States in the WCPFC Area.

A CCAMLR conservation measure amended in 2011 now allows the Secretariat to share VMS data from individual vessels with a contracting party that is planning active surveillance presence and/or inspections in a specified CCAMLR subarea or division. For the Secretariat to provide VMS data to the contracting party without the permission of the flag State, the contracting party must have designated inspectors, have previously carried out active surveillance and/or inspections, and have specified the geographic area of the planned surveillance or inspections. Other conditions and limitations apply. Also, the conservation measure now allows for a contracting party to request the Secretariat to check VMS data from a vessel against the claims on a *Dissostichus* [toothfish] Catch Document, which allows a simple check of VMS data without requiring release of data to the requester or permission from the flag State. (The Secretariat otherwise provides VMS data to contracting parties to verify such claims only with flag State permission.) At its 2012 meeting, CCAMLR agreed to form a VMS technical and operational group to advise on procurement of a new VMS software package and to review future needs of the system.

NAFO established a compliance-based observer program in 1998 and requires use of VMS on 100 percent of contracting party vessels in its Regulatory Area. All vessels are also required to carry at least one observer, with the exception noted below, whose main function is compliance but who may also perform scientific work as requested. Observers are to report infringements within 24 hours to an inspection vessel. Parties now have the option to implement the current observer program or to change to 25 percent observer coverage with more detailed and frequent electronic reporting, which requires on-board equipment that the NAFO Secretariat must have tested and found to be 100 percent reliable. In 2011 and 2012, NAFO continued to improve the effectiveness of its enforcement measures by implementing changes to catch reporting (logbook), VMS notification, and other provisions.

D. Flag State Responsibilities

IUU fishing can be exacerbated or even inadvertently encouraged by irresponsible flag States – in particular, those States that allow vessels to fly their flags without any capability or effort to monitor and control the operations of those vessels. In response to the perceived failings of several flag States in this regard, at the March 2007 COFI meeting, members asked the FAO to "consider the possibility . . . of an expert consultation to develop criteria for assessing the performance of flag States as well as to examine possible actions against vessels flying the flags of States not meeting such criteria."

COFI members at their 2009 meeting discussed assessment of flag State performance, including development of criteria for self-assessment and evaluation by outsiders. A group of experts consulting in June 2009 produced a report that was considered by a technical consultation in May 2011 and March 2012. At the first meeting, participants were able to conduct an initial review of approximately half the criteria prepared at the expert consultation. They found significant differences of view on the geographic scope of the criteria and how the evaluation process should run.

At the March 2012 meeting, participants made significant progress on practically all outstanding issues. Those still unresolved are whether the criteria would apply to third-party EEZs as well as the high seas, whether a State can initiate a flag State performance assessment of another State, and use of the term "market States" in the draft text. At its meeting in July 2012, COFI noted the need for further progress on the draft Criteria for Flag State Performance and requested the Secretariat to convene the second resumed session of the technical consultation as soon as possible. COFI welcomed NMFS funding to support that session. The FAO reports that the Technical Committee is likely to develop a list of possible actions to be taken against vessels flying the flags of States not meeting the criteria.[34]

E. Destructive Fishing Practices and Vulnerable Marine Ecosystems

As noted above, the statutory definition of IUU fishing includes fishing activity that has a significant adverse impact on VMEs, including seamounts, hydrothermal vents, and cold water corals, located beyond national jurisdiction, for which there are no applicable conservation or management measures or in areas with no applicable international fishery management

[34] FAO, "The State of World Fisheries and Aquaculture," Rome, 2012, p. 95.

organization or agreement. The United States and the international community have taken a number of actions in recent years to address IUU fishing that has adverse impacts on VMEs.

In fall 2011, the informal consultations for the UNGA Sustainable Fisheries Resolution again convened to review progress by States and RFMOs in implementing the bottom fishing provisions of Resolutions 61/105 and 64/72, both of which are described in the 2011 Report. The near-consensus view of the participants was that, although significant progress had been achieved, implementation remains uneven and further work by States and RFMOs is needed to fulfill the UNGA mandate to protect VMEs on the high seas from bottom fishing.

To that end, the 2011 Resolution (66/68) contains new language focused on improving State and RFMO approaches to assessing and mitigating fishing impacts on VMEs; augmenting scientific knowledge of VME habitats and associated species through international research; establishing mechanisms for compliance with VME provisions; and enhancing information sharing. Collectively, these measures will promote more uniform implementation by States and RFMOs of existing mandates and provide greater protection to VMEs and associated habitats.

One identified contributing factor to uneven implementation is the lack of detailed technical guidance and scientific knowledge on the location, distribution, and nature of VMEs worldwide. The 2011 Sustainable Fisheries Resolution therefore requests that the FAO further assist States and RFMOs in addressing this issue. New language invites the FAO to develop guidance on applying criteria for VME identification and on measures to mitigate bottom fishing impacts on VMEs; to assist in establishing best practices for conducting assessments and standards for implementing those assessments; to produce scientific guidance on stock assessments for deep sea species; and to provide access to data for facilitating implementation. UNGA calls upon States and RFMOs to conduct research on seabed mapping for the purposes of identifying and protecting VMEs and to consider available research on where VMEs are known or likely to exist, to protect or mitigate impacts to those areas.

In addition, Resolution 66/68 calls for strengthened procedures and actions for assessing VMEs and related target and non-target species, including a directive that the cumulative impacts of fishing on VMEs be considered. The new provisions also provide clearer directives on sharing information and making assessments publicly available, and specify conditions under which assessments should be updated.

Since 2008, when the resolution came fully into effect, all RFMOs with the authority to manage bottom fishing have implemented measures to comply with 61/105.

The United States has taken a strong role in NAFO relative to protection of VMEs. Since 2006, NAFO has closed more than 360,000 square kilometers to bottom fishing in its efforts to protect VMEs, and extended all existing closed areas for coral, sponges, and seamounts until the end of 2014. NAFO continued to enhance this protection by adopting a list of VME indicator species identified by its Scientific Council; reducing existing catch thresholds of sponges and corals needed to trigger vessel "move-on" rules; adopting first-time catch thresholds for "sea-pens" (a soft coral); agreeing to a comprehensive reassessment of NAFO fishing activities with respect to significant adverse impacts on VMEs; further enhancing the NAFO provisions relating to

exploratory fishing; and taking action to increase communication between its scientific and management bodies relative to protection of VMEs.

CCAMLR, in 2011 and 2012, identified four areas (circles with a radius of 1.25 nautical miles) in which bottom fishing is prohibited, under a conservation measure to create a list of registered VMEs. Within those areas, only scientific research activities approved by CCAMLR for monitoring or other purposes, based on advice from the Scientific Committee, are allowed.

VI. Progress to Strengthen Fisheries Management Organizations to End IUU Fishing Activities

For a number of years, the United States has pushed for effective international action against IUU fishing in global bodies such as UNGA and the FAO, as well as in RFMOs and bilaterally.

The United States is a member of numerous multilateral RFMOs, in addition to many global and bilateral agreements and arrangements. In recent years, the international community has increasingly recognized that successful action against IUU fishing activities and related problems will require strengthening existing regional fisheries institutions as well as creating new RFMOs to manage previously unregulated ocean areas. The United States has been a major force in these efforts, as discussed below. This Part highlights the establishment of new organizations, and the enhancement of existing ones in ways that induce their members to be more accountable, and influence non-members to be more cooperative, in managing fisheries on a sustainable basis.

A. Establishing New RFMOs

Due to the efforts of the United States and many others, the number of RFMOs continues to expand. This section describes developments in nascent RFMOs since the 2011 Report to Congress.

South Pacific Regional Fisheries Management Organization (SPRFMO). The Convention on the Conservation and Management of the High Seas Fishery Resources of the South Pacific Ocean entered into force on August 24, 2012. This organization fills a gap in the international fisheries management regime in the South Pacific, and responds to recent calls from the UN and elsewhere to take urgent action with regard to the impacts of destructive fishing practices on high seas VMEs. The main fisheries currently addressed by SPRFMO are pelagic fisheries for jack mackerel and bottom fisheries for species such as orange roughy. During the course of the negotiations, the participants agreed to non-binding interim CMMs covering both pelagic and bottom fisheries.

The first meeting of SPRFMO will take place beginning on January 28, 2013, in Auckland, New Zealand. The United States is a signatory to the Convention. The Department of State (DOS) is preparing ratification documents for submission to the White House, while NMFS is working on implementing legislation.

North Pacific Fisheries Commission (NPFC). The goal of the negotiators in establishing this new RFMO was to ensure the long-term conservation and sustainable use of the fisheries resources in the North Pacific Ocean, while also protecting the marine ecosystems in which these resources occur, including addressing the negative impacts of bottom fishing activities on VMEs. The Convention on the Conservation and Management of High Seas Fisheries Resources in the North Pacific Ocean was opened for signature in April 2012, with the United States the first signatory; it will enter into force when four parties have deposited their instruments of ratification. The first three sessions of the Preparatory Conference addressed the administrative and budgetary issues of setting up a Secretariat. Selection of a Secretariat host nation at the next session will facilitate detailed discussion of the budget.

The Convention establishes a management framework for all fisheries not already covered under existing international management instruments, with a particular focus on bottom fisheries, across the high seas areas of the North Pacific. Interim measures have been agreed with regard to bottom fishing, including the compilation, analysis, and exchange of data on bottom fishing in the region, and steps to protect VMEs from the impacts of bottom fisheries.

B. Strengthening Existing RFMOs

In addition to working to establish new RFMOs, the United States has pushed for improved governance systems in existing RFMOs to bring them into closer conformity with the provisions of the UNFSA. Some RFMOs have been updated through renegotiation of their underlying agreements or negotiation of new protocols. Others are finding ways to improve management and compliance without renegotiating their underlying agreements. This section reports on developments in existing RFMOs since the 2011 Report to Congress.

1. Renegotiation or Amendment of Underlying Agreements

U.S. officials were heavily involved in negotiating an agreement to update and modernize the guiding principles, mandate, and functions of the IATTC, a body established in 1949 to manage tuna fisheries in the EPO. The new agreement – the Antigua Convention – entered into force on August 27, 2010. The Senate provided its advice and consent to U.S. ratification, which is pending subject to the passage of implementing legislation to clarify U.S. authorities to implement the Antigua Convention. In the 112th Congress, such legislation was introduced as Title IV of S. 52 and Title II of H.R. 4100, but neither bill was passed.

NAFO adopted comprehensive amendments to its establishing Convention in 2007. The United States strongly supported revisions that incorporated the precautionary approach and ecosystem considerations into NAFO's mandate. The amendments will enter into force once nine of the contracting parties deposit their instruments of ratification. To date, Canada, Cuba, the EU, Norway, and the Russian Federation have done so. DOS has prepared a ratification package to obtain Senate advice and consent to the amendments; NMFS has drafted proposed revisions to the Northwest Fisheries Convention Act, which provides implementing authority for the NAFO Convention.

2. Performance Reviews

Many RFMOs have undertaken performance reviews to bolster their organizations. The Review Conference on the Fish Stocks Agreement at its 18th meeting in May 2010 urged all RFMOs that had not undertaken performance reviews, including some element of independent evaluation, to do so no later than 2012.

The SPRFMO Convention includes a requirement for a performance review every 5 years (Article 30).

In 2007, ICCAT established a Working Group on the Future of ICCAT, to consider its Convention, other basic texts, and ICCAT recommendations and resolutions vis à vis relevant international treaties and agreements. After several years of discussion, informed by an

independent performance review in 2008, ICCAT agreed at its 2012 meeting to launch a process to develop convention amendments concerning scope, decision-making procedures, and non-party participation, among other subjects. A working group will begin the process in 2013, with a target of completion by 2015. As interim steps, ICCAT adopted a resolution to guide the use of its objection procedure, including improving transparency and minimizing delay in the entry into force of ICCAT recommendations, and amended its mail voting procedures.

As described in the 2009 Report to Congress, the North Atlantic Salmon Conservation Organization (NASCO) embarked on a comprehensive performance review in 2004. In 2011, NASCO appointed a panel of independent experts to assess its fitness for the future. At the 2012 meeting the panel presented its recommendations, including that NASCO should explore whether and how to make more of its decisions binding. NASCO decided immediately to improve reporting requirements, and to initiate a process to consider steps to meet current and future challenges to the effective conservation and management of wild Atlantic salmon. A meeting of the NASCO parties in February 2013 will develop a plan of action with prioritized recommendations for consideration at the 2013 annual meeting.

A review panel consisting of outside experts and chairs of the Commission's standing committees presented a report on its performance review of the NPAFC to the annual meeting in 2010. The review was quite favorable to the NPAFC, especially its Committee on Enforcement, but pointed out that the Commission's very success in virtually eliminating directed and indirect high seas fishing for anadromous stocks places it at a crossroads. The reviewers had a total of 54 recommendations for the Commission, most of which were procedural in nature, including establishment of a working group on the future of the NPAFC. The Commission has completed 41 of the tasks, with 13 still in progress.

A review panel assessed the performance of NAFO against the objectives set out in its Convention and other relevant international instruments addressing the conservation and management of living marine resources. The panel presented its report at the 2011 annual meeting. Highlights of the recommendations include: continued development of cooperative relationships with other RFMOs and international organizations; improved quality and timeliness in data submissions and in reporting by contracting parties on infringements; further harmonization of relevant NAFO rules with applicable provisions of the Port State Measures Agreement; further development and implementation of risk-based assessment approaches and integration of the precautionary approach to decision making within NAFO; and enhanced working relationships among scientists and managers in the organization. At the 2012 meeting, NAFO adopted a plan of action that assigns tasks and deadlines to appropriate bodies within the organization; many of these activities are already underway. For example, working groups on conservation and rebuilding of fish stocks, management strategies, and VMEs that once were under the Fisheries Commission are now joint groups with the Scientific Council.

In 2011, the WCPFC received a set of 79 recommendations from an independent performance review conducted by representatives of members and independent experts. The Secretariat has prepared a matrix of those recommendations and members' comments on them. At its 2012 meeting, the Commission agreed to a process whereby each of its subsidiary bodies will begin in 2013 to consider relevant recommendations.

3. Bolstering Responsibilities of Members and Non-Members

Article X of the Antigua Convention, which entered into force in August 2010, mandates the IATTC to establish a Compliance Committee. A resolution adopted in 2011 provides guidance and elaborates on the process to be followed, a significant expansion of the previous compliance review process that should result in increased adherence to adopted measures. The IATTC Director, based on measures in force, drafted a comprehensive compliance questionnaire that must be completed and returned in advance of the annual meeting. Transmission of the questionnaire is accompanied by any evidence from observer reports or other sources of information highlighting possible instances of non-compliance; CPCs must address these matters when returning the questionnaire. These results are compiled by the Director and then reviewed in detail during a multiday meeting of the Committee in advance of the annual meeting. The Chair of the Compliance Committee may then make recommendations for improving the compliance of CPCs, individually or collectively, and may also choose to follow up on highlighted matters intersessionally. The resolution does not provide for a process that could result in consequences for instances of repeated non-compliance, but anticipates the development of such a process: "[t]he Committee may consider development of a scheme of sanctions and incentives as well as a mechanism for their application to improve compliance by all CPCs to be submitted to the Commission for consideration and possible adoption."

In 2009, CCAMLR revised a conservation measure to promote compliance by contracting party nationals by adding requirements to increase scrutiny of, and ability to take actions against, beneficial owners of vessels violating CCAMLR measures. Pursuant to this measure, in 2011 one member submitted information about actions it is taking against owners of IUU-listed vessels. In 2012, CCAMLR adopted a compliance evaluation procedure under which members will review incidents of non-compliance with a set of conservation measures, assess a compliance status category for each member, and make recommendations for action by the member in cases of non-compliance or for action by the Commission in cases of serious, frequent, or persistent non-compliance.

ICCAT has adopted a number of measures to improve adherence to its rules by both members and non-members, including mandatory quota reductions in cases of overharvest, prohibitions on retention of species if certain data are not supplied, and the trade measures recommendation mentioned in Part V.B.2. Regarding the latter, if an ICCAT member or non-member is found to be diminishing the effectiveness of ICCAT, that member or non-member is "identified." ICCAT sends a letter notifying the party of the identification, including the reasons for it, and asking the party to rectify the situation. Failure to rectify the identified activity may result in the imposition of penalties, such as quota reduction or, as a last resort, non-discriminatory trade restrictions. To date, trade-restrictive action under this instrument has been applied several times to non-members and once to an ICCAT member.

In 2011, the WCPFC initiated a trial scheme for compliance monitoring. At its 2012 meeting, the Commission committed to continuing the scheme for another year, but only after adopting provisions to prevent use of the compliance information for purposes outside the WCPFC. The Commission is expected to consider supplementing the monitoring scheme with a system involving consequences for non-compliance.

4. Steps to Enhance Participation by Non-Members

To implement the provision of the UNFSA relating to the duty of non-members to cooperate in the conservation and management of fish stocks, RFMOs are working toward enhanced participation by non-members in their organizations.

At the time of the 2011 Report to Congress, the IATTC had two cooperating non-parties, the Cook Islands and Kiribati. Kiribati has since become a member and the Cook Islands have maintained their cooperating status.

In CCAMLR, States that have acceded to the Convention, but that have not applied for membership in the Commission, are nonetheless obligated to abide by all the conservation measures adopted by the Commission, and are excluded from participation in Convention Area exploratory fisheries. Currently there are 10 such non-members. In addition, any non-Contracting party may cooperate with CCAMLR by participating in its CDS; Seychelles is the only nation with that status.

Following a substantial revision of the WCPFC measure pertaining to cooperating non-member status in 2008, the Commission again amended these provisions in 2009 to add a requirement that an applicant for this status commit to making financial contributions commensurate with what it would be assessed should it become a contracting party or a member. The number of WCPFC cooperating non-members has increased over the past few years. Those accepted for 2012 and 2013 are Belize, the Democratic People's Republic of Korea, Ecuador, El Salvador, Indonesia, Mexico, Panama, St. Kitts and Nevis, Senegal, Thailand, and Vietnam.

Currently, ICCAT has five cooperating non-members: Chinese Taipei, Colombia, Curaçao, El Salvador, and Suriname. At the 2011 meeting, ICCAT agreed to allow cooperating non-members to play a more active part in the Commission's work, in particular through presenting or co-sponsoring proposals.

5. Steps to Improve Cooperation and Coordination

Representatives of RFMOs are working to improve cooperation and coordination among RFMOs themselves, particularly for those operating in the same region or managing highly migratory species.

Kobe III. The first meeting of the five tuna RFMOs occurred in Kobe, Japan, in 2007; the second was hosted by the European Community, in San Sebastian, Spain, in summer 2009. Participants agreed to call these joint meetings the "Kobe Process." The United States hosted Kobe III in La Jolla in July 2011. More than 50 nations attended, with a strong showing from West African nations. Principles proposed by the United States for the cross-listing of IUU vessels were forwarded to the five tuna RFMOs, as guidance in harmonizing criteria and processes so that each tuna RFMO list could include IUU vessels identified by the others. Kobe III participants recommended that the tuna RFMOs establish a common format for assessing compliance with data reporting requirements. Another recommendation affirmed that tuna RFMOs should adopt port State measures and support developing nations in their efforts to

implement such measures. They also established a steering committee of the RFMO chairs and vice chairs, first convened at the COFI meeting in July 2012.

The WCPFC and the IATTC have approved a memorandum of cooperation that allows observers from either commission to serve on vessels that fish in both convention areas during the same trip. Prior to this arrangement, a vessel intending to fish in both areas had to carry an observer from each body. To implement the memorandum, staff members of the two commissions have trained observers to be qualified as cross-endorsed, and have developed an operating manual with instructions for the regional observer program.

The IATTC and WCPFC Conventions share a large overlap area that presents a number of questions and challenges for management. IATTC members convened an Extraordinary Meeting of the Commission in October 2012 and adopted a two-step recommendation. In the short term, vessels registered exclusively with one commission would apply the CMMs of that commission in the overlap area. For vessels flagged to members and appearing on both registers, the flag State would decide which commission's CMMs will apply for at least 3 years. A vessel listed on both registers but whose flag State is a member of only one commission would follow the CMMs of that commission. In the long term, a joint working group would explore avenues for managing tuna stocks in the entire Pacific Ocean. The WCPFC agreed to this proposal at its regular session in December 2012.

At its 2011 meeting, ICCAT adopted guidelines to encourage information sharing between CITES and ICCAT and to foster better understanding of their respective work. CITES will consider the guidelines at CoP16.

VII. International Efforts to Reduce Impacts of Fishing on PLMRs

The United States continues to work actively within the international community to promote measures that will protect and conserve PLMRs from bycatch or other harmful activities. U.S. bilateral and multilateral efforts include direct advocacy as well as training and other assistance. To date, U.S. efforts and RFMO actions concerning PLMRs have generally concentrated on the impacts of fishing on sea turtles, sharks (see Part VIII), dolphins, and some other marine mammals. This Part describes the actions taken by international fisheries bodies with regard to these PLMRs, and U.S. involvement in those actions.

A. Global Forums

United Nations General Assembly (UNGA). As a direct result of U.S. leadership, the UNGA 2011 Sustainable Fisheries Resolution calls for States and RFMOs to establish or strengthen existing data collection programs for the bycatch of marine mammals, sea turtles, seabirds, and sharks, in addition to supporting research on and development of appropriately selective gears. This is the first time that nations have agreed to include a reference to the bycatch of marine mammals within the resolution, which should provide an impetus for efforts and measures in addressing marine mammal bycatch internationally.

Food and Agriculture Organization (FAO). The United States participated in the development of FAO's International Guidelines on Bycatch Management and Reduction of Discards in 2009–2010, developed through an expert consultation followed by a technical consultation. COFI endorsed the guidelines at its meeting January 31–February 4, 2011. These guidelines provide advice to States, both individually and collectively through RFMOs, on ways to manage the bycatch of protected and all other marine resources, including undersized target fish. They detail actions for States during all stages of planning and implementation of bycatch management, including data collection and assessments, research and development, management tools, capacity building, and MCS. NMFS, as the lead on the U.S. delegation, ensured that the guidelines accord with our existing domestic measures to protect living marine resources.

At the July 2012 COFI meeting, the United States noted its ongoing efforts to assemble information on the mitigation of marine mammal bycatch in commercial fisheries through a series of international workshops, and signaled its desire to develop international guidelines to reduce the bycatch of marine mammals in commercial fisheries similar to existing guidelines for sea turtles and seabirds.

Convention on Migratory Species (CMS). Also known as the Bonn Convention, the CMS aims to conserve terrestrial, marine, and avian migratory species throughout their range. In 2011, the 10th Meeting of the Conference of the Parties to CMS adopted a resolution requiring parties to reduce bycatch from gillnets of CMS-listed taxa, including species of sea turtles, seabirds, marine mammals, and sharks. The resolution specifically urges CMS parties to assess and address their gillnet bycatch. Parties also agreed to a Global Programme of Work for Cetaceans, which among other actions calls upon parties to collaborate regionally on addressing entanglement and bycatch of cetaceans. The United States is not a party to CMS, but attended the meeting as an observer.

Pacific Cetacean MOU. In September 2012, the United States signed the MOU, an initiative to bring coherence to cetacean conservation activities across the Pacific Islands Region under the auspices of the CMS. The Whale and Dolphin Action Plan is the implementing mechanism of the MOU, which seeks to foster cooperation, build capacity, and ensure region-wide conservation of cetaceans and their habitats, as well as to safeguard the associated cultural values for the people of the Pacific Islands. Earlier in the month, signatories to the MOU met in New Caledonia, where they adopted the Whale and Dolphin Action Plan for 2013–2017 and the Oceania Humpback Whale Recovery Plan for the same time period.

International Council for the Exploration of the Sea. The United States participated in several groups sponsored by the Council in 2011 and 2012 that were directed at bycatch of protected species.

Joint Tuna RFMO Technical Bycatch Working Group. On July 11, 2011, just prior to the Kobe III meeting, the Joint Tuna RFMO Technical Working Group on Bycatch convened for the first time. The working group first reviewed work conducted in the RFMOs on bycatch, implementation of CMMs, and priorities to reduce bycatch. The working group developed an extensive list of recommendations pertaining to standardization of data collection protocols, data sharing, and observer training and certification. The working group provided a provisional list of research priorities and its proposed work plan to the Kobe III meeting for consideration. In March 2012, some members of the working group met with technical experts from tuna purse seine fishery observer programs to begin to harmonize bycatch data collection by tuna RFMOs. ICCAT's Standing Committee on Research and Statistics (SCRS) has agreed to take the lead in an effort to develop minimum standards for observer programs in longline fisheries. (The working group's recommendations specific to sharks appear in Part VIII.)

B. RFMOs

At its 2011 meeting, ICCAT adopted a recommendation that directs members and cooperating parties to require collection of bycatch and discard data through existing logbook and observer programs, and to report these data in a format specified by the SCRS. ICCAT has also adopted minimum standards for observer coverage, including 5 percent minimum coverage for pelagic longline, purse seine, and baitboat fisheries. For artisanal fisheries that are not subject to ICCAT's standards and requirements, CPCs are required to collect bycatch data through other means and to describe their efforts in annual reports. CPCs are also required to report on steps taken domestically to mitigate bycatch and reduce discards, beginning in 2012.

Funding for the new position of Bycatch Coordinator was included in ICCAT's 2012–2013 budget; the position has been filled with a permanent hire. This will permit the SCRS to more fully address both ecosystem-based management and fishery impacts on bycatch species.

Under its Convention, the WCPFC is to adopt measures to minimize waste, discards, catch by lost or abandoned gear, catch of non-target species (both fish and non-fish), and impacts on associated or dependent species (particularly endangered species). Another mandate is to promote the development and use of selective, environmentally safe, and cost-effective fishing gear and techniques. The WCPFC has adopted a number of taxa-specific measures to meet these

obligations, as described in the following sections. The Commission administers a regional observer program that collects data on catches of non-target species and on discards. Its scientific data agreement requires that members provide total estimated catches of certain non-target species. The WCPFC maintains a Bycatch Mitigation Information System to facilitate information sharing related to bycatch and bycatch mitigation.

C. Specific Species

Sea Turtles. All marine turtles are designated as either threatened or endangered under the ESA. The Kemp's ridley sea turtle, listed as endangered, is found principally in U.S. and Mexican waters. The breeding populations of olive ridley turtles on the Pacific coast of Mexico are currently listed as endangered, while other olive ridley populations are listed as threatened. Leatherback and hawksbill turtles are classified as endangered. Green turtles are currently listed as threatened (except for an endangered population of green turtles nesting in Florida and on the Pacific coast of Mexico). In September 2011, NMFS designated nine distinct population segments of loggerhead sea turtles, four listed as threatened and five as endangered. Previously, the entire global population had been listed as threatened.

Sea turtles in the Atlantic Ocean, Mediterranean Sea, Gulf of Mexico, and Pacific Ocean are incidentally taken as bycatch or entangled in pelagic longline, purse seine, trawl, gillnet, pound net, and trap/pot fisheries. Sea turtles frequently travel throughout ocean basins between their nesting beaches and foraging grounds. For instance, Pacific loggerheads nest in Japan, but spend part of their juvenile stage foraging off the Baja Peninsula of Mexico and in the central North Pacific Ocean.

The Shrimp-Turtle Act (Section 609 of P.L. 101-162) committed the U.S. Government to work to ensure that other nations take measures to protect sea turtles in their wild-caught shrimp fisheries through measures comparable to those in effect in the United States (e.g., turtle excluder devices, TEDs). Over the past two decades, the United States has worked with many governments to establish TEDs programs. Each year DOS and NMFS experts carry out TEDs inspections and training in nations mentioned below. The United States worked with Costa Rica to address gaps in enforcement that had resulted in an embargo, and on April 30, 2012, lifted the embargo on Costa Rican wild-caught shrimp products.

Currently, 13 nations have regulatory regimes requiring the use of TEDs: Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Nigeria, Pakistan, Panama, and Suriname. Twenty-six nations and one economy have shrimp fishing environments that do not pose a danger to sea turtles. Of these, 10 nations and one economy harvest shrimp using manual rather than mechanical means, or use other shrimp fishing methods not harmful to sea turtles. They are the Bahamas, Belize, the Dominican Republic, Fiji, Hong Kong, Jamaica, Oman, the People's Republic of China, Peru, Sri Lanka, and Venezuela. The 16 other nations have shrimp trawl fisheries in cold waters, where the risk of taking sea turtles is negligible: Argentina, Belgium, Canada, Chile, Denmark, Finland, Germany, Iceland, Ireland, the Netherlands, New Zealand, Norway, Russia, Sweden, the United Kingdom, and Uruguay. In addition to the Shrimp-Turtle Act, the United States has worked aggressively through RFMOs, multilateral environmental agreements, and other forums to urge nations to implement measures comparable to those applicable in the United States to protect sea turtles from fisheries

operations. For example, during 2011 and 2012, NMFS and DOS have actively advocated measures to protect sea turtles in international fisheries and conservation bodies and at bilateral fisheries meetings.

Multilateral Sea Turtle Arrangements. With U.S. leadership, two multilateral arrangements have been negotiated to conserve and protect sea turtles. Under the Inter-American Sea Turtle Convention (IAC), which is the only binding international agreement for sea turtles, parties must work to reduce, to the greatest extent practicable, incidental capture, retention, harm, or mortality of sea turtles, and also to implement the FAO Guidelines to Reduce Sea Turtle Mortality in Fishing Operations. The Fifth Conference of Parties, meeting in Bonaire in June 2011, set a 2-year work plan and budget, and adopted an MOU with the IATTC. The IAC Scientific and Consultative Committees are reviewing requests from Guatemala and Panama for exceptions from the Convention's harvest prohibitions, to allow domestic egg harvest for subsistence communities. Those committees will make a recommendation to the Sixth Conference of Parties in June 2013.

The Indian Ocean Southeast Asian Marine Turtle MOU, a non-binding instrument, recommends more general conservation action, such as measures to prevent bycatch of sea turtles, but without specifying specific gear types or actions. At the Meeting of Signatory States in January 2012, participants established a network of "sites of importance" for marine turtles and their habitats. They reviewed nations' implementation of the Conservation and Management Plan under the MOU, and conducted workshops on the impacts of climate change on sea turtle populations and on the use of telemetry data to better understand sea turtle interaction with coastal and ocean habitats.

RFMOs. As a result of U.S. efforts, several RFMOs, cited in the 2011 Report, have also adopted sea turtle measures. ICCAT's Subcommittee on Ecosystems met in July 2012 to discuss data needs to carry out an assessment of the impact of sea turtle bycatch in ICCAT fisheries, as required by a 2010 Commission recommendation; to review methods used to estimate bycatch rates; and to identify analytical techniques that may be possible to implement, given available data. A data request will be circulated to the parties prior to the next meeting of the Subcommittee to assist in completing the fishery impact assessment in 2013.

Dolphins. Since the early 1990s, the United States has worked diligently to ensure that foreign vessels fishing for tuna with purse seines in areas where such fisheries interact with dolphins are subject to measures to protect dolphins comparable to those applicable to U.S. purse seine vessels. In 1992, the United States and the Governments of Belize, Colombia, Costa Rica, Ecuador, France, Honduras, Mexico, Panama, and Spain negotiated the La Jolla Agreement, a voluntary arrangement that established conservative annual dolphin mortality limits and represented an important step toward reducing bycatch of dolphins in commercial Eastern Tropical Pacific (ETP) tuna purse seine fisheries. In 1999, the Agreement on the International Dolphin Conservation Program (AIDCP), a binding regime to protect dolphins in that fishery, entered into force. Nations and entities that have acceded to or ratified the Agreement include Belize, Colombia, Costa Rica, Ecuador, El Salvador, the EU, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, the United States, Vanuatu, and Venezuela. Bolivia applies the Agreement provisionally.

The objectives of the AIDCP are to progressively reduce incidental dolphin mortalities in the ETP tuna fishery to levels approaching zero; to ensure the long-term sustainability of tuna stocks in the ETP, as well as living marine resources related to the tuna fisheries; to seek ecologically sound means of capturing large yellowfin tunas not in association with dolphins; and to avoid, reduce, and minimize the incidental catch and discard of juvenile tuna and the incidental catch of non-target species, taking into consideration the interrelationship among species in the ecosystem. To achieve these goals, the AIDCP established a system of dolphin mortality limits (DMLs), a per-stock-per-year dolphin mortality cap (set at 0.1 percent of the minimum estimated abundance of stocks).

The observed dolphin mortalities in the EPO purse seine fishery for 2010 and 2011 were 1,170 and 986 respectively. This represents a reduction in observed mortality in the fishery of more than 99 percent from the estimated 133,000 mortalities in 1986. The Agreement requires parties to manage their DMLs in a responsible manner and provides for the reallocation of DMLs that have either not been used or have been forfeited during a particular year because of irresponsible use. In 2009, the AIDCP revised its per-stock mortality limits for northeastern and western/southern spotted dolphins and eastern and whitebelly spinner dolphins. The AIDCP will examine revised stock mortality limits for common dolphins over the next several years.

In addition to the DML system, the Agreement provides incentives to vessel captains to continue to reduce incidental dolphin mortality, with the goal of eliminating mortality altogether. The Agreement also includes a mechanism for transparent tracking and analysis of potential infractions, with opportunities for participation by environmental NGOs and industry representatives; it focuses on high-risk activities such as sets that occur after dark, as well as any possible harassment of national or international observers.

Other Marine Mammals. The bycatch of marine mammals in fisheries is a significant factor in long-term conservation and management of marine mammal stocks worldwide. Hundreds of thousands of these animals are killed each year through entanglement in fishing gear. Marine mammals interact with or are bycaught in gillnet, trap, longline, and trawl fisheries. Accurate abundance and bycatch estimates for marine mammals are lacking in areas where marine mammal distribution overlaps with coastal and international fisheries, which makes quantitative analysis of bycatch extremely difficult. Progress in quantifying fishery impacts on marine mammal populations and related efforts to mitigate or reduce mortality have been slow, sporadic, and limited to a few specific fisheries or circumstances.

CCAMLR has focused significant effort on the assessment and avoidance of incidental mortality of Antarctic marine living resources, including mammals, in commercial fisheries, through establishment of its Working Group on Incidental Mortality Associated with Fishing. All vessels in CCAMLR fisheries are required to carry an observer for some or all of their fishing operations. For icefish and toothfish, the requirement is 100 percent coverage by an international observer; for krill the requirement is 50 percent coverage by an international or national observer. Observers report a vessel's interactions with marine mammals and steps taken to mitigate interactions, such as abandoning hauling and using an acoustic device. CCAMLR requires the use of seal exclusion devices on trawls, and requires reporting of mammals caught and released or killed.

In 2011, the WCPFC adopted a CMM to prohibit vessels from setting purse seines on a school of tuna associated with a cetacean. In the event a cetacean is unintentionally encircled in a purse seine net, the vessel captain must take steps to ensure the cetacean's safe release.

63rd Annual Tuna Conference. In May 2012, NMFS organized a special session on marine mammal bycatch at the Tuna Conference, an open and informal forum for scientists, engineers, managers, fishermen, and NGOs from around the world to exchange information and ideas including recent research findings on tunas and "tuna-like" species. The session reviewed what is known about marine mammal bycatch in global tuna fisheries, discussed available mitigation measures within purse seine and longline fisheries to reduce bycatch, and identified data gaps and research needs.

VIII. Shark Conservation and Protection

The key components of a comprehensive framework for international shark conservation and management have already been established in global agreements and organizations, which have identified or adopted provisions or guidance to assist States and RFMOs in the development of measures to conserve and sustainably manage sharks. Some of these mechanisms have created international legal obligations with regard to shark conservation and management, while others are voluntary.

A. Global Forums

CITES. Parties at CoP16 in March 2013 will consider several proposals to list shark species in Appendix II, which requires a two-thirds majority of parties present and voting. The United States is co-sponsoring one proposal to list the oceanic whitetip shark, a top predator with one of the widest ranges of any shark. In the past, oceanic whitetips were described as among the most common sharks found in temperate, tropical waters; however, populations of this species have declined markedly. The primary threats to oceanic whitetip sharks are unsustainable harvest aimed at supplying the international shark fin market, and mortality from bycatch in other fisheries.

At the last CITES meeting, the United States submitted a similar proposal; it received a simple majority of votes, but not the needed two-thirds. Since then, a stock assessment has reaffirmed that certain populations of this species have continued to decline. This new information, as well as continued international and domestic concern, prompted the United States to co-sponsor, with Brazil, Colombia's proposal to include the oceanic whitetip shark in Appendix II.

Brazil, Colombia, Costa Rica, Denmark (on behalf of the EU), Ecuador, Honduras, and Mexico are proposing to list scalloped, great, and smooth hammerhead sharks on Appendix II. The United States offered such a proposal at the last CITES meeting in March 2010, due to concerns that over-exploitation for the international fin trade is undermining the conservation status of these species. The fins of these hammerhead shark species are among the most valuable. The proposal failed to acquire the two-thirds majority needed for adoption. The United States remains concerned about the status of scalloped, great, and smooth hammerhead sharks and supports the leadership of the nations that have sponsored the CoP16 proposal for inclusion in Appendix II.

Brazil, Comoros, Croatia, Denmark (on behalf of the EU), and Egypt propose to list the porbeagle shark on Appendix II.

Convention on Migratory Species. The United States is not a party to the CMS; however, non-parties are able to participate in individual instruments – MOUs and agreements – concluded under the CMS umbrella. The first meeting of signatories of the CMS Sharks MOU was held in September 2012 in Bonn, Germany. The signatories adopted a conservation plan to catalyze regional initiatives to tackle overfishing and raise awareness of other threats to migratory sharks.

Joint Tuna RFMOs. At the third joint meeting of the tuna RFMOs in 2011 (Kobe III), a newly created bycatch working group, with participants from all five tuna RFMOs, stressed that full stock assessments should be conducted for those shark species where data are available. For species where data are lacking, precautionary measures should be taken, consistent with the FAO International Plan of Action for the Conservation and Management of Sharks. The working group recommended that RFMOs should:

- Initiate research to determine the impact and outcome of the practice of intentional sets on whale sharks, if there is evidence the practice is occurring.
- Conduct risk assessment processes to develop their priorities for shark species that may need further assessment or mitigation.
- Require their members and CPCs to record in logbooks the number of sharks discarded.
- Take action to improve data collection on sharks and manta and devil rays in targeted industrial and artisanal fisheries. (The Working Group noted that a fins-naturally-attached requirement would improve species identification and enforcement and should be considered as part of existing shark finning bans.)
- Consider supporting studies to investigate post-release survival of sharks in longline fisheries in relation to hook type and duration of set, among other factors.
- Consider supporting studies to further develop shark bycatch mitigation strategies for longline fisheries.
- Evaluate the costs and benefits of banning the use of wire leaders in tuna longline fisheries.
- Develop handling and release protocols for all sharks and manta and devil rays, taking into consideration the safety of the crews.

B. RFMOs

In 2011, the IATTC adopted a resolution prohibiting the retention of any part of an oceanic whitetip shark in fisheries covered by the Antigua Convention. The IATTC also held two technical meetings on sharks, primarily focused on undertaking a stock assessment of silky sharks in the EPO, consistent with the priorities identified by the Commission. The stock structure and assessment results are considered preliminary at this stage, but should facilitate the development of future conservation advice.

In 2011, ICCAT adopted a recommendation co-sponsored by the United States that requires release of silky sharks caught in association with ICCAT fisheries, as well as prohibiting retention on board, transshipment, and landing of the species. There are limited exceptions, one for developing coastal States that retain silky sharks for local consumption. Parties not reporting species-specific data for sharks were required to submit a data collection improvement plan. At the 2012 ICCAT meeting, agreement was reached on only one measure proposed for sharks, a recommendation that requires reporting on implementation of and compliance with existing shark CMMs and with the "no data, no fish" recommendation as it relates to shark data. A proposal repeatedly put forward by Belize, Brazil, and the United States would have required all sharks caught in association with ICCAT fisheries to be landed with their fins naturally attached. Support for this proposal increased from the 2011 to the 2012 meeting, but no consensus was reached.

In 2004, NAFO set a 13,500 metric ton total allowable catch limit for thorny skates, a number far in excess of scientific advice for this stock. Although catches remain below the catch limit, the potential for overharvest is considerable. The United States has advocated greater protection for thorny skates since then, and particularly in meetings with interested NAFO parties in 2010 and 2011. As a result, NAFO agreed on a limit of 12,000 metric tons for 2011; 8,500 metric tons for 2012; and recently adopted an even lower number, 7,000 metric tons, for 2013 and 2014. The United States can take credit for reducing this catch limit by almost 50 percent.

The WCPFC has a CMM that prohibits shark finning, a list of "key shark species," and a research plan for conducting stock assessments for key species. In 2011, based on a U.S. proposal, the WCPFC adopted a CMM for oceanic whitetip sharks, prohibiting retention on board, transshipment, and landing of the species. In 2012, the Commission considered but could not agree on a proposal from members of the Pacific Islands Forum Fisheries Agency to require that fins stay attached to the carcass, and to prohibit the use of wire leaders. The Commission did agree to prohibit intentional purse seine sets around whale sharks. The measure includes a dispensation for Japan, allowing it to consider adoption of "compatible measures" in its EEZ.

CCAMLR has established bycatch limits for skates and rays in new and exploratory fisheries and toothfish fisheries in certain areas. While Conservation Measure 32-18 bans the directed fishing of sharks, except for scientific research, and requires as far as possible the live release of incidentally caught sharks, there are no provisions in place to prohibit shark finning. At the 2011 meeting, the United States proposed prohibiting shark finning in the CCAMLR Convention Area. While several members expressed support for the proposal, others expressed concerns that precluded them from supporting it. Recognizing that some members were not prepared to act on its shark finning proposal at that meeting, the United States withdrew the proposal. At the 2012 meeting, CCAMLR adopted revisions to a conservation measure to clarify the circumstances under which skates may be returned to the water, and to require reporting the number caught. For one area of high skate bycatch, CCAMLR adopted measures for the 2012–2013 fishing season requiring a vessel to move fishing location when the take of skate exceeds 0.5 tons per set, limiting soak times to less than 30 hours, and limiting the area where fishing may occur.

IX. International Cooperation and Assistance

The international community recognizes the importance of providing necessary tools and training to assist developing coastal and fishing States with management and monitoring of their fisheries and fishing vessels. Such assistance helps nations address IUU fishing activities, promotes the adoption of measures to mitigate the adverse impacts of fishing activities on PLMRs, and furthers shark conservation programs. The need for such cooperation and assistance has been recognized in several recent international and regional fisheries agreements, including the UNFSA.

A. International Institutional Efforts

FAO Activities. To help developing States implement the provisions of the UNFSA, the UN established a trust fund that is managed by the FAO. The FAO has also recognized the critical role of capacity development as a means of assisting developing nations to combat IUU fishing through port State measures. At COFI's request, the FAO convened an informal, open-ended technical meeting to review draft terms of reference for the ad-hoc working group referred to in the Port State Measures Agreement and to draft terms of reference for an appropriate funding mechanism to assist developing States in implementing the Agreement. The July 2012 COFI meeting endorsed these terms of reference, which will be considered further by the ad-hoc working group when it is eventually established. In the meantime, NMFS is providing financial support for the next regional training workshop on skills and capabilities necessary to implement the Port State Measures Agreement.

ICCAT Funds. ICCAT has several funds created specifically for scientific capacity building; these are used primarily to finance travel of scientists from developing States to participate in intersessional scientific meetings and the annual SCRS meeting. In 2011, ICCAT established a fund to support the attendance of developing State members in various scientific and non-scientific meetings. In 2012, ICCAT spent around 294,000 USD for such activities.

CCAMLR Activities. CCAMLR's CDS Fund supported the July 2012 African IUU Capacity Building Training Event, aimed at strengthening port State controls on continued IUU activity involving toothfish and other species. Fifty-six participants from 15 African nations attended.

WCPFC Efforts. The WCPFC is the only RFMO whose budget contains a line item funded by all members to support the special needs of developing States parties.

IATTC Fund. In 2011, the IATTC created a fund for strengthening the scientific and technical capacity of developing nations that will allow them to fully comply with their obligations under the Antigua Convention.

B. Bilateral and Regional Assistance

Congress has directed NMFS to engage in international cooperation and assistance, particularly in the areas of combating IUU fishing and mitigating bycatch of PLMRs. In addition to meeting these IUU and PLMR mandates, the NMFS International Cooperation and Assistance Program accomplishes many other important goals, including strengthening international fishery

management organizations and promoting goodwill in international marine resource management forums. Program funds are used to build strategic partnerships with other nations and the capacity of developing nations to promote sustainable and responsible fisheries management at the national, regional, and global levels.

The United States has been active in providing technical and other types of cooperation and assistance to developing States for conservation and management, stock assessment, scientific research, and monitoring and enforcement. This section sets forth some examples from among the many programs NMFS carried out during 2011 and 2012.

Strengthening Monitoring, Control, and Surveillance in Central America. Under the auspices of the Central America-Dominican Republic Free Trade Agreement, NMFS has forged a partnership with the Organization of the Fishing and Aquaculture Sector of Central America – OSPESCA – to promote sustainable and legal fisheries in this region, from which the United States imported more than $481 million worth of seafood products in 2011. Perhaps the most impressive collaboration began in 2009. Initial efforts are described in the 2011 report, and have progressed through establishment of an MCS Network in Central America, workshops on conducting inspections for illegal products in seafood processing plants, enforcement of shark laws, and uses of enforcement technology including VMS. Work to be completed includes steps to implement the Agreement on Port State Measures and to participate in the Global Record of Fishing Vessels.

Enhancing Fisheries Enforcement and Observer Capabilities in West Africa. Over the past 2 years, NOAA has collaborated in efforts to train West African fisheries management and enforcement officials and students. U.S. trainers instructed 10 students at the Murray Town (Sierra Leone) Armed Forces Maritime Wing during a 3-day session in March 2011. The same course was presented to 40 Liberian students during a 4-day training session in Monrovia in March 2011.

NOAA conducted two separate 3-week observer training sessions in 2011. The first was in May, for 35 Liberian staff from the Bureau of National Fisheries and the World Bank's West African Regional Fisheries Project. Those organizations partnered with NOAA in training on at-sea safety and data collection for targeted and bycatch species, marine debris, and sea turtle and marine mammal interactions. The second course was conducted in November in Libreville, Gabon, for 30 fisheries observers; the Wildlife Conservation Society, the World Wildlife Fund, the University of Exeter, and the Darwin Initiative provided assistance. In February 2012, U.S. trainers presented a 5-day course in Monrovia, providing previously trained observers and inspectors information on collecting data from tuna purse seine and longline vessels.

As a follow-up, NOAA has assisted West African nations in creating and implementing databases for the management and storage of observer information. Once the Liberian database was established, U.S. officials trained 12 staff members in database management and analysis. The United States is also assisting Gabon in establishing an observer database similar to Liberia's, particularly through translation services.

Colombia–United States Partnership on Queen Conch. NMFS has a long history of collaboration with Colombia on management of marine species. Colombia is a leader in the management of queen conch, an important species whose international trade is regulated under Appendix II of CITES. Workshops have promoted coordination between CITES and regional fisheries authorities to encourage cooperation among range States in enforcement of national and CITES requirements. NMFS recently sponsored a workshop to review management of queen conch in the Southwest Caribbean, from which Colombia developed a case study on its methods of making no-detriment findings to demonstrate sustainability for export of queen conch. That case study, presented at a workshop of CITES experts, became the basis of guidance provided to other nations in using this important conservation tool.

International Gillnet Workshops. In October 2011, NMFS hosted an international workshop to develop recommendations regarding best practices, a "toolkit" of mitigation options, and research and experimental priorities for the future.[35] A month later, NMFS organized a second workshop, focused on overcoming the challenges associated with mitigating gillnet bycatch in developing nations with significant gillnet fisheries and a lack of expertise to address bycatch problems. Held concurrent with a meeting of the Society for Marine Mammalogy, the workshop identified key actions to address marine mammal bycatch in artisanal gillnet fisheries. NMFS hosted a third workshop in September 2012, coincident with the meeting of the Sociedad Latinoamerican de Especialistas en Mamiferos Acuáticos. The purpose was to define a process for achieving major marine mammal bycatch reductions in South American gillnet fisheries. Participants examined different courses of action that could lead to greater progress in reducing bycatch of threatened marine mammals in both industrial and non-industrial gillnet fisheries. They considered the bycatch of species such as the franciscana and Chilean dolphin, while exploring mitigation strategies that respect the interests of fishermen to maintain productive livelihoods.

Driftnet Eradication and Alternative Gear Testing in Morocco. In 2011, Moroccan legislation banned use of driftnets in its large pelagic fisheries. To assist with Morocco's transition to alternative gear in its swordfish fisheries, NOAA offered to share "buoy gear" technology developed by U.S. fishermen. Use of this gear in small-scale fisheries off the coast of Florida has demonstrated decreased bycatch rates while increasing target catch rates. Buoy gear is simple to construct and inexpensive to maintain. If effective in Morocco, this type of gear potentially offers an optimal alternative to driftnets. With the support of DOS funding, NOAA conducted a needs assessment in January 2012; testing in the Mediterranean is planned for 2013.

International Symposium on Circle Hooks in Research Management and Conservation. In May 2011, NMFS organized a 3-day meeting of international scientists, managers, and industry and NGO representatives. The goal was to develop an updated, science-based assessment of the management and conservation utility of circle hooks in commercial and recreational fisheries around the globe. The meeting provided a forum for individuals, organizations, and agencies to share relevant research results and perspectives. Themes of the symposium included empirical field studies, ecological and population assessments, fisheries management evaluations, and

[35] The outcome of this workshop will be published as a special edition of the journal *Endangered Species Research*.

socioeconomic research and analysis. Ultimately, organizers of the meeting hope to support uniformity in circle hook terminology, research approaches, and data analyses as well as greater collaboration among the international scientific, management, and conservation communities.

U.S. –Taiwan Circle Hook Research. NOAA is engaged in a cooperative experiment with Taiwan in the Atlantic Ocean to study the use of large circle hooks in deep-set longline fisheries. This experiment will evaluate the effect of this gear on target catch retention rates for bigeye tuna, as well as rates of associated bycatch. As part of this project, NOAA provided supplemental training for experienced observers from Taiwan and has helped to develop training material on data collection protocols. Participants are gathering data on fishing effort, catch, biological information on species caught, disposition of any bycatch, tag encounters, and marine mammal/sea turtle sightings.

Reducing Sea Turtle Interactions with Gillnet Fisheries. Since 2005, NMFS researchers and a team of international collaborators have been conducting research that has identified net illumination as a potential strategy to reduce sea turtle interactions with gillnets while not impacting rates of target fish catch. To date, experiments have been conducted in coastal fisheries in Peru (collaborating with ProDelphinus since 2010), and Brazil (working with TAMAR since 2010). Researchers chose these locations due to their high levels of sea turtle interactions and the availability of local collaborating scientists with the necessary infrastructure to carry out these experiments. This work has demonstrated significant reduction in sea turtle bycatch in certain fisheries and has been internationally recognized by the Smartgear competition.

Japanese Pound Nets. Upon returning from their trans-Pacific migrations from the west coast of North America to Japan, subadult and adult loggerhead turtles spend considerable time in coastal and nearshore habitats of Japan and other Asian nations where there is high risk of interactions with coastal pound net fisheries. Recent reports suggest a very high interaction rate between sea turtles and these fisheries and, in particular, high mortalities in mid-water pound nets. Since 2009, in collaboration with researchers from the University of Hawaii, the Sea Turtle Association of Japan, the Tokyo University of Marine Science and Technology, and ProPensinula, NMFS scientists have developed an in-water method to identify mitigation measures useful in reducing sea turtle bycatch in mid-water pound net fisheries. Using both wild-caught and captive loggerhead sea turtles, they have developed and tested pound net escape devices for turtle exclusion as well as testing for fish retention. The work engages fishermen, fisheries officials, gear manufacturers, and scientists to develop these devices.

Mariculture of Corals to Reduce Wild Harvest. In 2004, more than one million live corals were harvested from the wild for the aquarium trade. The United States is the world's largest consumer in that market (more than 70 percent of corals, other reef invertebrates, and marine fish). Several Coral Triangle nations are exploring mariculture as a lower-impact option for the sustainable harvest of corals. NOAA and the Ocean Foundation hosted an international workshop in July 2011 in Indonesia with the goal of improving the mariculture of stony corals through the development of comprehensive best management practices that all nations could apply. While many nations already had stony coral mariculture guidelines developed, the

workshop participants identified information gaps and components of current plans that could be improved.

A follow-up workshop, held in Indonesia in cooperation among NOAA, the Ocean Foundation, and Yayasan Alam Indonesia Lestari, took place in June 2012. Participants included Indonesian officials; coral mariculture farmers, exporters, and importers from Indonesia and other Asian nations; academic experts; and NGOs. The workshop provided a forum to fill in gaps related to Indonesia's guidelines, and also allowed NOAA to continue initiatives to address the unsustainable and destructive trade in coral reef species, specifically building on past efforts to address trade issues through CITES listing and trying to better understand the magnitude of the coral trade. The workshop participants were asked to develop draft criteria for restocking (restoration) of corals, and to develop recommendations to support a sustainable and responsible coral trade.

Annex 1: International Fisheries and Related Agreements and Organizations to which the United States Is Party or in which the United States Has a Substantial Interest

To provide basic knowledge of the multilateral agreements, RFMOs, and related international organizations concerning living marine resources of which the United States is a member or that are of substantial interest to the United States, a list of many such organizations and agreements, with brief descriptions, is set forth below.

Global

United Nations Convention on the Law of the Sea. This treaty sets the rules for jurisdiction and management authority in the oceans, and establishes general requirements concerning conservation. The Convention currently has 164 parties; the United States is not yet a party, but operates consistent with the fisheries provisions of the Convention. President Clinton submitted the Convention to the Senate in 1994.

Agreement for the Implementation of the Provisions of the U.N. Convention on the Law of the Sea Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UN Fish Stocks Agreement or UNFSA). This agreement provides more specific rules for the conservation and management of straddling and highly migratory fish stocks, including application of the precautionary approach, ecosystem-based management, a requirement that nations with vessels fishing on the high seas either join the appropriate RFMO or apply the CMMs established by that RFMO to its fishing vessels, and other similar requirements. The 1995 agreement, which entered into force in 2001, now has 79 parties, including the United States.

Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (FAO Compliance Agreement). This agreement requires flag States to exercise control over their vessels on the high seas to ensure that they follow applicable conservation and management regulations. The agreement was adopted in 1993 and entered into force in 2003. It has 39 parties, including the United States.

FAO Code of Conduct for Responsible Fisheries. This non-binding document, prepared in 1995, sets forth principles and international standards of behavior for responsible fisheries practices, to ensure effective conservation, management, and development of living aquatic resources.

International Whaling Commission. The IWC was established under the International Convention for the Regulation of Whaling in 1946, with the purpose of providing for the proper conservation and management of whale stocks. It currently has 89 parties, including the United States.

Convention on International Trade in Endangered Species of Wild Fauna and Flora. CITES provides for the protection and regulation of certain species of wild fauna and flora, including certain living marine species, against over-exploitation, through limitations on international trade. Under CITES, species are listed in Appendices according to their conservation status:

Appendix I ("threatened with extinction"); Appendix II (may become threatened with extinction unless trade is strictly regulated); and Appendix III (species that any party identifies as being subject to regulation within its jurisdiction for the purpose of preventing or restricting exploitation, and that needs the cooperation of other parties in the control of trade). CITES currently has 176 parties, including the United States.

Agreement on the Conservation of Albatrosses and Petrels. ACAP, a legally binding agreement, was established under the CMS; it has 13 parties. Its purpose is to enhance the understanding of the conservation status of albatrosses and petrels and their susceptibility to a range of threats, as well as to provide an effective means of mitigating those threats. Although not a party, the United States participates in ACAP meetings as an observer.

Memorandum of Understanding on the Conservation of Migratory Sharks. This non-binding agreement, negotiated under the auspices of the CMS, provides an international framework for coordinating sustainable management and conservation efforts for seven species of migratory sharks. The MOU has 25 signatories, including the United States.

Atlantic

International Commission for the Conservation of Atlantic Tunas. ICCAT provides for international cooperation in conservation and management, including scientific research, for tunas and tuna-like species in the Atlantic. It covers all waters of the Atlantic Ocean, including the adjacent seas. ICCAT has 48 contracting parties, including the United States, plus five cooperating non-parties or fishing entities.

North Atlantic Salmon Conservation Organization. NASCO has jurisdiction over salmon stocks that migrate beyond areas of coastal State jurisdiction in the Atlantic Ocean north of 36° N. It has six parties, including the United States.

Northwest Atlantic Fisheries Organization. NAFO's Convention Area is located within the waters of the Northwest Atlantic Ocean roughly north of 35° N and west of 42° W. The principal species managed are cod, flounders, redfish, American plaice, Greenland halibut (turbot), capelin, shrimp, hake, and squid. NAFO has 12 contracting parties, including the United States.

Southeast Atlantic Fisheries Commission. The SEAFO Convention, which entered into force in 2003, regulates fisheries outside EEZs in the Southeast Atlantic Ocean. Species covered include fish, mollusks, crustaceans, and other sedentary species, except species subject to coastal State jurisdiction and highly migratory species. There are currently seven parties. The United States signed the Convention, but is not a party because no U.S. vessels fish in the area.

Pacific

Western and Central Pacific Fisheries Commission. The WCPFC manages tuna and other highly migratory species in the western and central Pacific Ocean. The Convention entered into force in

2004. It currently has 25 members, including the United States; seven participating territories; and eleven cooperating non-members.

South Pacific Regional Fisheries Management Organization. The Convention on the Conservation and Management of High Seas Fishery Resources in the South Pacific Ocean entered into force on August 25, 2012. Its objective is to ensure the long-term conservation and sustainable use of fishery resources and to safeguard the marine ecosystems in which these resources occur. The Convention has 10 parties, not yet including the United States.

South Pacific Tuna Treaty. This agreement provides U.S. tuna purse seine vessels access to fish in the waters of the Pacific Island parties to the Treaty, including adjacent high seas areas in the central and western Pacific. Although not a fisheries management arrangement, it is referenced in this report because it contains some important and forward-looking monitoring and control provisions, including observer and VMS requirements. The Treaty has 17 parties, including the United States. It is administered by the Forum Fisheries Agency, comprised of the 16 Pacific Island parties.

Inter-American Tropical Tuna Commission. The IATTC manages tunas and other species taken by tuna-fishing vessels in the EPO. It has 21 members, including the United States, plus one cooperating non-member.

Agreement on the International Dolphin Conservation Program. This agreement establishes legally binding mechanisms to reduce incidental dolphin mortality in the tuna purse seine fishery in the EPO to levels approaching zero. The agreement has 15 parties, including the United States, plus one nation that applies the Agreement provisionally.

North Pacific Anadromous Fish Commission. The NPAFC promotes the conservation of anadromous stocks (salmon) and ecologically related species, including marine mammals, seabirds, and non-anadromous fish, on the high seas of the North Pacific, the Bering Sea, and the Sea of Okhotsk, north of 33° N. It has five parties, including the United States.

Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea. This Convention was established to conserve and manage the pollock resources in the high seas area of the Bering Sea (the "donut hole"). It has six parties, including the United States.

Pacific Salmon Convention. The PSC implements the United States-Canada Pacific Salmon Treaty. Four commissioners and four alternates from each nation represent the interests of commercial and recreational fisheries as well as Federal, state, and tribal governments. The PSC provides regulatory advice and recommendations to the two parties with regard to salmon originating in waters of one nation that are subject to interception by the other, salmon that affect the management of the other nation's salmon, and salmon that biologically affect the stocks of the other nation.

International Pacific Halibut Commission. Established by a 1923 Convention between the United States and Canada, the Commission's mandate covers research on and management of the

stocks of Pacific halibut within Convention waters of both nations. The Commission consists of three government-appointed commissioners for each nation.

Memorandum of Understanding for the Conservation of Cetaceans and their Habitats in the Pacific Islands Region. Negotiated under the auspices of the CMS, this non-binding MOU provides an international framework for coordinated conservation efforts for cetaceans and their habitats in the Pacific Islands Region. The MOU has 15 signatories, including the United States.

Southern Ocean

Commission for the Conservation of Antarctic Marine Living Resources. With the exceptions of any commercial seal hunt south of 60° S and all whaling activities, CCAMLR conserves and manages all marine living resources between the edge of the Antarctic continent and the Antarctic Polar Front (varying between 45° S and 60° S). There are 25 members of the Commission, including the United States. Another 10 nations have acceded to the Convention, agreeing to be legally bound by its terms, but not contributing to the budget or participating in decisions.

Convention for the Conservation of Antarctic Seals. The Convention is designed to promote and achieve the protection, scientific study, and rational use of Antarctic seals, and to maintain a satisfactory balance within the ecological system of Antarctica. It prohibits the killing or capture of seals in the area south of 60° S, except as specifically provided for in the Convention. It has 14 parties, including the United States.

Western Hemisphere

Inter-American Convention for the Protection and Conservation of Sea Turtles. The IAC is the only binding Convention for the protection and conservation of sea turtles in the world. The IAC specifically protects six of the seven species of sea turtles: loggerhead, green, leatherback, hawksbill, olive ridley, and Kemp's ridley. This Convention entered into force in 2001 and has 15 parties, including the United States.

Indian Ocean

Indian Ocean–South East Asian Marine Turtle Memorandum of Understanding. This MOU operates as a non-binding agreement under the CMS. It provides a framework within which the States of the region as well as other concerned States can work together to conserve and replenish depleted marine turtle populations for which they share responsibility. The MOU has 33 signatories, including the United States.

Annex 2: United States Laws and Regulations Providing Tools to Address IUU Fishing and Bycatch of PLMRs, including Summaries of Recent Enforcement Cases

Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006. The 2006 reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. 1801 *et seq*., directs substantial attention to fishing issues outside U.S. waters, particularly IUU fishing and bycatch of PLMRs. Title IV of the Act amended the High Seas Driftnet Fisheries Moratorium Protection Act, 16 U.S.C. 1826d-1826g, to call on the Secretary of Commerce to urge other nations and RFMOs to address IUU fishing and to put into place regulatory measures to end or reduce bycatch of PLMRs comparable to those of the United States, taking into account different conditions. It also puts into place an identification and certification procedure for nations whose vessels engage in IUU fishing or bycatch of PLMRs.

Magnuson-Stevens Fishery Conservation and Management Act. The MSA, originally enacted in 1976, is the foundational legislation for the conservation and management of fisheries within the U.S. EEZ. Besides establishing the framework for regulating U.S. fisheries, the Act contains specific and extensive prohibitions and enforcement authorities to ensure a high rate of compliance with regulations governing both domestic and foreign fishing within the EEZ.

High Seas Driftnet Fishing Moratorium Protection Act. This Act prohibits the United States from entering into international agreements that would prevent full implementation of the UN Moratorium on Large-Scale High Seas Driftnets. The MSRA and SCA added specific authorities and responsibilities to assist in reducing or eliminating IUU fishing, bycatch of PLMRs, and certain shark fishing practices.

High Seas Driftnet Fisheries Enforcement Act. This Act, 16 U.S.C. 1826a-1826c, seeks to end the use of large-scale driftnets by foreign fisheries operating beyond the EEZ of any nation. Among other provisions, the Act authorizes identification of nations whose vessels are engaging in high seas fishing with large-scale driftnets; such identification may lead to limitations on importation of certain products from those nations.

High Seas Fishing Compliance Act. This Act, 16 U.S.C. 5501-5509, implements the FAO Compliance Agreement for vessels flagged in the United States. The Act requires high seas fishing vessels to operate under permits issued by the Secretary of Commerce, and to comply with certain international measures.

Shark Conservation Act of 2010. Enacted January 4, 2011, Public Law 111-348 amended the Moratorium Protection Act to promote adoption by RFMOs of shark conservation measures, including banning removal of any of the fins of a shark and discarding the carcass at sea. The Act amended the definition of IUU fishing with an explicit reference to violation of international shark conservation measures, and provides for identification of a nation for activities related to shark conservation.

Shark Finning Prohibition Act. This Act, 16 U.S.C. 1866 note, makes it illegal for persons under U.S. jurisdiction to remove any fins of a shark and discard the carcass at sea, or to possess such

fins, and for persons to offload into a U.S. port any shark fins without the corresponding carcass. The law requires U.S. delegations at bilateral and multilateral meetings to seek a prohibition on shark finning, which some RFMOs have adopted.

Lacey Act. The Lacey Act, 16 U.S.C. 3371-3378, prohibits the import, export, transport, sale, possession, or purchase in interstate or foreign commerce of any fish or wildlife taken, possessed, transported, or sold in violation of any U.S. state law or regulation or of any foreign law. The two-part prohibition requires evidence of a violation of domestic or foreign law, and also evidence of trafficking. NMFS has used the law to prosecute foreign individuals who import illegal catch, such as tuna caught without authorization in another nation's EEZ.

Marine Mammal Protection Act. A goal of the MMPA, 16 U.S.C. 1361 *et seq*., is to reduce the incidental kill or serious injury of marine mammals in the course of commercial fishing to insignificant levels, approaching zero. The Act prohibits "taking" (actual or attempted harassment, hunting, capture, or killing) and importation into the United States of marine mammals except where explicitly authorized. The MMPA also bans the importation of fish caught with commercial fishing technology that results in the incidental kill or serious injury of marine mammals in excess of U.S. standards.

Endangered Species Act. This Act, 16 U.S.C. 1531 *et seq.*, provides for the conservation of species that are in danger of extinction throughout all or a significant portion of their range. The Act lists species as either "threatened" or "endangered." When a species is endangered, it is protected from being "taken" through harassment, harm, injury, pursuit, hunting, killing, capturing, or collection. The Act also provides for U.S. implementation of limitations on trade of species listed under CITES.

International Dolphin Conservation Program Act. This Act, 16 U.S.C. 1441 *et seq.*, amended the MMPA to provide that nations whose vessels fish for yellowfin tuna with purse seine nets in the ETP are permitted to export tuna to the United States only if the nation provides documentary evidence that it participates in the International Dolphin Conservation Program and is a member (or applicant member) of the IATTC, is meeting its obligations under the Program and the IATTC, and does not exceed certain dolphin mortality limits.

Shrimp-Turtle Law (Section 609 of P.L. 101-162). This law, 16 U.S.C. 1537, requires the United States to embargo wild-caught shrimp harvested with commercial fishing technology, such as trawl nets, that may adversely affect sea turtles. The import ban does not apply to nations that have adopted sea turtle protection programs comparable to those of the United States. Nations seeking to import shrimp must be certified by DOS as meeting the law's requirements on an annual basis.

Pelly Amendment. The 1971 Pelly Amendment to the Fishermen's Protective Act of 1967, 22 U.S.C. 1978, directs the Secretary of Commerce to certify to the President if "nationals of a foreign country, directly or indirectly, are conducting fishing operations in a manner or under circumstances which diminish the effectiveness of an international fishery conservation program." The President has discretion in whether to direct the Secretary of the Treasury to prohibit the importation of products from the certified country.

Summaries of Recent Enforcement Cases with an International Nexus

This section summarizes recent U.S. enforcement cases involving an international nexus such as IUU fishing by a foreign-flagged vessel, international trafficking in seafood illegally harvested or labeled, and U.S. assistance with another nation's investigation of a fisheries violation. NOAA, the USCG, and the U.S. Department of Justice are actively engaged around the nation and overseas in monitoring fishing activity for a number of ecologically and economically valuable marine species. These efforts in combating IUU fishing and PLMR bycatch not only help to protect global fish stocks and other marine resources, but also preserve the integrity of the U.S. domestic fish market and the safety of the U.S. food supply.

Some of the more significant cases since January 2011 are outlined below:

- A joint investigation between the U.S. Fish and Wildlife Service and NOAA into illegal black coral imports produced a guilty plea. The criminal sentencing resulted in a $1.8 million criminal fine and an additional $500,000 as community service. More than 13,600 pounds of raw black coral, valued in excess of $2.17 million, were forfeited. According to the U.S. Department of Justice, this was the largest financial penalty for illegal coral trade, the largest non-seafood wildlife trafficking financial penalty, and the fourth largest monetary fine for any U.S. case involving illegal wildlife trade.

- In April 2012, NOAA completed an investigation of a Los Angeles-based seafood company that imported approximately 5,000 pounds of Mexican abalone through the Otay Mesa commercial port of entry using invoices that were illegal, according to the Mexican Government. The importer also labeled shark fin chunk with false information. This was a joint investigation with the California Department of Fish and Game; the case has been referred for criminal prosecution.

- On July 27, 2011, United Seafood Imports was fined $200,000. The company owner was sentenced to 2 years of probation with 6 months of home confinement, restrictions on working in the seafood industry, 200 hours of community service, and a requirement to teach Lacey Act seminars and write an article for publication regarding the mislabeling of products. The charges involved the importation of Thai, Malaysian, and Indonesian shrimp that was relabeled to indicate Panama, Honduras, and Ecuador as the nations of origin.

- On September 2, 2011, Van Bodden-Martinez was sentenced to 3 years of probation with the special condition that he cannot import into the United States any fish or marine products harvested in Bahamian waters. Bodden-Martinez was charged for violation of the Lacey Act, based on violations of Bahamian law. The investigation showed that Van Bodden-Martinez returned to the United States from the Bahamas with approximately 528 queen conch; 45 wrung spiny lobster tails, of which 43 were undersized; and 42 yellowtail snapper – all well above the Bahamian bag limits. Neither the defendant nor his vessel possessed any Federal, state, or Bahamian permits or licenses.

- On September 7, 2011, the USCG responded to a sighting by a Japanese patrol aircraft of the *Bangun Perkasa* actively engaged in high seas driftnet fishing 210 miles southeast of Hokkaido, Japan. This vessel claimed Indonesian registry in an attempt to prevent law enforcement action by the USCG, but the Government of Indonesia denied registry. As a "vessel without nationality," the fishing vessel was subject to the jurisdiction of the United States and was subsequently seized for violating U.S. law, specifically the MSA's prohibition against large-scale driftnet fishing. The vessel was escorted to Dutch Harbor, Alaska, where it was turned over to NOAA for processing and follow-up investigation. The vessel has been scheduled for scrapping.

- In 2011, NOAA worked closely with Russian officials to seize 112 metric tons of Russian-origin King crab that was harvested in the Russian EEZ. The United States alleged that Harbor Seafood, Inc., imported the crab illegally because it was harvested from Russian waters in violation of Russian quotas, was not marked in accordance with regulations under the Lacey Act, and was not accompanied by information required under the Public Health Security and Bioterrorism Preparedness and Response Act of 2002. The importer entered into a consent judgment under which the United States will retain approximately $2.1 million of the $2.5 million in proceeds from sale of the illegally imported product. The importer also agreed to undertake a compliance review and provide remedial training to its employees concerning the laws that govern importation of seafood products.

- In spring 2012, a USCG law enforcement detachment aboard a naval warship, operating in support of the African Maritime Law Enforcement Partnership, assisted in two cases in West African EEZs. In March, the team boarded a French-flagged vessel in the Sierra Leone EEZ and detected three violations: failure to notify Sierra Leone authorities of the maximum amount of catch, improper hull marking, and improper notification when entering the EEZ. Sierra Leone fined the vessel the equivalent of 51,000 USD and seized 320 tons of catch. In the second case, on June 19, 2012, the detachment assisted Gambian shipriders with boarding a Sierra Leone vessel. The team issued two violations, for fishing without a license and for not flying a flag while fishing in the Gambian EEZ. The Gambian shipriders seized the catch; the naval ship escorted the fishing vessel to a Gambian patrol boat for disposition of the case.

- On November 2, 2011, a USCG team operating in coordination with a Kiribati shiprider boarded an Indonesian-flagged vessel fishing in the Kiribati EEZ. The boarding team discovered several violations: no notification to Kiribati of commencement of fishing, license not on board, and out-of-date logs. The Kiribati shiprider issued citations to the vessel’s owner.

- A USCG team operating under a shiprider agreement with Palau boarded a Philippine-flagged fishing vessel on May 14, 2012. The team documented five violations: fishing inside the Palau EEZ without permit, illegal entry into the Palau territorial sea, reef fish on board, shark fins on board, and no VMS. The USCG cutter assisted the Palau shiprider in escorting the vessel to Koror, where it was seized.

Annex 3: Seabird Bycatch Issues

Seabirds fall within the definition of international living marine resources under the Moratorium Protection Act, but not within the definition of protected marine living resources. Section 316 of the MSA highlights the need for the Secretary of Commerce to work cooperatively with the Secretary of the Interior, with regional fishery management councils, and within international organizations to seek ways to mitigate seabird bycatch. NMFS has pushed hard internationally for action to protect seabirds.

The Agreement on the Conservation of Albatrosses and Petrels (ACAP) coordinates international activity to mitigate known threats to albatross and petrel populations. The ACAP treaty was submitted to the Senate in 2008 for its advice and consent to ratification; draft implementing legislation was submitted to Congress in 2009. The United States participates in ACAP meetings as an observer due to its interest in seabird conservation and its status as a range State under ACAP. ACAP held its fourth Meeting of the Parties in April 2012, where the Balearic shearwater was added to the list of species covered by the Agreement.

Several RFMOs have taken action concerning seabirds in 2011 and 2012:

CCAMLR. CCAMLR's Working Groups on Incidental Mortality Associated with Fishing and on Fish Stock Assessment analyze and report on observed and estimated seabird mortality by fishery and gear type. Observed seabird bycatch in the Convention Area is near zero in the legal fishery outside of the French EEZ. Seabird bycatch within the French EEZ continues to decline significantly each year due to improved mitigation and management measures. CCAMLR was unable to produce an estimate of the levels of incidental mortality of seabirds in IUU fishing due to lack of information on the potential rate of interactions with gillnets, now believed to be the primary gear used by IUU vessels in the Convention Area. The Scientific Committee did note that penguins are potentially at risk from incidental capture in gillnets, depending on the depths and locations fished. At its 2012 meeting, CCAMLR revised the conservation measure for minimizing mortality of seabirds incidental to longlining, to clarify that systems to remove hooks from offal must be effective.

IATTC. The IATTC first adopted a seabird resolution in 2005. Since then, the United States, in cooperation with other parties, has worked to strengthen this resolution. The IATTC adopted a non-binding recommendation on seabird mitigation measures in the longline fishery in 2010; the substance of the recommendation was made binding at the 2011 meeting. The measure is very similar to the 2009 U.S. proposal and the 2007 WCPFC measure, although exclusions for waters around Mexico were added.

ICCAT. In 2011, ICCAT agreed to a supplementary recommendation on reducing incidental bycatch of seabirds in longline fisheries. This measure strengthens the 2002 requirements for mitigation and moves toward implementation of best practices. The 2011 recommendation requires use of two of three measures (night setting, branch line weighting, and bird scaring lines) for vessels fishing south of 25° S, and recommends voluntary use of the measures in the Mediterranean and other areas as appropriate. The recommendation also establishes binding minimum technical standards for each of the measures and provides additional technical

guidance for design and deployment of tori lines. The recommendation comes into effect to the extent possible in January 2013, and is fully in effect no later than July 2013. The SCRS will undertake another fishery assessment in 2015 to evaluate the efficacy of the measures.

IOTC. In 2012, the IOTC adopted a resolution on reducing the incidental bycatch of seabirds in longline fisheries, to enter into force on July 1, 2014. This measure is substantially the same as the ICCAT recommendation described above. The Scientific Committee will evaluate the resolution prior to the 2016 meeting.

WCPFC. Based on its Scientific Committee's review of recent mitigation research and possible improvements to the measure that was first adopted in 2007, the Commission in 2012 adopted a revised measure that varies the requirements for the northern and southern hemispheres. Requirements for the southern hemisphere are now consistent with those recently adopted by the IOTC and ICCAT. Requirements for the northern hemisphere remain largely unchanged and are consistent with those adopted by the IATTC.

In addition to involvement with multilateral organizations, the United States also addresses seabird bycatch initiatives at bilateral fishery meetings with Brazil, Canada, Chile, the EU, Japan, the Republic of Korea, Mexico, Russia, and Taiwan.

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APPENDIX H

MARINE MAMMAL CONSERVAITON AND MANAGEMENT MEASURES SUMMARY BY REGIONAL FISHERY MANAGEMENT ORGANIZATION

MARINE MAMMALS					
	CCSBT	**IATTC /AIDCP**[1]	**ICCAT**	**IOTC**	**WCPFC**
Provision	**Recommendation to Mitigate the Impact on Ecologically Related Species (2008)** (no explicit reference to marine mammals)		**Recommendation on Information Collection and Harmonization of Data on Bycatch and Discards**[2]	**Resolution 13/04 On the Conservation of Cetaceans**	**Conservation and Management Measure for Protection of Cetaceans from Purse Seine Fishing Operations**
4.1 Binding	No	Yes	Yes	Yes	Yes
4.2 Stated management objective	Not explicit. (Use of ERS Rec. to mitigate incidental harm to ERS caused by fishing for SBT uncertain)	Yes, to reduce and eventually eliminate dolphin mortality, and to seek ecologically sound means of capturing large yellowfin tunas not in association with dolphins	CPCs shall require the collection of bycatch and discard data in their existing domestic scientific observer and logbook programs	Prohibit vessels from intentionally setting a purse seine net around a cetacean in the IOTC area of competence, if the animal is sighted prior to the commencement of the set.	Prohibit vessels from setting purse seine net on a school of tuna associated with a cetacean in the high seas and EEZ of the Convention Area, if the animal is sighted prior to commencement of the set
4.3. Implementation of IPOA[3]	No	No	No	No	No
4.4 Prescribed vessel applicability and area of application	No	Yes, for purse seine vessels with a carrying capacity greater than 363 mt (class 6)	Yes, for vessels >15 meters; an alternative approach for vessels < 15 meters	Yes, applies to all fishing vessels flying the flag of a CPC and on the IOTC Record of Fishing Vessels or authorized to fish tuna and tuna-like species managed by the IOTC on the high seas. This measure does not apply to artisanal fisheries operating exclusively in their respective EEZ.	Yes, for purse seine vessels
4.5 Use of multiple mitigation measures	No	Yes	N/A	Yes, if a cetacean is unintentionally encircled in a purse seine net, take all reasonable steps to ensure the safe release of the cetacean, taking into consideration the safety of the crew. Steps shall include the best practice guidelines for the safe release and handling of cetaceans developed by the IOTC Scientific Committee	Yes, if a cetacean is unintentionally encircled in the purse seine net, take all reasonable steps to ensure its safe release, including stopping the net roll and not recommencing fishing operation until the animal has been released and is no longer at risk of recapture. Includes taking into consideration the safety of the crew.
4.6 Standards for mitigation measures	No	Yes	N/A	Yes, standards for best practices for release to be endorsed by IOTC in 2014	Yes, standards for best practices for release
4.7 Reporting and information sharing requirements	Yes	Yes, 100% observer coverage on class 6 vessels and observer data reported and used to monitor compliance.	Yes, CPC report bycatch and discard data to the Secretariat	Yes	Yes
4.8 Research and review of mitigation measures	No	Yes, through the International Review Panel (IRP) and research through the Science Advisory Board (SAB)	N/A	CPCs using other gear types fishing for tuna and tuna-like species associated with cetaceans shall report all interactions with cetaceans to the relevant authority of the flag State	Yes, To report on implementation based on observer data
4.10 Review for effectiveness	Yes	Yes, review through the IRP and	Yes, SCRS evaluate	N/A	N/A

[1] The IATTC and AIDCP do not have bycatch mitigation measures for the longline fleet

[2] This recommendation focuses on data collection, ICCAT does not have specific marine mammal bycatch mitigation measure in either the purse seine or longline fleet

[3] There is no International Plan of Action for marine mammals

MARINE MAMMALS					
	CCSBT	**IATTC /AIDCP[1]**	**ICCAT**	**IOTC**	**WCPFC**
Provision	**Recommendation to Mitigate the Impact on Ecologically Related Species (2008)** (no explicit reference to marine mammals)		**Recommendation on Information Collection and Harmonization of Data on Bycatch and Discards[2]**	**Resolution 13/04 On the Conservation of Cetaceans**	**Conservation and Management Measure for Protection of Cetaceans from Purse Seine Fishing Operations**
and revision		revision possible through decision taken and the annual Meeting of the Parties	measures in 2012 and report to Commission		
4.11 Safe handling and live release	No	e.g. Prohibition of brailing live dolphins, requirement that all dolphins be removed from the net before sack-up, equipment and procedural guidelines for conducting backdown , requirements for rafts and provisions for putting divers into the water in some circumstances	N/A	The IOTC Scientific Committee will develop best practice guidelines for the safe release and handling of encircled cetaceans, taking into account those developed in other Regional Fisheries Management Organizations, including the WCPFC, these guidelines will be submitted to the 2014 Commission meeting for endorsement	Yes, In taking steps to ensure the safe release of the cetacean, CCMs shall require the master of the vessel to follow any guidelines adopted by the Commission for the purpose of this measure standards for best practices for release
4.12 Carcass retrieval	No	Life history sampling of fishery killed dolphins, but to date there is no funding supplies, training, etc.	N/A	No	No
4.13 Collection and use of observer data	Not explicit. No requirement to provide observer data	Yes, extensive use of observer data for both scientific and compliance purposes	Yes	Not explicit	Yes, Secretariat will report on the implementation of this conservation and management measure on the basis of observer reports, as part of the Annual Report on the Regional Observer Program.
4.14 Reporting interactions and estimating bycatch	Not explicit. (Use of ERS Rec. uncertain)	Yes, observed mortalities reported and bycatch is estimated using observer data	Yes	CPCs shall report, in accordance with Article X of the IOTC Agreement, any instances in which cetaceans have been encircled by the purse seine nets of their flagged vessels.	CCMs shall report the incident to the relevant authority of the flag State, including details of the species (if known) and number of individuals, location and date of such encirclement, steps taken to ensure safe release, and an assessment of the life status of the animal on release (including, if possible, whether the animal was released alive but subsequently died).
4.15 Compliance requirements	No	Yes	N/A	CPCs shall report the information and data collected through logbooks, or when an observer is onboard through observer programs, and provide to the IOTC Secretariat by 30 June of the following year	Yes, CCMs shall include in their Annual Report any instances in which cetaceans have been encircled by the purse seine nets of their flagged vessels.
4.16 Consultation or cooperation w/ other RFMOs and IGOs	Yes, to comply with WCPFC and IOTC measures when fishing for SBT in those areas.	N/A	N/A	No	No

MARINE MAMMALS					
	CCSBT	**IATTC /AIDCP**[1]	**ICCAT**	**IOTC**	**WCPFC**
Provision	**Recommendation to Mitigate the Impact on Ecologically Related Species (2008)** (no explicit reference to marine mammals)		**Recommendation on Information Collection and Harmonization of Data on Bycatch and Discards**[2]	**Resolution 13/04 On the Conservation of Cetaceans**	**Conservation and Management Measure for Protection of Cetaceans from Purse Seine Fishing Operations**
4.17 Support for developing nations	No	N/A	N/A	No	No

APPENDIX I

BYCATCH MEASURES ADOPTED BY REGIONAL FISHERY MANAGEMENT ORGANIZATIONS

Regional Fishery Management Organization	FAO Area(s), Ocean(s) & Map of Jurisdiction[i]	Dominant Fisheries & Gear	Bycatch of Protected Living Marine Resources Addressed[ii]	Current Bycatch Control Measures
Inter-American-Tropical-Tuna Commission[iii] **(IATTC)** Convention for the Establishment of an Inter-American Tropical Tuna Convention, opened for signature in May 1949) and entered into force in March 1950.	All: 87 Some: 77, 81, 88. Eastern Pacific Ocean (EPO), 50° S to 50° N latitudes and 150° W to 70° W longitudes and along West Coast of the Americas. Detailed description: http://www.ccamlr.org/pu/E/conv/defn-bnd091202.pdf See map http://www.fao.org/fishery/org/iattc_inst/en	Yellowfin, Skipjack, Bigeye, Pacific Bluefin Albacore & Black Skipjack Tuna; Bonitos; and Others (including Mackerel, Sharks, other Tunas). Gear: Gillnet, trap/pot, harpoon, longline, pole and line, troll, purse seine, trawl. (See Catch Reports http://www.iattc.org/Standard-Codes/StdGearCodes.htm)	General Juvenile Tuna, Non target fish species, Sea Turtles, Billfish, Sharks and Rays Seabirds Sea Turtles Sharks Dolphins Dolphins (cont'd.)	Location of all IATTC Resolutions: http://www.iattc.org/ResolutionsENG.htm IATTC 2006 Res. C-04-05 (Rev.2) Consolidated resolution on bycatch: Requires prompt release of sharks, rays turtles and other non-target species. • Promotes research into methods to avoid bycatch (time-area analyses), survival rates of released bycatch and techniques to facilitate live release • Urges Parties to provide the required bycatch information as soon as possible. (See also Resolution C-03-08) IATTC 2005 Res. C-05-01 Resolution on Incidental Mortality of Seabirds: Recommends Parties inform on status of National Plan of Action (NPOA) on Reducing Incidental Catches of Seabirds in Longline Fisheries (Seabirds) and implement FAO International Plan of Action (IPOA)-Seabirds; voluntarily collect and provide info on interaction; and working group on stock assessment may present assessment on impact to IATTC. IATTC 2007 Res. C-07-03 Resolution to Mitigate the Impact of Tuna Fishing Vessels on Sea Turtles: Implement FAO COF 2005 Guidelines on Reducing Turtle Mortality in Fishing Operations (FAO-Sea Turtle Guidelines); place observers on vessels with interactions if practical; bring aboard and resuscitate ASAP. In purse seine fisheries, avoid turtles, monitor fish aggregating devices (FADs) to release ASAP and consider & report possible experimental ways to reduce capture. In longline fishery, carry tools for quick release, improve technology to reduce capture, and report on ideas. IATTC staff to review reports and write up/publish. IATTC 2004 Res. C-04-07 Resolution on a Three-Year Program to Mitigate the Impact of Tuna Fishing on Sea Turtles. IATTC to undertake a program of data collection and analysis on interaction; research on improved gear and mitigation methods; industry education; capacity building in coastal nations re sea turtle conservation. (See also Recommendation C-03-10) IATTC 2005 Res. C-05-03 Resolution on the Conservation of Sharks Caught in Association with Fisheries in the EPO: Establish and implement a NPOA on the conservation and management of sharks in conformity with the FAO IPOA of same name. In 2006, IATTC with co-op of Parties (assistance may be available for data collection including nursery area locales) to publish advice on status of key shark species and develop a comprehensive research plan. Sharks caught in assoc. with IATTC-managed fisheries: Parties must fully utilize; shall have on board fins that total no more than 5% of the weight of the sharks on board; prohibited from retaining, transferring, landing or trading fins in contravention; encourage the return alive on non-targeted sharks and do research to decrease

				incidental take. Shall report annually data on catches, effort by gear, landing and trading by species, where possible, and on implementation of Resolution. IATTC 2009 Res. C-09-04, Resolution on IDCP. Continue to have observer on trips made in EPO by purse seiner of capacity greater than 363 mt. **Agreement on the International Dolphin Conservation Program (AIDCP)** (Signed in May, 1998 and entered into force February 1999; as amended October, 2007)iv Art. II: Goal to reduce Dolphin mortality to zero; seek ways to catch Tuna w/o encirclement and to avoid, reduce, minimize other bycatch. Art III (Annex I) defines area. Art. V: Annual mortality limits for fleet (currently no more than 5000) incl. per stock per year; assign Dolphin Mortality Limits (DMLs) to vessels greater than 363mt (Annex III [numbers/stock/year based on NMFS/NOAA minimum estimate abundance or other best science], Annex IV [DML assignment methods]); if have DML, comply w/apparatus requirements (Annex VIII); offer incentives, training, certification, gear improvement trading verification of Tuna caught w/o mortality or serious injury (Annex IX); research sharing. Art. VI: Estb./implement model for sustainable fishing. Art. VII: Implement at State level; Art. X: Scientific Advisory Board (Annex V). Art XI: Each member estb. National Scientific Advisory Committee (Annex VI). Art XII: Estb. International Review Panel IRP – compiles list entitled to DML, analysis of reports, IDs and notifies parties of infractions, list of captains in compliance and recommends ways to reduce mortality (Annex VII). Art XIII: Onboard observers (Annex II [if over 363 mt, manadated, and specified procedures]). Art. XV: Financing program by vessel fees. Art. XVI: Compliance program with annual certification and inspections to assure meet above espc. as to observers and operational requirements – sanction based upon IRP recs. Are national and must be of sufficient gravity to get compliance incl. no DML allocation to vessel with record of repeat violations. AIDCP Resolutions: http://www.iattc.org/ResolutionsActiveENG.htm AIDCP 2004 Res. A-04-08 Criteria for Attaining Status of Cooperating Nonparty. Contact and encourage purse seiners to adopt procedures and mechanisms for them to attend as observers. AIDCP 2004 Res. A-04-03 Dolphin Safety Gear Inspections. Twice annually if have a DML. AIDCP 2004 Res. A-04-02 Captains with Two or More Night Set Infractions. Must train. AIDCP 2003 Res. A-03-02 At Sea Reporting. If must carry observer, must report weekly AIDCP 2002 Res. A-02-01 Vessels of Less Than 363 MT Capacity. If identified as setting on dolphins, must carry an observer. Other Dolphin, bycatch-related IDCP documents: System for Tracking & Verifying Tuna (2003, as amended); System for AIDCP Dolphin Safe Certification (2005, as amended); and a number of Procedures and Guidelines such as Technical Guidelines to Prevent High Mortality During Sets on Large Dolphin Herds (2002)

The International Commission for the Conservation of Atlantic Tunas [v] **(ICCAT)** International Convention for the Conservation of Atlantic Tunas, opened for signature in 1966, and entered into force in 1969.	All: 27, 21, 31, 34, 37, 41; almost all: 47 and 48. Atlantic Ocean and adjacent seas See map http://www.iccat.int/en/convarea.htm	About 30 species are of direct concern to ICCAT: Atlantic Bluefin, Skipjack, Yellowfin, Albacore and Bigeye Tuna; Swordfish; Billfishes such as White Marlin, Blue Marlin, Sailfish and Spearfish; Mackerels such as Spotted Spanish Mackerel and King Mackerel; and, small Tunas like Black Skipjack, Frigate Tuna, and Atlantic Bonito. Gear: Purse seine, longline, gillnet, trawl, pole and line, rod and reel, harpoon, trap/pot. (See ICCAT Manual: http://www.iccat.int/en/ICCATManual.htm)	General Sharks Seabirds Sea Turtles	ICCAT Resolutions and Recommendations[vi] as to Bycatch: http://www.iccat.int/en/RecsRegsresults.asp?cajaYear=checkbox&cajaKey=checkbox&cajaType=c ICCAT 2008-08 Resolution by ICCAT on Porbeagle Shark (Lamna nasus). Calling for meeting in 2009 to discuss development of a common management regime for all fisheries that take. (Meeting held June 22-27 in Copenhagen) ICCAT 2008-07 Recommendation by ICCAT on the Conservation of BigEye Thresher Sharks (Alopias superciliosus) Caught in Association with Fisheries Managed by ICCAT. That parties require their fleet to release alive and unharmed and record catch for reporting ICCAT 2007-06 Supplemental Recommendation by ICCAT Concerning Sharks. Collect data including dead discards and size frequency and by 2009 develop stock assessment and management recommendation for Porbeagle shark. ICCAT 2006-10 Supplementary Recommendation by ICCAT Concerning the Conservation of Sharks Caught in Association with Fisheries Managed by ICCAT. Amends ICCAT Re. 04-10 to add that Standing Committee on Research and Statistics (SCRS) do assessment and conservation plans for Shortfin Mako shark and Blue shark for 2008 and asks for collection of information by parties. ICCAT 2005-05 Recommendation by ICCAT to Amend Recommendation 04-10 Concerning the Conservation of Sharks Caught in Association with Fisheries Managed by ICCAT. Amends to add that those parties that have not adopted measures to reduce mortality of North Atlantic Shortfin Mako Shark do so and that others annually report efforts. ICCAT 2004-10 Recommendation by ICCAT concerning the conservation of sharks caught in association with fisheries managed by ICCAT. Report shark catch; full utilization required; fins onboard cannot total more than 5% of the weight of the sharks onboard; cannot retain, transship or land fins in contravention; encourage bycatch of sharks be released alive, especially juveniles, if not used for food/subsistence. ICCAT 2003-10 Resolution by ICCAT on the shark fishery. Provide information on shark bycatch; fully implement a NPOA in accordance with the FAO IPOA for the Conservation and Management of Sharks. ICCAT 1995-02 Resolution by ICCAT on cooperation with the Food & Agriculture Organization of the United Nations (FAO) with regard to study on the status of stocks and by-catches of shark species. Provide information to FAO on sharks to determine status of stocks and bycatch. ICCAT 2007-07 Recommendation by ICCAT on Reducing Incidental Bycatch of Seabirds in Longline Fisheries. All vessels fishing South of 20 S use tori poles and tori lines to scare seabirds away from longlines except if targeting swordfish with monofilament line at night. Is provisional based upon review of the ongoing ecological risk assessment.. The swordfish boats have to use weighted branch lines as well and this is applied to the entire convention area, unlike the area of application designated for the other boats.

				ICCAT 2005-08 Resolution by ICCAT on Circle Hooks. Parties are encouraged to undertake research trials in commercial pelagic longline fisheries on using circle hooks to decrease turtle bycatch mortality – and to encourage such by recreational and artisanal fisheries. Also should exchange ideas on other mitigation methods and proper handing of turtles including carrying and using de-hookers, line cutters and scoop nets. SCRS will assess efficacy of circle hooks in this regard and submit to Commission (which might also decrease post release mortality of Blue and White Marlin which were in rebuilding mode in 2005). ICCAT 2003-11 Resolution by ICCAT on sea turtles. To report on turtle bycatch, nesting areas and instances of swallowed marine debris; should share information on technical measures to minimize catch, and should release alive and share methods on best ways to do to ensure survival.
Commission for the Conservation of Southern Bluefin Tuna)[vii] **(CCSBT)** Convention for the Conservation of the Southern Bluefin Tuna, opened for signature in May, 1993 and entered into force May 1994.	Portions of 41, 47, 51, 57, 58, 71, 78. Southwest Atlantic Ocean, Southeast Atlantic Ocean, Western Indian Ocean, Eastern Indian Ocean, Southwest Pacific Ocean – entire range of Southern Bluefin See map http://www.fao.org/fishery/rfb/ccsbt/en	Southern Bluefin Tuna Gear: Longline and purse seine.	Seabirds, notably Albatross and Petrels; and other species such as Sea Turtles and Sharks	CCSBC 2008 Recommendation to Mitigate the Impact on Ecologically Related Species of Fishing for Southern Bluefin Tuna. Members and coop non-members should implement IPOAs on Seabirds and Sharks and FAO Guidelines on Reduction of Sea Turtle Mortality in Fishing Operations. Comply with binding and recommendatory measures re protecting ERS, including above, from fishing as adopted by the IOTC when fishing in that Convention area and same for WCPFC when fishing in that convention area. Collect and report data on ERS bycatch to CCSBT ERSWG. File annual report on actions to comply with this. CCSBT will consider further action as data dictates.
Western and Central Pacific Fisheries Commission[viii] **(WCPFC)** Convention on the Conservation and Management of Highly Migratory Fish Stocks in the	All 81, 71, 61 and 61; portions of 77 and 67. Western and Central Pacific Ocean. Waters of the Pacific Ocean bounded to the south and to the	Albacore,Yellow-fin, Bigeye & other Tunas, Striped Marlin, Pacific Swordfish, & other highly migratory species. Gear: Purse seine, longline, gillnet, troll, pole and line, harpoon.	General Sharks All	WCPFC Conservation and Management Measures (CMM), and Resolutions[ix]: http://www.wcpfc.int/conservation-and-management-measures WCPFC CMM 2008-06 Conservation and Management of Sharks. Implement IPOA-Seabirds and report on need/status of NPOA-Seabirds which should include minimize waste of sharks and admonition to return alive to water. Include key shark species (Blue, Oceanic Whitetip, Mako, Thresher) in annual report with specificity on catch and effort by gear. Commission may consider assistance to assist in data collection. Must fully utilize; fins onboard cannot total more than 5% of the weight of the sharks onboard; cannot retain, transship or land fins in contravention; and for fisheries not directed at sharks, encourage bycatch of sharks be released alive, especially juveniles, if not used for food/subsistence. Review effectiveness of this and in 2010, Scientific Committee to

Western and Central Pacific Ocean, opened for signing in September 2000, and entered into force in June 2004.	east by a line drawn from the south coast of Australia due south along the 141° meridian of east longitude to its intersection with the 55° parallel of south latitude; thence due east along the 55° parallel of south latitude to its intersection with the 150° meridian of east longitude; thence due south along the 150° meridian of east longitude to its intersection with the 60° parallel of south latitude; thence due east along the 60° parallel of south latitude to its intersection with the 130° meridian of west longitude; thence due north along the 130° meridian of west longitude to its intersection with the 4° parallel of south latitude; thence due west along the 4° parallel of south latitude to its intersection with		Sea Turtles Seabirds	develop a research plan on sharks, if possible with IATTC. WCPFC CMM 2008-04 Conservation and Management Measure to Prohibit the Use of Large Scale Driftnets on the High Seas in the Convention Area . Use of nets greater than 2.5 km in length prohibited in Convention area. WCPFC CMM 2008-04 Conservation and Management of Sea Turtles. Implement, as appropriate, FAO Guidelines to Reduce Turtle Mortality in Fishing Operations. Must annually report progress and interactions. When Parties are fishing for species covered by Convention, must, if practicable, bring aboard comatose turtle and foster recovery/resuscitate before putting back. Observers' reports must include turtle interactions.. Purse seine vessels that fish for species covered by the Convention should avoid encirclement, to the extent practical, and take measures to release. Release if possible from FADs. If entangled, stop net roll when turtle comes out of the water, disentangle and assist recovery. Carry dip nets if appropriate to assist. Report all interactions. Longline gear vessels carry cutters and de-hookers. As of January 1, 2010, except in limited cases, longline for swordfish using a shallow set must mitigate through use of special hooks, or use of whole finfish for bait, or other approved methods. Other longline fisheries urged to experiment with special large circle hooks/develop other mitigation methods, Will review and update these measures. Secretariat may allocate funds to assist in implementing the FAO Guidelines. Proper sea turtle mitigation and handling guidelines will be prepared by WCPFC Secretariat and distributed by June 30, 2009 WCPFC CMM 2007-04 Conservation and Management Measure to Mitigate the Impact of Fishing for Highly Migratory Fish Stocks on Seabirds. Implement IPOA-Seabirds and report status and, as appropriate, status of formulating and implementing NPOA-Seabirds. For longline vessels, a table of mitigation methods, from which must choose at least two in areas south of 30° S and north of 23° N including one of following: side setting with bird curtain and weighed lines, night setting with minimal lighting, Tori lines or weighed branch lines. Additional options include: blue-dyed bait, deep setting line shooter, underwater setting chute and management of offal discharge (Attachment O, Annex 1 provides provisional specifications/details). In other areas, encouraged to use one or more. In areas south of 30° S and north of 23° N annual reporting required giving methods required/used with technical specifications and this must be annually updated. Parties should research, refine share and report on mitigation methods. Scientific Committee will continue to investigate and make recommendations. Efforts to release caught birds in good condition encouraged, and removing hooks when possible without jeopardizing life of bird. Annual reporting of details of bird bycatch information required.

	the 150° meridian of west longitude; thence due north along the 150° meridian of west longitude. See map: http://www.wcpfc.int/system/files/documents/convention-texts/Map.pdf			
Indian Ocean Tuna Commission[x] **(IOTC)** The Agreement for the Establishment of the Indian Ocean Tuna Commission, was concluded under Article XIV of the FAO Constitution, was approved by the FAO Council in November 1993, and entered into force in March 1996.	51, 57 Indian Ocean and adjacent seas. See map: http://www.fao.org/fishery/org/iotc_inst/en	Tuna, Swordfish and other highly migratory species. Gear: Gillnet, longline, purse seine.	General Sea Turtles Sea Turtles (cont'd) All Seabirds, especially Albatross and Petrels	IOTC Resolutions and Recommendations: http://www.iotc.org/files/proceedings/misc/ComReportsTexts/resolutions_E.pdf IOTC Resolution 09/06 On Marine Turtles. Parties collect and report (logbooks, observers) detailed information on all interactions, successful mitigation measures and other negatives witnessed such as destroyed nursery areas and marine debris ingestion. Report progress on implementation of FAO Guidelines to Reduce Turtle Mortality in Fishing Operations. Must, if practicable, bring aboard comatose turtle and foster recovery/resuscitate before putting back. Must have on board necessary equipment to deal, as per to-be-developed IOTC guidelines on turtle handling. Reiterates with more specificity for gillnetters; longliners (line cutters, de-hookers, dip nets, use of whole finfish as bait); and purse seiners (avoid encirclement & release if entangled, release if entangled in FADs/adopt FAD designs that reduce entrapment, stop net roll when trapped turtle comes out of water, rescue and assist recovery). Requests parties, where appropriate, to undertake research trials of circle hooks, whole finfish bait, alternative FAD design and other possible gear/methodology mitigating measures and report to Scientific Committee (SC) at least 60 days prior to annual meeting. SC to request Working Party on Ecosystems and Bycatch to develop recommendations as to above mitigating practices and on proper turtle handling and on standards for data compilation and for an IO sea turtle ID guide. These recommendations shall be reported to the SC for consideration at its 2010 annual meeting. WGOEB is encouraged to collaborate, especially with the WCPFC. The full Commission will consider the SC recommendations at 2011 meeting, together with socio-economic considerations, as to requiring further mitigation methods. Parties are admonished, as far as their research on mitigation, that "consideration should be given to ensuring methods do not cause greater harm than they prevent and do not adversely impact other species (especially threatened species) and/or the environment." Parties are encouraged to collaborate with the Indian Ocean – South-East Asian Marine Turtle MOU Secretariat and its member states. IOTC Recommendation 05/08 On Sea Turtles. Implement FAO Sea Turtle Guidelines and take actions now formalized in Resolution 09/06. IOTC Resolution 09/06 To Prohibit the Use of Large-scale Driftnets on the High Seas in the IOTC

			Sharks	Area. Prohibited – methods to assure compliance to be reviewed in 2012. IOTC Resolution 08/03 On Reducing the Incidental Bycatch of Seabirds in Longline Fisheries. Hooklines should be made to sink as soon as possible. In longline fisheries south of 30° S, a table of mitigation methods, from which must choose two including one from column A: night setting with minimal lighting, Tori lines, or weighed branch lines. Additional options in column B include use of: blue-dyed squid bait, offal discharge control, and line shooting device. (Annexes 1and 2 provide specifications/details). In other areas, encouraged to use one or more methods. The SC will review data and advise Commission on efficacy by 2011 annual meeting with any recommendations. IOTC Recommendation 05/09 On Incidental Mortality of Seabirds. If appropriate, inform on progress in implementing IPOA-Seabirds, and progress toward developing NPOA-Seabirds and its implementation. Voluntarily inform SC on seabird interactions and assessment of impact of same. IOTC Resolution 05/05 Concerning the Conservation of Sharks Caught in Association with Fisheries Managed by the IOTC. Report shark catch data. In 2006, SC shall provide a status report on key species and research plan with a timeline for providing full status assessment. . Must fully utilize; fins onboard cannot total more than 5% of the weight of the sharks onboard; cannot retain, transship or land fins in contravention. For fisheries not directed at sharks, encourage bycatch of sharks be released alive, especially juveniles, if not used for food/subsistence.
General Fisheries Commission for the Mediterranean[xi] **(GFCM)** The Agreement for the Establishment of the Fisheries Commission for the Mediterranean. Drafted under the provisions of Article XIV of the FAO Constitution, approved by the FAO Conference in 1949, it entered into force in 1952**.**	All of 37. Mediterranean Sea, Black Sea and connecting waters. See map: http://www.gfcm.org/gfcm/abo)ut/3/en	GFCM Priority Species table (48 Species): Danube sturgeon, Starry sturgeon, Sturgeon European eel, Giant red shrimp, Blue and red shrimp, Bullet tuna, Bogue, Common dolphinfish Horned octopus, Musky octopus, European anchovy Little tunny (=Atl. Black skipj.), Beluga, Shortfin mako, Skipjack tuna Porbeagle, European squid,	General Sharks Sharks (cont'd)	GFCM Recent Recommendations and Resolutions[xii]: http://www.gfcm.org/gfcm/topic/16100/en Recommendation GFCM/2006/8 adopting selected ICCAT Recommendations: - - GFCM/2006/8 (B): Recommendation [05-05] by ICCAT to amend the Recommendation [04-10] Concerning the Conservation of Sharks Caught in Association with Fisheries Managed by ICCAT. GFCM adopts the amendment that Parties report on implementation of Recommendation ICATT 04-10 and implement if not done so re reducing mortality of North Atlantic Shortfin Mako Shark. Recommendation GFCM/2005/3 adopting selected ICCAT Recommendations: -.- GFCM/2005/3 (E) Recommendation [04-10] by ICCAT Concerning the Conservation of Sharks Caught in Association with Fisheries Managed by ICCAT. GFCM adopts: report shark catch; full utilization required; fins onboard cannot total more than 5% of the weight of the sharks onboard; cannot retain, transship or land fins in contravention; encourage bycatch of sharks be released alive, especially juveniles, if not used for food/subsistence. Parties encouraged to voluntarily undertake research to make gear more selective (e.g., avoiding use of wire traces); to ID nursery areas and report. Commission may consider funding to assist in data collection.

		Blackbellied angler, Angler (= Monk), Whiting, European hake, Blue whiting (=Poutassou), Red mullet Surmullet, Norway lobster, Common octopus, Plain bonito, Blackspot(=red) seabream, Common Pandora, Common spiny lobster, Pink spiny lobster, Deepwater rose shrimp, Bluefish Blue shark Atlantic bonito, European pilchard (=Sardine), Round sardinella, Atlantic mackerel Common cuttlefish Common sole European sprat, Albacore Atlantic Bluefin tuna Mediterranean horse mackerel, Atlantic horse mackerel, Swordfish. Gear: Trawl, purse seine, longline, dredge.		

Commission for the Conservation of Antarctic Marine LivingResources [xiii] **(CCAMLR)** **Convention on the Conservation of Antarctic Marine Living Resources**, opened for signature in May 1980, and entered into force in April 1982.	48, 58 and 88. Atlantic Antarctic, Indian Antarctic and Pacific Antarctic Oceans. See map: http://www.ccamlr.org/pu/E/conv/map.htm	Patagonian Toothfish (longline, trawl & pots); Toothfish, Icefish, Krill & Lanternfish (trawl); Crabs (pots); and Squid (jig). Gear: Longline, trawl, trap/pot and jig.	General All bycatch. All bycatch, espc. Sharks and Rays All bycatch of fish, including Skates and Rays. Sharks All, especially fur seals Seabirds Seabirds and marine mammals	CCAMLR Conservation Measures (CM) and Resolutions: http://www.ccamlr.org/pu/E/e_pubs/cm/08-09/toc.htm CCAMLR Resolution 7/IX (undated). Driftnet fishing in the Convention Area. Prohibited (in accord with UN Resolution 44/225). CCAMLR CM 22-04 (2006). Interim prohibition of deep-sea gillnetting. As to all species, all areas and all seasons, with limited exceptions for science. CCAMLR CM 33-02 (2008) Limitation of bycatch in Statistical Area 58.5.2 in 2008/09 season. For all gear types, sets tonnage limits for non-target species and by species for certain fish (e.g., skates and rays counted as single species), and when reached, fishery must move distances based on any one haul. CCAMLR CM 33-03 (2008). Limitation of bycatch in new and exploratory fisheries in 2008/09 season. See above for 7 separate Statistical Areas. CCAMLR CM 32-18 (2006). Conservation of sharks. No directed fishery allowed; exception for science; bycatch should be returned alive, especially juveniles and gravid females. CCAMLR CM 26-01 (2008).General environmental protection during fishing. All are prohibited from use of plastic packaging bands to secure bait boxes and all other use of plastic packaging bands prohibited unless an onboard incinerator. Packaging bands must be cut into approximately 30cm lengths, incinerated ASAP, and residue plastic stored/not discharged at sea. Prohibition on listed types of discharges in area south of 60° S and no live birds allowed in that area. CCAMLR CM 24-02 (2008). Longline weighting for seabird conservation. Tests in various protocols must be met, initially, annually and at sea. in presence of observer, in order to try to get baited hooks rapidly out of the vicinity were seabirds will negatively interact with them CCAMLR CM 25-02 (2008). Minimization of the incidental mortality of seabirds in the course of longline fishing or longline fishing research in the Convention Area. Measures required to get baited hooklines to sink rapidly beyond the reach of birds. Setting allowed only at night with minimal ship's lighting. Dumping of offal prohibited during set; to be avoided during haul and if discharged then, must be on opposite side of vessel – if not possible to either retain or use opposite side, vessel not allowed to fish. If discharge offal/fish heads, must remove hooks. Use streamer scare line during set and, in areas designated as being high risk for catching birds, must use scare device during hauling as well. Every effort to release caught birds alive, and to remove hooks when possible without jeopardizing life of bird. CCAMLR CM 25-03 (2003). Minimization of the incidental mortality of seabirds and marine mammals in the course of trawl fishing in the Convention Area. Net monitor cables prohibited. Minimize ship lighting. No offal discharge during shooting or hauling. Nets cleaned prior to shooting to avoid attracting birds. Minimize time net lying on surface during shooting, hauling and maintenance. Develop gear that minimizes chance of birds encountering parts of the net to which

				they are most vulnerable. Other CCAMLR initiatives re seabird bycatch: Resolution 22/XXV (2006) regarding the need for cooperation and information exchange between RFMOs regarding seabird interactions. In 1996,the Commission published and distributed to fisherman, Fish the Sea Not the Sky[xiv], which explained methods to reduce bird catch. They delay opening fishing seasons until the end of breeding season of most Albatross and Petrel species[xv]
South East Atlantic Fisheries Organization[xvi] **(*SEAFO*)** The Convention on the Conservation and Management of Fisheries Resources in the South East Atlantic Ocean (**Convention),** opened for signature in April 2001, and entered into force in April 2003.	Miniscule portion of 34; almost all of 47. South East Atlantic Ocean Beginning at the outer limit of waters under national jurisdiction at a point 6° South, thence due west along the 6º South parallel to the meridian 10° West, thence due north along the 10º West meridian to the equator, thence due west along the equator to the meridian 20° West, thence due south along the 20º West meridian to a parallel 50° South, thence due east along the 50º South parallel to the meridian 30° East, thence due north along the 30º East meridian to the	Main Commercial Species in Revised SEAFO Species List 2008: Patagonian Toothfish, Orange Roughy, Alfonsino, Deep-sea Red Crab, Mackerel; Armourhead, Boarfish, Oreo dories, Cardinal Fish, Octopus, Squid, Wreckfish, Skates, Sharks (deep sea). (See: http://www.seafo.org/Cons%20&%20Mngt%20Measures/2007%20conservation%20measures/Commission_Report_Eng_2008.pdf) Gear: Trawl, longline, & trap/pot.	General Sea Turtles Sharks Seabirds Seabirds (cont'd)	SEAFO Conservation and Management Measures: http://www.seafo.org/welcome.htm SEAFO 2006 Resolution 01/ 06: To Reduce Sea Turtle Mortality in SEAFO Fishing Operations. Parties should, as appropriate, implement FAO Guidelines to Reduce Sea Turtle Mortality in Fishing Operations; should provide detailed information on Sea Turtle fishery interactions and on any Sea Turtle specific training offered observers. SEAFO should cooperate and exchange information and develop relevant strategies for further consideration. SEAFO 2008 Recommendation to cease directed fishery on deepwater sharks until obtain status of stocks information adopted. No C/M online number. SEAFO 2006 Conservation Measure 04/06: On the Conservation of Sharks Caught in Association with Fisheries Managed by SEAFO. Report annually shark catch; full utilization required; fins onboard cannot total more than 5% of the weight of the sharks onboard; cannot retain, transship or land fins in contravention; encourage bycatch of sharks be released alive, especially juveniles, if not used for food/subsistence. Encouragement to make gear more selective. Commission may consider assistance to assist in data collection SEAFO 2006 Conservation Measure 05/06: On Reducing Incidental By-catch of Seabirds in The SEAFO Convention Area. Within a year, Commission shall develop a system to facilitate information sharing of Seabird data among Parties and for reporting to SEAFO. Parties shall collect and report; All longline vessels fishing South of 30° S shall carry and use Tori lines and poles (and guidelines for use set out in Appendix to the CM). Where practical, shall use Tori poles and scaring lines in areas of high Seabird abundance/activity. Setting allowed only at night with minimal ship's lighting. Dumping of offal prohibited during set; to be avoided during haul and if discharged then, must be on opposite side of vessel – if it is not possible to either retain or use opposite side, vessel not allowed to fish. If discharge offal/fish heads, must remove hooks. Nets cleaned prior to shooting to avoid attracting birds. Minimize time net lying on surface during shooting, hauling and maintenance. Develop gear that minimizes chance of birds encountering parts of the net to which they are most vulnerable. Release caught birds alive, and to remove hooks when possible without jeopardizing life of bird. Will review at 2009 meeting.

	coast of the African continent (See map: http://www.fao.org/fishery/rfb/seafo/en)			
North Atlantic Fisheries Organization[xvii] **(*NAFO*)** Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries, (Convention) replaced the International Convention for the Northwest Atlantic Fisheries (ICNAF) and entered into force in January 1979.	21. Waters of the Northwest Atlantic Ocean north of 35º00' north latitude and west of a line extending due north from 35º00' north latitude and 42º00' west longitude to 59º00' north latitude, thence due west to 44º00' west longitude, and thence due north to the coast of Greenland, and the waters of the Gulf of St. Lawrence, Davis Strait and Baffin Bay south of 78º10' north latitude. See map: http://www.nafo.int/about/frames/about.html	NAFO fishers target approximately 25 species, of which the following are managed by NAFO: Cod, Redfish, A. plaice, Witch flounder, Yellowtail flounder, G. Halibut, W. Hake, Skate, Capelin, Squid and Shrimp. http://www.nafo.int/fisheries/frames/fishery.html (For a complete listing, see: Conservation and Enforcement Measures, Annex II, List of species. http://www.nafo.int/about/frames/about.html) Gear: Purse seine, trawl, dredges, liftnet, falling gear, gillnet, trap/pot, hook & line, harpoon.	General Sharks Sharks (cont'd)	NAFO Conservation and Enforcement Measures: http://www.nafo.int/about/frames/about.html NAFO Conservation and Enforcement Measures, 2009 (NAFO FC Doc. 09/1 Serial No. N5614) Chapter 1. CONSERVATION AND MANAGEMENT MEASURES Article 17 - Conservation and Management of Sharks. 1. Contracting Parties shall report data for all catches of sharks, in accordance with the data reporting procedures laid down in Chapter III, including available historical data. 2. Contracting Parties shall ensure that fishing vessels fully utilize their entire catches of sharks. Full utilization is defined as retention by the fishing vessel of all parts of the shark excepting head, guts and skins, to the point of first landing. 3. Contracting Parties shall require their vessels not to have onboard shark fins that total more than 5% of the weight of sharks onboard, up to the first point of landing. Contracting Parties that currently do not require fins and carcasses to be offloaded together at the point of first landing shall take the necessary measures to ensure compliance with the 5% ratio through certification, monitoring by an observer, or other appropriate measures. 4. The ratio of fin-to-body weight of sharks described in paragraph 3 shall be reviewed by the Scientific Council and reported back to the Commission in 2006 for revision, if necessary. 5. Fishing vessels are prohibited from retaining on board, transshipping or landing any fins harvested in contravention of these provisions. 6. In fisheries that are not directed at sharks, Contracting Parties shall encourage the release of live sharks, especially juveniles, to the extent possible, that are caught as by-catches and are not used for food and/or subsistence. 7. Contracting Parties shall, where possible, undertake research to identify ways to make fishing gears more selective. 8. Contracting Parties shall when possible conduct research to identify shark nursery areas.

[i] As to each of the RFMOs discussed in this table, the management authority does not include jurisdiction within State waters. This does not apply in the case of CCAMLR due to the manner in which the governance of Antarctica is allocated among nations.

[ii] In each of the RFMOs discussed in this table, there are data which indicate at least some bycatch of marine mammals, seabirds, sea turtles and sharks. This column identifies which of those categories of species have been dealt with by recommended or mandatory requirements. See: N.M. Young and S. Iudicello, Worldwide Bycatch of Cetaceans: Analysis and Action Plan (NOAA, Technical Memorandum NMFS, July 2007); information as presented in this report on Marine Mammals, Turtle and Sharks, Seabirds; and the RFMOs' own recognition of the problem illustrated by adoption of the measures set out in the adjoining column of this table.

[iii] IATTC Home: http://www.iattc.org/

Members of IATTC: Belize, Canada, China, Columbia, Cook Islands, Costa Rica, Ecuador, El Salvador, France, Japan, Nicaragua, Panama, Peru, Mexico, Rep. of Korea, Spain, USA, Vanuatu, and Venezuela. The European Union and Chinese Taipei are Cooperating Non Parties or Cooperating Fishing Entities.

Conventions: 1949 IATTC Convention ; Antigua Convention

[iv] AICDP Convention: http://www.iattc.org/PDFFiles2/AIDCP-(amended-Oct-2007).pdf ; IATTC Convention Protocol, (1999).

The IATTC has significant responsibilities for the implementation of the International Dolphin Conservation Program (IDCP), and provides the Secretariat for that program. Agreement on the International Dolphin Conservation Program, Article XIV. http://www.iattc.org/PDFFiles2/AIDCP-(amended-Oct-2007).pdf . Boundaries for IDCP are 40° N latitude to 150° W longitude to 40° S latitude to coast of South America on NW along continent to 40° N latitude. As of the end of 2008, the following States had ratified or acceded to the Agreement: Costa Rica, Ecuador, El Salvador, European Union, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, United States, Vanuatu and Venezuela**.** States and Regional Economic Integration Organizations which are applying the Agreement provisionally: Bolivia, Colombia**.** . IDCP website is http://www.iattc.org/IDCPENG.htm

[v] ICCAT Home: http://www.iccat.int/en/

Members: 48 contracting parties: Japan, South Africa, Ghana, Canada, France (St-Pierre et Miquelon), Brazil, Morocco, Rep. of Korea, Cote d'Ivoire, Angola, Russia, Gabon, Cap-Vert, Uruguay, Sao Tome e Principe, Venezuela, Guinea Equatorial, Guinee Rep., UK (O. territories), Libya, Peoples Rep. of China, Croatia, EU, Tunisia, Panama, Trinidad & Tobago, Namibia, Barbados, Honduras, Algeria, Mexico, Vanuatu, Iceland, Turkey, Philippines, Norway, Nicaragua, Guatemala, Senegal, Belize, Syria, St Vincent & The Grenadines, Nigeria, Egypt, Albania, Sierra Leone, Mauritania; and three non-contracting parties: Chinese Taipei, Guyana and Netherlands Antilles.

Convention/basic documents, revised through September 2007: http://www.iccat.int/Documents/Commission/BasicTexts.pdf

[vi] Although styled as "Recommendations," these decisions by the present voting membership are mandatory six months after adoption and formal notification of the parties; however there are objection mechanisms. Convention, Art. VIII. http://www.iccat.int/Documents/Commission/BasicTexts.pdf

[vii] CCSBT Home: http://www.ccsbt.org/

Members: Australia, Indonesia, Japan, New Zealand, Republic of Korea; the Fishing Entity of Taiwan participates through an Extended Commission. Cooperating non-members: EU, Philippines and South Africa.

Convention: http://www.ccsbt.org/docs/pdf/about_the_commission/convention.pdf

[viii] WCPFC Home: http://www.wcpfc.int/

Members: Australia, China, Canada, Cook Islands, European Community, Federated States of Micronesia, Fiji, France, Japan, Kiribati, Korea, Republic of Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Chinese Taipei, Tonga, Tuvalu, United States of America and Vanuatu. Participating Territories: American Samoa, Commonwealth of the Northern Mariana Islands, Guam, French Polynesia, New Caledonia and Wallis and Futuna, and Tokelau. Cooperating Non-members: Belize, Indonesia, Senegal, Mexico and El Salvador.

Convention: http://www.wcpfc.int/key-documents/convention-text

[ix] Resolutions describe non-binding statements and recommendations addressed to members of the Commission and Cooperating non-members. Such Resolutions are sequentially numbered and include the year of adoption. Conservation and Management Measures describe binding decisions relating to conservation and management measures. Such decisions are sequentially numbered and include the year of adoption.

[x] IOTC Home: http://www.iotc.org/English/index.php

Members: Australia, Belize, China, Comoros, Eritrea, European Community, France, Guinea, India, Indonesia, Iran (Islamic Republic of), Japan, Kenya, Korea (Republic of), Madagascar, Malaysia, Mauritius, Oman (Sultanate of), Pakistan, Philippines, Seychelles, Sri Lanka, Sudan, Tanzania, Thailand, United Kingdom, Vanuatu. Cooperating Non-Contracting Parties: Senegal, South Africa, Uruguay.

Agreement:
http://www.iotc.org/English/download.php?target=/English/info/../../files/proceedings/misc/ComReportsTexts/IOTC%20Agreement.pdf&ref=http://www.iotc.org/English/info/mission.php

[xi] GFCM Home: http://www.gfcm.org/gfcm

Members: Albania, Algeria, Bulgaria, Croatia, Cyprus, European Community, Egypt, France, Greece, Israel, Italy, Japan, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Romania, Slovenia, Spain, Syria, Tunisia, Turkey.
Agreement: ftp://ftp.fao.org/FI/DOCUMENT/gfcm/web/GFCM_Agreement.pdf

[xii] Although styled "Recommendations", under the terms of the Agreement establishing the GFMC, such conservation and management and implementation measures under Article III.1.(b) are binding on the membership after being voted on positively by 2/3 of those present and voting at the meeting, and go into effect after due notice. There are provisions for objection. Article V. See: ftp://ftp.fao.org/FI/DOCUMENT/gfcm/web/GFCM_Agreement.pdf

[xiii] CCAMLR Home: http://www.ccamlr.org/
Members: Argentina, Australia, Belgium, Brazil, Chile, the European Union, France, Germany, India, Italy, Japan, Namibia, Republic of Korea, Norway, New Zealand, Poland, Russian Federation, South Africa, Spain, Sweden, Ukraine, United Kingdom, United States, and Uruguay. Bulgaria, Canada, Cook Islands, Finland, Greece, Mauritius, Netherlands, Peru, and Vanuatu have acceded to the convention, so are parties, but not members of the Commission.
Convention: http://www.ccamlr.org/pu/e/e_pubs/bd/pt1.pdf

[xiv] CCAMLAR Secretariat, *Fish the Sea Not the Sky, How to Avoid By-Catch of Seabirds When Fishing with Bottom Longlines* (1996).
http://www.ccamlr.org/pu/e/e_pubs/ftsnts.pdf

[xv] CCAMLAR Secretariat, *CCAMLAR work on the elimination of seabird mortality associated with fishing* (2007).
http://www.ccamlr.org/pu/E/sc/imaf/docs/CCAMLR_elimination%20of%20IMAF.pdf

[xvi] SEAFO Home: http://www.seafo.org/
Members: Angola, European Community, Namibia, Norway and South Africa.
Convention: http://www.seafo.org/welcome.htm Basic Documents: Convention: *NOTE: Cessation direct shark fishery confirmed by email; 8/10/09.

[xvii] NAFO Home: http://www.nafo.int/
Members: Canada, Cuba, Denmark (Faroe Islands & Greenland), European Community, France (St. Pierre and Miquelon), Iceland, Japan, Norway, Republic of Korea, Russian Federation, Ukraine and USA
Convention: http://www.nafo.int/about/frames/about.html

APPENDIX J

INTERNATIONAL BYCATCH REPORT

Synthesis: International Bycatch

A Report to NOAA Fisheries Office of International Affairs
August 2009

Southeast Office

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Introduction

The reauthorized Magnuson-Stevens Act (MSRA)[1], adopted by the U.S. Congress and signed into law in January 2007, contains provisions for domestic and international fisheries stewardship that call for the United States to work multilaterally to address illegal, unregulated and unreported (IUU) fishing, and bycatch of protected living marine resources (PLMRs). The Act complements other existing NOAA mandates that protect marine mammals and endangered marine life, including the Marine Mammal Protection Act (MMPA)[2] and the Endangered Species Act (ESA).[3]

To fully implement the international obligations established under the MSRA, Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA), NOAA Fisheries' Office of International Affairs is building its understanding of fisheries interactions with protected species and how or whether existing regulations and policies of national, regional and international institutions prevent or mitigate these interactions. The National Marine Fisheries Service (NMFS) has submitted a report on international bycatch to Congress, compiled background information on global bycatch and Illegal Unreported and Unregulated (IUU) fishing in support of an environmental assessment, published a survey of international bycatch of small cetaceans, conducted a workshop on longline bycatch, and participated in other international workshops and investigations related to bycatch of marine turtles, seabirds, and other protected living marine resources.

The NMFS Office of International Affairs has identified as an important next step the assessment of the relative risks of fisheries interactions with protected living marine resources globally, to rank the severity of fisheries and regions for bycatch, and to identify existing international bycatch management and conservation efforts that are applicable to such interactions. Although not completed in this project, the eventual aim of a risk assessment is to be able to map bycatch "hot spots," identify gaps in conservation and management in the areas of

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[1] Fishery Conservation and Management Act (16 U.S.C. 1801-1882 1976, P. L. 94-265), as amended by P.L. 109-479 (hereinafter MSRA).

[2] Marine Mammal Protection Act of 1972 (16 U.S.C. 1361-1407, P.L. 92-522, October 21, 1972, 86 Stat. 1027) as amended.

[3] Endangered Species Act of 1973 (16 U.S.C. 1531-1544, Public Law 93-205, 87 Stat. 884) as amended.

highest risk, and identify opportunities for international action, cooperative research and information exchange.

This report describes initial steps taken to begin risk assessment and spatial analysis. Within the project period, investigators were able to conduct a preliminary literature review, review existing databases and mapping projects, and begin construction of an analytic framework that could be used to overlay geographic areas, species occurrence, fishery activity, reported bycatch, RFMO jurisdiction and existing conservation measures. The project period was insufficient to produce more than a "proof of concept" analysis, but the work did highlight data gaps and produce some ideas on how they might be filled.

A key finding is the need to construct a surrogate or model to create a spatial footprint for fishing activity, as none of the existing databases provides this information. This is particularly important in light of the emerging emphasis on marine spatial planning and its expansion to a planning framework for use of living marine resources.[4] Although numerous efforts to map bycatch are ongoing, they use extrapolations or surrogates such as catch or landings volume to delineate fishing activity.

Section I of the report describes overall approach and methodology. Section II outlines the literature and database review and summary, provides a preliminary summary of the literature on protected species distribution and potential fisheries interactions, a preliminary summary of the literature on protected species vulnerability to various gear types, a summary of geographic analyses being conducted for various species, and a summary of Regional Fishery Management Body (RFB) bycatch measures. Section III describes gaps in available or accessible data, gaps in data collection, with emphasis on factors necessary to characterize risk for bycatch in fisheries. Section IV lays out a GIS methodology to initiate the identification of global commercial fishing bycatch based on geographic area, species groupings (i.e. sharks, marine mammals, turtles, seabirds) fishing regions/jurisdictional boundaries. In addition to highlighting the methodology, this section will identify gaps in data and information.

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[4] White House Press release, June 12, 2009. Announcement of CEQ-led task force that will develop, among other products, a recommended framework for marine spatial planning that will be "comprehensive, integrated, ecosystem-based approach that addresses conservation, economic activity, user conflict, and sustainable use of ocean . . .resources consistent with international law."

Section I: Overall Approach

The initial statement of work called for an analysis, according to fishery and gear type, and based on protected species distribution, of the potential for fisheries interactions with protected living marine species. Further, the project description called for maps, based on this analysis, showing the overlay of fishing activities and bycatch, with identification of geographic areas of high risk, current countries active in that fishery (if known), and potential for future growth of the fishery (if known).

The statement of work also called for an assessment of the effectiveness of international conservation and management measures currently implemented at the international, regional, and if feasible, individual country level, and based upon that assessment, identification of gaps in conservation and management efforts related to bycatch of protected living marine resources and identification of opportunities for international action, cooperative research and information exchange.

The initial project plan called for identification of areas to be included in GIS layers, distribution of PLMRs in the selected areas, analysis of potential interactions by fishery location, distribution of PLMRs subject to gear types, description of known incidence of bycatch by area, resulting in a prediction or inference of the likelihood of interactions by area.

The tools and methodology the team proposed to use to produce the deliverables were:

1. Literature review, particularly documents noted in the Statement of Work;
2. Review of existing GIS and marine spatial planning sites and projects;
3. Interviews with principle investigators and creators of such sites;
4. Acquisition and assembly of data sets necessary to produce GIS layers for fisheries, gear, PLMR distribution and applicable management authorities;
5. Review of RFMO frameworks and conservation and management measures;
6. Interviews with key NOAA Fisheries Office of International Affairs staff and their counterparts in regions identified by the risk analysis.

The team was able to complete items 1 and 2; partially undertake items 3, 4 and 5. The risk analysis was not completed, so the team did not conduct interviews described in 6. Multiple

approaches were used to accomplish the tasks: examination of data and issues by species distribution, by species status, by documented or reported bycatch, by management jurisdiction, and by bycatch measures.

In defining the scope of species the team would examine, we relied on the published list of Protected Living Marine Resources included in the Report to Congress, provisions of the MSRA, MMPA and ESA, status designations for sharks provide by the IUCN Red List and Shark Specialist Group, and IUCN red list status for seabirds, sea turtles and marine mammals that occur outside U.S. waters. Because of the number of species that comprise this total and the challenges in obtaining data sets for that number of species, the team used criteria to set priorities among the larger groups. This process is explained in more detail in Section II.

Similarly, rather than attempt to describe every RFB approach to bycatch, we selected a representative sample of RFBs in whose areas of jurisdiction bycatch was reported for sharks, seabirds, sea turtles and marine mammals, and where the body had adopted measures to address bycatch that were more than a recitation of the FAO Code for Responsible Fishing.

The MSRA directed attention to fishing issues outside U.S. waters, particularly IUU fishing and bycatch in high seas fisheries that went beyond what had been enacted previously. The international provisions of the MSRA are designed to "strengthen the ability of international fishery management organizations and the United States to ensure appropriate enforcement and compliance with conservation and management measures in high seas fisheries," particularly with regard to IUU fishing, expanding fleets, and high bycatch levels.[5] Section 207 of the MSRA authorizes the Secretary of Commerce to promote improved monitoring and compliance for high seas fisheries or fisheries governed by international or regional fishery management agreements.[6] Among other provisions, the section calls for improved communication and information exchange among law enforcement organizations, an international monitoring network, an international vessel registry, expansion of remote sensing technology, technical

[5] Senate Report 109-229, Report of the Committee on Commerce, Science and Transportation on S. 2012, Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2005. April 4, 2006, at 43.

[6] MSRA, supra note 1, at Sec. 401.

assistance to developing countries and support of a global vessel monitoring system for large vessels by the end of 2008.[7]

Section 403 of the MSRA's international provisions amends the Moratorium Protection Act[8] by adding several new sections, including a requirement for a biennial report to Congress, action to strengthen regional fishery management organizations; and identification of nations whose fishing vessels are engaged, or have been engaged during the preceding calendar year, in fishing activities or practices resulting in bycatch of PLMRs beyond any national jurisdiction, or fishing activities or practices beyond the EEZ of the United States that result in bycatch of a PLMR that is shared by the United States, if the relevant organization has failed to implement measures to reduce such bycatch; the nation engaged in PLMR bycatch is not a party to a relevant organization; and the nation has not adopted a bycatch reduction program comparable to that of the United States, taking into account different conditions.[9] (A companion provision on IUU fishing will not be discussed in this report, but is elaborated in a Proposed Rule to Implement Identification and Certification Procedures to Address Illegal, Unreported, and Unregulated (IUU) Fishing Activties and Bycatch of Protected Living Marine Resources. Congress also called upon the Secretary of Commerce to provide assistance to nations or organizations to help them develop gear and management plans that will reduce their bycatch of PLMRs.[10]

The term ''protected living marine resources'' is defined in the Moratorium Protection Act as non-target fish, sea turtles, or marine mammals that are protected under United States law or international agreement, including the MMPA, ESA, the Shark Finning Prohibition Act, and the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES); but they do not include species, except sharks, that are managed under the MSA, the Atlantic Tunas Convention Act, or any international fishery management organization. See 16 U.S.C. 1826k. A list of PLMRs covered by the bycatch provisions is to be included with publication of

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[7] *Id.*

[8] 16 U.S.C. 1826d-k (P.L. 104-43).

[9] MSRA, supra note 1, at Sec. 403.

[10] Senate Report, *supra* note 5 at 12.

the final rule. A list of all international living marine resources shared by the United States and included in an agreement to which the United States is party is included as an annex to the Report to Congress.

Given these parameters, the investigation focused on PLMRs as defined in the statute, taken as bycatch in fisheries on the high seas. Seabirds are not included in the definition of PLMRs under the MSRA, but are included in the report to Congress as an international living marine resource for which conservation is an issue of growing global concern, and an issue on which NMFS has been actively involved internationally.[11] They are included in the statement of work and in this report. Based on these parameters, the investigation excluded bycatch of PLMRs in fisheries within the EEZs of any nation or bycatch provisions that apply solely within a nation's EEZ. This approach may have omitted some species or issues of particular concern.

As an organizing tool for both the literature review and summaries, and as a means to build toward GIS processes, we used the FAO Statistical Areas for the descriptive framework. These are arbitrary areas defined for statistical purposes, the boundaries of which were determined in consultation with international fishery agencies.[12] They include both high seas and national waters. FAO Statistical areas are widely recognized as the statistical reporting basis for fisheries and provide a means to overlay information from fishery reporting data-bases with other data.

Seabirds, turtles, marine mammals and sharks are summarized in tables by occurrence in FAO statistical areas. Other information gathered from the literature review—status, vulnerability to fishing gear, bycatch information, bycatch mitigation measures—is summarized in tabular form as well as in text.

The formulation of the geographic description called for in the deliverables requires the ability to map fishing areas and fishing fleet operations as well as species distribution. Attempts to characterize fishing operations, fleets or gear geographically were not completed in the project

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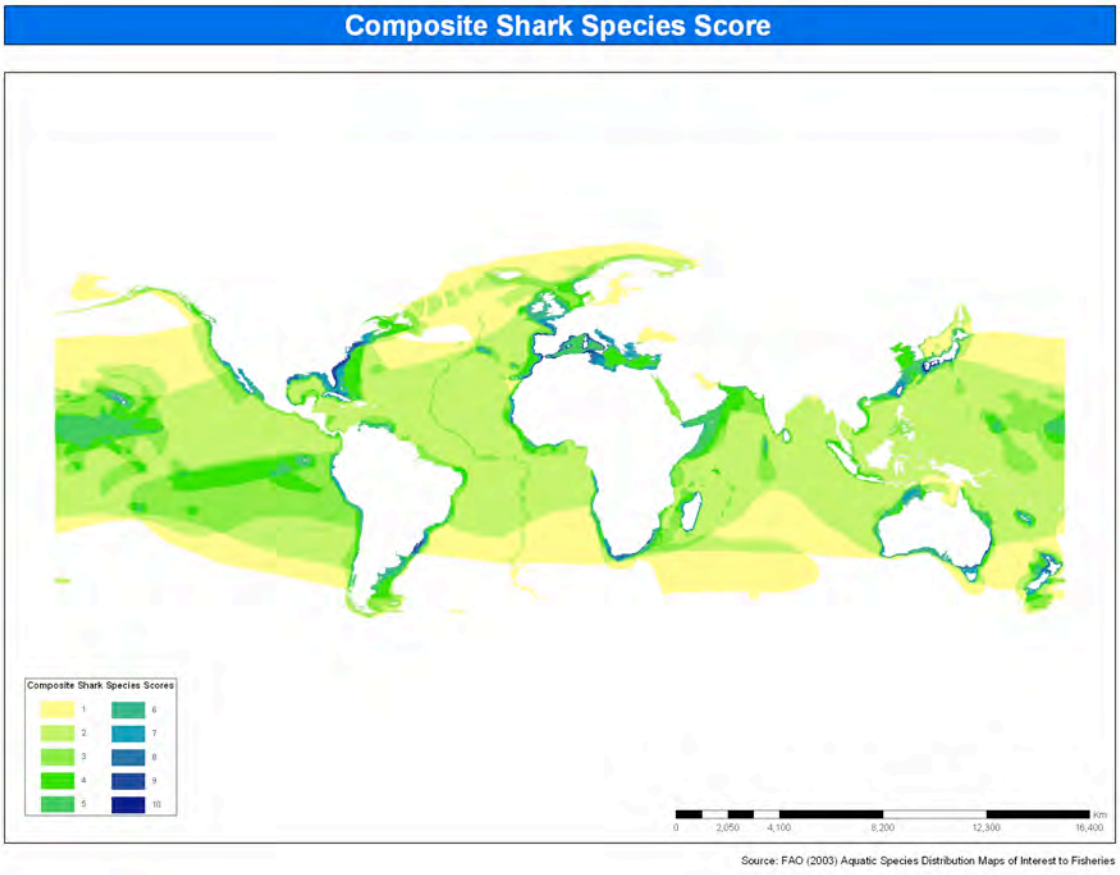
[11] Section 116 of the MSRA highlights the need for the Secretary of Commerce to work cooperatively with the Secretary of Interior and industry and within international organizations to seek ways to mitigate seabird bycatch.

[12] For an explanation of how the areas were established, see http://wwww.reliefweb.int/rw/rwb.nsf/db900sid/CJCN-7J5PQM?OpenDocument

period. However, using sharks as an example or proof of concept, it was possible to demonstrate how the overlay of species occurrence, documentation of bycatch, FAO area and fishing area might be mapped. Figure 1 illustrates how presence of sharks can be mapped using FAO species distribution data. The generation of this figure is explained in detail in Section IV below.

Figure 1. Distribution of Shark Species



It may be possible to fill the fishing effort data gap with tools that are available in ongoing mapping projects such as the Sea Around Us, in combination with other sources of data such as observer programs, VMS information, and species-specific mapping projects. These possible methods are described in detail in the GIS methodology section and conclusion.

Information on various international agreements is summarized in a table on the measures used by nine Regional Fishery Management Organizations to address bycatch of certain groups of PLMRs (Seabirds, Sea Turtles, Sharks, and Marine Mammals). The nine organizations were

chosen to complete first based on several considerations. Additional RFB measures could be summarized similarly with additional time. The summary was prepared by research within the respective body's website, with a parallel investigation of the FAO pages devoted to that RFB. Within a particular RFB's site, the establishing Convention was reviewed as well as all relevant conservation, management and enforcement measures, Annual Meeting Reports, information provided by the body's scientific, research and ecosystem management committee, including reference to catch and effort data where publicly available and necessary (e.g., to ascertain dominant species fished and/or gear types). An evaluation of effectiveness of measures would require additional time to conduct the interviews described above. The summary in Section II does provide some general observations about effectiveness of measures.

Box 1. Species Listed MMPA/ESA & CITES

Short tailed albatross
Eskimo curlew
Stellers eider
Marbled murrelet
Brown pelican
Newell's, Townsend's shearwater
Roseate tern
Flatback turtle
Green turtle
Hawksbill turtle
Kemp's ridley turtle
Leatherback turtle
Loggerhead turtle
Olive ridley turtle
Finless porpoise
Antarctic fur seal
Guadalupe fur seal
Juan Fernandez fur seal
Walrus
Beaked whales
Blue whale
Bowhead whale
Minke whales
Fin whale
Gray whale
Humpback whale
North Atlantic right whale
Northern bottlenose whale
Pygmy right whale
Sei whale
Southern bottlenose whale
Southern right whale
Sperm whale

Section II: Summary of Literature

Bycatch of marine animals is the subject of voluminous scientific, marine policy and fishery management literature. A summary of the status of PLMRs subject to bycatch and of global bycatch measures was prepared as the first biennial report to Congress required under the MSRA.[13] Bycatch of PLMRs also was summarized in a Draft Environmental Assessment (EA), Regulatory Impact Review and Regulatory Flexibility Analysis that accompanied a proposed rule required by the MSRA.[14] A current list of

[13] Implementation of Title IV of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 Biennial Report to Congress – January 2009. U.S. Department of Commerce.

[14] Proposed Rule to Implement Identification and Certification Procedures to Address Illegal, Unreported, and Unregulated (IUU) Fishing Activities and Bycatch of Protected Living Marine Resources (PLMRs) 74 Fed. Reg. 2019 (Jan. 14, 2009).

activities and agreements related to bycatch is available online at http://www.nmfs.noaa.gov/by_catch/international.htm.

It is well established that the incidental catch, or bycatch, in fisheries is one of the greatest threats to marine mammals, seabirds, sea turtles, and sharks. Thousands of these animals are incidentally captured each year through entanglement in fishing gear, including gillnets, trawl nets, purse seines, and longlines. Progress on quantifying the scale of this mortality, identifying the magnitude of the threat, and mitigating or reducing the mortality has been slow, sporadic, and limited to a few specific fisheries or circumstances. Minimizing bycatch has become increasingly important for NMFS over the past several years as understanding of bycatch has increased.

This section summarizes requirements of U.S. law to act internationally for the conservation of living marine resources, reports of government actions to promote bycatch reduction internationally, and information on bycatch of seabirds, sea turtles, marine mammals and sharks in high seas fisheries.

2.1 U.S. Activities to Promote Bycatch Reduction Internationally

U.S. law and policy provide mechanisms for action to reduce bycatch of marine mammals and sea turtles in fishing operations. The MMPA, ESA, and the MSRA provide policy statements, action mandates and research direction for U.S. actions related to the bycatch of protected species. The MMPA, and the MSRA also direct U.S. managers to work in the international arena to promote conservation of PLMRs such as marine mammals, sea turtles, seabirds and sharks. A current list of activities and agreements related to bycatch is available online at http://www.nmfs.noaa.gov/by_catch/international.htm.

NMFS has reported regularly to Congress on progress toward reducing bycatch in international fisheries since 2000. Actions have included a task force that produced an action plan to reduce sea turtle bycatch in longline fisheries and has promoted the implementation of the Food and Agriculture Organization (FAO) International Plan of Action (IPOA) for Reducing Incidental Catch of Seabirds in Longline Fisheries and the FAO IPOA for the Conservation and Management of Sharks. NOAA has sponsored workshops, conducted training, trained and supported experiments in improved gear technology to avoid bycatch of sea turtles and seabirds, developed and supported scientific, technological and environmental initiatives with member

nations of various agreements, led negotiations to conclude new bi- and multi-lateral agreements to protect sea turtles, and pressed for measures at fishery management RFMOs to protect seabirds, turtles and sharks from interactions with fishing gear. A list of recent activities aimed at reducing bycatch can be found on the agency website at http://www.nmfs.noaa.gov/by_catch/international.htm

The MMPA contains national and international sections that provide tools to address the bycatch of marine mammals. Serious injury and mortality of marine mammals incidental to commercial fishing operations is a primary threat to many marine mammal species and was the principle reason for the adoption of the MMPA. The MMPA states that marine mammal "species and population stocks should not be permitted to diminish beyond the point at which they cease to be a significant functioning element in the ecosystem of which they are a part."[15]

Internationally, the MMPA requires the Secretary of Commerce or the Secretary of the Interior, working through the Secretary of State, to negotiate agreements with other nations to protect and conserve marine mammals. The international provisions of the MMPA provide the United States with the tools to take a leadership role in initiating negotiations with all foreign governments engaged in commercial fishing found to be unduly harmful to any species or population stock of marine mammal The United States has been active since the early 1990s to ensure that tuna vessels of nations fishing in the Eastern Pacific and other areas where such fisheries interact with dolphins are employing measures commensurate to those of U.S. vessels. In addition to significant contributions to research and population monitoring, the U.S. led negotiations that resulted in the Agreement on the International Dolphin Conservation Program (AIDCP). This program is discussed in the Report to Congress and in the NOAA Tech Memorandum World Bycatch of Cetaceans. In 2006, NMFS Office of International Affairs developed an international action plan to begin to address marine mammal bycatch in fisheries.

The ESA was enacted in 1973 to provide for the conservation of species "which are in danger of extinction throughout all or a significant portion of their range."[16] The ESA provides broad protection for species of fish, wildlife, and plants that are listed as threatened or

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[15] 16 U.S.C. 1631(2).

[16] 16 U.S.C. 1531-1543 (1976), Pub. L. 93-205, 87 Stat. 884, as amended.

endangered in the United States or elsewhere. The Act operates through listings of species as either threatened or endangered, which then triggers action for protection of critical habitat and development of recovery plans. In addition to its provisions for protecting and recovering these species within U.S. jurisdiction, ESA reaches beyond U.S. borders to protect endangered species both through its own provisions and through U.S. implementation of CITES. Marine species listed under MMPA, ESA and on Appendices of CITES are listed in Box 1.

In addition, the Secretary of Commerce, through the Secretary of State, must encourage foreign countries to provide for the conservation of fish, wildlife and plants, including listed species; enter into bilateral or multilateral agreements for this purpose; encourage and assist foreign persons who take fish, wildlife and plants for import to the U.S. for commercial or other purposes to develop and carry out conservation procedures. Further, the Secretary of Commerce may provide personnel and financial assistance for the training of foreign personnel and for research and law enforcement, and may conduct law enforcement investigations and research abroad as necessary to carry out the Act.[17]

2.2 Seabirds

Seabirds are highly migratory, spanning wide-ranges across oceans. They spend considerable time on the high seas in waters where their habitat overlaps with fishing operations and where no national jurisdiction exists (BirdLife International 2004). Seabirds of numerous families,including albatrosses, petrels, fulmars, shearwaters, gulls, gannets, and a few others, are subject to bycatch in fisheries. Migratory birds are protected under international agreements such as the Migratory Bird Treaty and the Convention on Migratory Species.[18] While they are not specified as PLMRs in the MSRA definition, they were listed as in the Report to Congress.[19] The specific species included as PLMRs can be seen in Table 1.

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[17] 16 U.S.C. 1537.

[18] The United States is party to a number of bilateral conventions designed to protect migratory birds, including agreements with the United Kingdom (Canada), Mexico and Japan. These treaties are implemented through the Migratory Bird Treaty Act, 16 U.S.C. 703 *et seq*.

[19] MSRA Section 316 calls for a bycatch reduction engineering program and specifically calls for coordination on seabird interactions between the Secretary of Commerce and Secretary of Interior. 16 U.S.C. 1865 (c).

Albatross comprise the largest family of birds in which all species are threatened by extinction globally (BirdLife Intl. 2004a). Of the twenty-one species recognized by the IUCN, nineteen are globally threatened while the other two are considered near threatened (Small 2005). (Nine species of seabirds are listed as endangered or threatened under the ESA. Of these only the short-tailed albatross also appears on the IUCN redlist.) As a result, research efforts have focused on studying these species, and the largest amount of information on geographic distribution is available than for any other group of seabirds. Most of the information discussed in this report pertains to albatrosses and to a lesser extent to petrels, based on the availability of data. Similar to albatrosses, petrels are also globally threatened (BirdLife International 2004); some information is available for these species' distribution but at a smaller extent than for albatrosses.

2.2.1 Distribution

Satellite tracking data and range maps from several species of albatross have been used to develop maps of geographic extent, which are available from Small (2005). This report also indicates where albatross species overlap with boundaries of RFMOs (Small 2005).

Areas of importance for albatross species include the western and central Pacifc Ocean. The highest concentration of albatross occurs in this area and is found between 30oS and 50oS (Small 2005). About 45% of albatross distribution is found in the western and central Pacific Ocean (Small 2005). Other parts of the Pacific that are important areas for albatross include the Southeast region, especially the coastal shelf off of Peru and Chile. This area is particularly important when the range of non-breeding birds is taken into account (Small 2005). The eastern Pacific comprises about 10-12% of the combined range of several albatross species, particularly Chatham, Antipodean, Buller's, and Salvin albatrosses (Small 2005). While not breeding in this area, they are still vulnerable to incidental takes in the region. A high proportion of albatross breeds in the Northeast Pacific, including Laysan, Black-footed, and short-tailed albatross (Tickell 2000). Albatross use areas of the California current region of North America and around the Hawaiian islands. The North Pacific is also important to petrel species (Crowder and Myers 2001).

Pacific waters around Australia and Asia are also very important areas for seabirds. These areas comprise major foraging areas for breeding seabirds (BirdLife International 2004).

High use waters include shelf and slope areas around the South Island of New Zealand and over the Chatham rise. Non-breeding birds use the shelf and slope waters more frequently than breeding birds (BirdLife International 2004). Oceanic waters are used by seabirds as well, specifically subtropical waters of the Tasman Sea between 40-46oS over the polar frontal zone, Antarctic waters from 60-67oS from 145oE-165oW, and sub-Antarctic waters southwest of Macquarie Island and southeast of Campbell Island (BirdLife International 2004).

As previously mentioned, sub-tropical and sub-Antarctic waters are important habitat for many sea bird species, and these waters of the Indian Ocean are within the overall range of many albatross and petrel species. Hotspots within the Indian Ocean include shelf and shelf edge waters around islands due to the proximity of the islands and the presence of the shelf, seamounts possibly due to enhanced productivity, and the subtropical convergence North of Mariot and Crozet islands. The entire western portion of the South Indian Ocean is utilized while eastern waters remain primarily unexploited. (BirdLife International 2004). The southern area is crucial for the Amsterdam and Indian yellow-nosed albatrosses.

Similar to the waters of the Southwest Indian Ocean, Southeast Atlantic waters coincide with a large proportion of albatross distribution. This region is particularly important for Tristan, Atlantic yellow-nosed, and sooty albatrosses (Small 2005). In the Southwest Atlantic, large sea bird colonies are found around the southern portions of the South American continent and around South Georgia, including colonies of black-browed and wandering albatrosses and southern giant, white-chinned and, northern giant petrels (BirdLife International 2004). High use areas are localized around South Georgia and over oceanic waters north and northwest of the island from 38o-48oS (BirdLife International 2004). Black-browed albatross, which breed around South Georgia and Chile, can forage long distances from their nesting sites, and they utilize shelf or shelf break waters close to colonies (BirdLife International 2004). Similarly, wandering albatross breed in the area around the southern tip of South America and neighboring islands. Their wide-range and ability to forage in the open oceans lead to overlaps between breeding populations.

Also around South Georgia, the Southern Ocean is particularly important for seabirds, including grey-headed and wandering albatrosses and northern and southern giant petrels

(BirdLife International 2004). The latter are dominant scavengers in the southern oceans. White-chinned petrels use areas of the Antarctic in the summer months (BirdLife International 2004). Shelf areas are especially important habitat for petrel species.

2.2.2 Interactions

Interactions between seabirds and commercial fishing gear occurs in pelagic and demersal longline, trawl, and gillnet fisheries (Bartle 1991, Strann et al. 1991, Brothers et al. 1999, FAO 1999, Melvin et al. 1999, Darby and Dawson 2000, CCAMLR 2003, Gilman et al. 2005, Sullivan et al. 2006, Baker et al. 2007, Bull 2007). While seabirds are vulnerable to entanglement in trawl nets and cables (Bartle 1991, Schiavini et al. 1998, Sullivan et al. 2003), most bycatch mitigation research for seabirds has focused on longline entanglements. The findings from these sources are summarized in Table 2.

The focus on longline bycatch results from the decline of albatross, which has been largely attributed to bycatch in longline gear (Croxall et al. 1990, Brothers 1991, Weimerskirch et al. 1997, Nell et al. 2000). Seabirds are vulnerable to capture during the setting of baited hooks which remain at the surface for a brief amount of time before sinking. While albatross have garnered the most attention due to bycatch concerns, other families are also vulnerable to incidental take where their distribution overlaps with commercial fishing effort.

Numerous regions throughout the world's oceans provide habitat for seabirds and are areas of overlap with commercial fishing operations. Areas of reported overlap between longline fishing effort and the distribution of breeding albatross have been mapped for areas South of 30oS during the years 1990-1998 (BirdLife International 2004). For pelagic longline fisheries, the areas that emerged with the greatest overlap with seabirds include waters off of southern Africa, the east and west coasts of Australia and New Zealand, and the coast of Uruguay. For demersal fisheries, overlap between fisheries operations and seabirds occurred off of Chile, the Patagonian shelf, New Zealand, and sub-Antarctic islands; however, fishing effort may have shifted since 1998 (BirdLife International 2004). Additional accounts by region and species are available below.

In the Atlantic, black-browed albatross overlap with commercial fishing effort in shelf waters, especially near the southern tip of South America (Small 2005). Discarded fish and offal

are important in the diet of these seabirds, and they often become entangled in longline and trawl gear as a result (Croxall et al. 1998, Huin 2002, Reid and Sullivan 2004). Tristan albatross, which can be found in waters between 30o-45 oS likely overlap with pelagic longline gear that operates within these latitudes in the South Atlantic (Tuck et al. 2003, BirdLife International 2004). Spatial variation between stages of breeding and in fishing effort over the course of year means that Tristan albatross could be threatened by bycatch throughout the year (Cuthbert et al. 2004).

In the Southern Ocean and southern Indian Ocean, bycatch occurs in both pelagic and demersal longline fisheries (BirdLife International 2004). For wandering albatross, their wide range leads to overlap with many different fisheries, including shelf and pelagic fisheries, particularly in tropical and sub-Antarctic areas (BirdLife International 2004). In the early 1970s, a decline in wandering albatross populations occurred simultaneously with the development of subtropical tuna fisheries in the Indian Ocean, and a recovery corresponded to a decrease in effort within this fishery (BirdLife International 2004). Tracking of white-chinned albatross during the breeding season at Crozet Island in the Indian Ocean has shown an overlap between these seabirds and subtropical oceanic fisheries and neritic fisheries for toothfish near South Africa (BirdLife International 2004).

In the Pacific, fishing gear being used includes purse seines, poles and lines, and longlines (SCTB 2004). The North Pacific is one of the world's most productive fishing areas. It is home to the largest tuna fishery and also home to albatross and petrel species (Joseph 2003). As in other areas previously discussed, demersal and pelagic longlines are believed to be serious threats to seabirds in this area. Pelagic longlines are considered the greatest cause of anthropogenic mortality for laysan and black-footed albatross and likely other species as well (Crowder and Myers 2001). In the United States, NMFS action on seabird bycatch has concentrated on interactions in Pacific longline fisheries due to albatross encounters in this area (NMFS 2008). In the Atlantic pelagic longline fishery, takes of seabirds have also been analyzed; however, only 113 takes were estimated from 1992-2004 with the majority of seabirds taken being shearwaters (NMFS 2008).

Numerous methods have been developed and tested for reducing bycatch of seabird in longline gear. The methods that have been most successful include the use of bird-scaring lines (known as tori lines) that stream behind a vessel, line shooters that drive baits quickly below the surface, side-setting devices that make it difficult for birds to dive for bait, weighted lines that cause bait to sink rapidly, and dyed bait that reduces visibility to birds (Brothers et al. 1999). In the Alaska demersal longline fleet, paired tori lines and performance standards were implemented in 2002 (NMFS 2008). Total seabird mortality decreased by 69% and total seabird bycatch decreased by 79% (NMFS 2008). A study in the Hawaiian tuna and swordfish pelagic longline fishery found the most effective seabird bycatch reduction methods was side-setting of baited hooks. In 2000, over 2,300 albatross were estimated to be taken in this fishery, including 1,339 black-footed albatross and 1,094 laysan albatross (NMFS 2008). In 2006 after required mitigation measures had been implemented, estimated bycatch had decreased to less than 100 albatross which consisted of an estimated 73 black-footed albatross and 15 laysan albatross (NMFS 2008).

In addition to the bycatch mitigation measures discussed above, methods devised for sea turtles, specifically circle hooks, may be to be effective for seabirds as well. Observer data from the U.S. North Atlantic pelagic longline fisheries indicated that seabird catch per unit effort was six times less with circle hooks than with traditional J hooks (NMFS 2008).

In terms of bycatch mitigation, countries and RFMOs differ in their commitment to taking action. Small (2005) provides tables that summarize the mitigation efforts in each region as recommended or mandated by RFMOs. They also provide the gear type and area managed under each RFMO, including purse seine, trawl, and longline fisheries. Here we provide a more general overview as it pertains to seabird bycatch mitigation efforts. Gilman and Moth-Poulsen (2007) also reviewed measures taken by intergovernmental organizations to address sea turtle and seabird interactions with fishing gear on the high seas. They found that while several RFMOs adopted voluntary measures, only five took legally binding measures that required member nations to utilize avoidance methods in pelagic and demersal longline fisheries (Gilman and Moth-Poulsen 2007).

The RFMO that has taken the most measures in reducing bycatch is the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), which operates in the Southern Ocean, an area important for grey-headed and wandering albatross. Since 1992, the CCAMLR has made efforts to decrease bycatch of albatross and petrels in trawl and longline fisheries by requiring the use of tori lines and weighted lines (Small 2005). In addition, they ban discards of offal during setting and hauling of gear, require setting of longlines to occur at night, regulate the use of deck lighting, encourage trawl nets to be cleaned before setting when feasible, and ban the use of net monitor cables (Small 2005). For exploratory fisheries, the CCAMLR estimates bycatch limits for seabirds (CCAMLR 2004b). The beginning of fishing seasons are also delayed by CCAMLR until the end of the breeding season for most albatross and petrel species (CCAMLR 2004b). Collectively, these measures have be extremely successful in reducing seabird mortality in longline fisheries in this area by over 99% from 6,589 estimated mortalities in 1997 to only 15 in 2003 (Small 2005). Other CCAMLR efforts have reduced sea bird mortality in the icefish trawl fishery by 40% of the 2001 level by 2003 (CCAMLR 2003a). IUU fishing remains the main source of seabird mortality in the area managed by CCAMLR (CCAMLR 2002a).

Other RFMOs have taken less stringent mitigation measures to reduce seabird bycatch. The area regulated by the Commission for the Conservation of Southern Bluefin Tuna (CCSBT), which manages stocks of southern bluefin tuna between 30-50oS, coincides with areas of highest albatross distribution. CCSBT has required the use of tori lines on its longline vessels since 1995 when operating south of 30oS; however, no additional measures have been taken since then even though they have been proposed by Australia and New Zealand (CCSBT 2001c). In this area, despite regulatory use of tori lines, Japan has estimated that its vessels cause incidental mortality of between 6,000-9,000 seabirds each year (Kiyota and Takeuchi 2004).

Despite the importance of the Indian and Pacific Oceans for albatross and petrel species, RFMOs in these areas, including the Indian Ocean Tuna Commission (IOTC) which manages tuna and billfish, has not established bycatch research or mitigation requirements for participating members (Small 2005). In 2007, the Western and Central Pacific Fisheries Commission (WCPFC) called for implementation of the International Plan of Action to mitigate

the impact of fishing for highly migratory fish stocks on seabirds. (See detail in Table 3). The International Commission for the Conservation of Atlantic Tunas (ICCAT) has specified provisional mitigation measures for participating members, such as tori poles and tori lines (ICCAT 2007); however, some members, including Canada and the U.S. have established national requirements for seabird bycatch reduction by their flag vessels (Small 2005). Observers for ICCAT have recorded bycatch of 10 seabird species, including the Atlantic yellow-nosed, wandering, and black-browed albatrosses and spectacled petrel (ICCAT 2004c). They have also recorded bycatch of 5 sea turtle, 24 marine mammal, 12 skate and ray, 46 coastal shark, and 11 pelagic shark species (ICCAT 2004c). Beginning in 2002, members of ICCAT were encouraged to collect data pertaining to encounters with seabirds and to take voluntary bycatch mitigation measures. No mandatory measures were implemented.

The Inter-American Tropical Tuna Commission (IATTC), which manages tuna and tuna-like stocks in the ETP, has taken several actions to decrease bycatch of sea turtles as discussed in the sea turtle section, but it has not taken action for seabird bycatch mitigation (Small 2005). While only a small population of breeding albatross utilizes the area managed by the IATTC, the northeast and southeast Pacific waters are used by non-breeding seabirds.

In summary, only CCAMLR has established stringent requirements for its members to decrease seabird bycatch. Priorities for bycatch reduction efforts at the international level include testing and implementing strategies such as tori lines, bait setting capsules, side-setting, weighted branchlines, bait pod or smart hooks, and circle hooks for their effectiveness in reducing seabird entanglements in each fishery (NMFS 2008).

2.3 Sea turtles

All six sea turtle species found in U.S. waters are listed as either threatened or endangered under the ESA, and they are also all distributed in the high seas. Three are listed as critically endangered by the IUCN, two as endangered, and one as vulnerable. (See Table 4) These species include green (Chelonia mydas), hawksbill (Eretmochelys imbricata), leatherback (Dermochelys coriacea), loggerhead (Caretta caretta), olive ridley (Lepidochelys olivacea), and Kemp's ridley (Lepidochelys kempii) sea turtles. A seventh sea turtle species, the flatback (Natator depressus), is found only in coastal waters of Australia. This report provides

information about the geographic range and fishery interactions of the six sea turtle species that occur in the high seas. More information about sea turtle biology and status can be found in the Draft Environmental Assessment (Bartlett 1989, Nichols et al 1999) and in the most recent status reviews (http://www.nmfs.noaa.gov/pr/listing/reviews.htm#species).

2.3.1 Distribution

All six sea turtle species are widely dispersed and highly migratory species (NMFS 2001). Leatherback sea turtles are found globally in waters of the Atlantic, Pacific, and Indian Oceans and in the Caribbean Sea and the Gulf of Mexico (Dutton et al. 1999). These highly migratory animals exploit convergence zones and upwelling areas in the open ocean, along continental margins, and in archipelagic waters (Eckert 1998). Aerial surveys have found leatherbacks in slope waters off of California, Oregon, and Washington in the United States, while fewer utilize the continental shelf area (Eckert 1993). Important migratory corridors have been identified along the western U.S. and West Coast of Mexico and from central California to the Hawaiian islands (Stinson 1984).

Leatherback sea turtles range further north than other sea turtle species since they can keep their body temperatures higher over longer periods of time in cool waters and because their prey, which includes cnidarians (jellyfish and siphonophores) and tunicates (pyrosomas and salps), are also widely dispersed (Eckert 1993, NMFS and FWS 1998c). As a result, they can be found in waters that range from tropical to sub-polar. In the Atlantic, leatherbacks have been sighted as far north as Newfoundland, Canada and Norway and as far South as Uruguay, Argentina, and South Africa (NMFS SEFSC 2001).

Leatherback sea turtles are occasionally seen in coastal waters, but they usually chose to utilize pelagic waters. Females migrate long distances from temperate, pelagic foraging grounds to tropical beaches where they lay eggs during nesting season (Eckert 1993). Important nesting beaches are generally tropical and found between 40oN to 35oS latitude (Sternberg 1981). Leatherbacks do not nest on U.S. beaches in the Pacific Ocean; however, the Pacific coast of Mexico is the most important breeding ground for Eastern Pacific Leatherbacks with about half of the global population nesting there (NMFS and FWS 1998c). However, leatherbacks in the Atlantic are known to nest in the southern United States.

Loggerhead sea turtles are also globally dispersed. They inhabit continental shelves, bays, estuaries, and lagoons in subtropical, temperate, and tropical waters (Eckert 1993). They are usually found in waters between 16-20oC, with the limit on their distribution being 10oC (FAO 1990). Open-ocean, pelagic waters are important for loggerheads during the first years of their lives. Large aggregations of juvenile loggerheads are found in the East Pacific, specifically off the west coast of Baja California, Mexico (Bartlett 1989, Pitman 1990)). These sightings occur far from the nearest nesting beaches of significant size, which are in Japan and Australia, and they usually occur in the summer between July and September (Pritchard 1969).

It is believed that loggerhead sea turtles may utilize warm water currents for long migrations between nesting and foraging grounds (FAO 1990). Important nesting areas for loggerhead sea turtles are found in the North Pacific, South Pacific, and southern Great Barrier Reef waters; however, nests in these locations have been in decline (Limpus 1982, Chaloupka and Limpus 2001, Kamezaki et al. 2003). Loggerheads also nest in the western Atlantic Ocean between North Carolina and Florida and along the Gulf coast of Florida. Witherington et al report a decline in the nesting population of Northwest Atlantic loggerheads. The most recent status review was completed in August 2009 and is available at http://www.nmfs.noaa.gov/pr/species/statusreviews.htm, but was not reviewed for this report. The Center for Biological Diversity and Oceana filed a petition in 2007 to list Atlantic and North Pacific loggerheads as endangered under the ESA.

Green sea turtles nest and feed in tropical and subtropical regions near continental coasts and around islands (FAO 1990). They are rarely found in temperate waters since they prefer water temperatures above 20oC (FAO 1990). Green sea turtles, along with hawksbill sea turtles, are the most tropical sea turtles. In summer months, they inhabit waters on the western sides of oceans from 40oN-35oS and on eastern sides of oceans from 30oN-25oS (FAO 1990). In the winter, their range on western sides of oceans become 30oN-25oS and on eastern sides of oceans 20oN-15oS (FAO 1990).

Non-breeding green sea turtles inhabit pelagic waters 500 to 800 miles from shore. Post-hatchling and juvenile green sea turtles also live in pelagic habitats, and they feed at or near the surface. Breeding turtles remain closer to shore in bays and estuaries (Eckert 1993). These

animals are highly migratory and travel great distances, usually sticking close to coasts. Females travel from rookeries to feeding grounds once every two years or more using coastal waters (Bjorndal 1997).

Green sea turtles are known to frequent an area between the Galapagos Islands and the Central American coast (NMFS and FWS 1998a). In the Pacific, they are the most commonly observed sea turtle species. Major populations occur around Australia and Malaysia, and smaller numbers inhabit the insular Pacific islands of Polynesia, Micronesia, and Melanesia (Wetherall 1993) and the French Frigate Shoals in the middle of the Hawaiian archipelago (Balazs et al. 1995). Also in the eastern Pacific Ocean, primary nesting grounds are found in Michoacan, Mexico, and the Galapagos Islands. Green sea turtles also utilize the U.S. Mid-Atlantic and Northeast waters in the western Atlantic. They can be found in estuarine and coastal waters of the Chesapeake Bay and North Carolina sounds and as far North as Long Island Sound, particularly in the summer. In the continental United States, they nest on beaches of the Atlantic and Gulf of Mexico coasts of Florida (Meyland et al. 1995).

Hawksbill sea turtles are circum-tropical in distribution (FAO 1990). Hawksbill sea turtles inhabit clear waters on mainland and island shelves. They prefer shallow waters where seagrasses, algal meadows, and coral reefs exist (FAO 1990). Similar to other sea turtle species, they are also highly migratory. Hawksbill sea turtles can be found in waters from 30oN to 30oS within the Atlantic, Pacific, and Indian Oceans and their associated water bodies (NMFS and FWS 1998b). The largest remaining concentrations of these endangered sea turtles exist around the remote oceanic islands of Australia and the Indian Ocean (EA). While hawksbill sea turtles are relatively uncommon in the western Atlantic waters of the continental U.S., occurring occasionally in south Florida and Texas, they are found in the Caribbean region and Central America due to their preference for coral reef habitat (FAO 1990, EA).

Nesting areas for hawksbill sea turtles include areas in the Pacific Ocean such as the main Hawaiian Islands, American Samoa, Republic of Palau, and the Federated States of Micronesia. Also in the Pacific, nesting occurs on the islands and mainland of Southeast Asia, from China to Japan, and throughout the Philippines, Malaysia, Indonesia, Papua New Guinea, and Solomon

Islands (McKeown 1977) in addition to Australia (Limpus 1982). In the western North Atlantic, hawksbill sea turtles nest in Puerto Rico and the Virgin Islands.

Olive ridley sea turtles are found in tropical waters, with the exception of the Gulf of Mexico (Abreu-Grobois and Plotkin 2008). They are also pelagic (Plotkin 1994), foraging throughout areas like the eastern tropical Pacific often in large groups. They utilize tropical and occasionally sub-tropical migration routes that take them across thousands of kilometers of deep, oceanic waters ranging from Mexico to Peru and out 3,000 kilometers into the central Pacific (Plotkin 1994, Abreu-Grobois and Plotkin 2008). While they generally occur in tropical areas, some olive ridley sea turtles do venture as far north as the Gulf of Alaska (Hodge and Wing 2000).

Nesting primarily on Rancho Nuevo beach in Tamaulipas Mexico (Pritchard 1969), the Kemp's ridley sea turtle has declined to the lowest population of all the world's sea turtles. Found in shallow, warm, nearshore waters in the northern Gulf of Mexico, Kemp's ridley sea turtles utilize this area until cold water forces them to move offshore or towards the coast of Florida (Pritchard 1969). Some Kemp's ridley also can be found as far North as the coast of Georgia and into New England in warm months, beginning in late May and June (Pritchard 1969).

2.3.2 Interactions

Sea turtle distribution often overlaps with commercial fishing effort, leading to incidental entrapment in a wide range of fishing gears. Sea turtles have been incidentally captured in pelagic and demersal longline, gillnet, hook and line, set-net, pot and trap, trawl, dredge, pound net, and purse seine gear, with interactions especially prevalent in the tropics and subtropics (Robins 1995, Cheng and Chen 1997, FAO 2004, Eckert and Eckert 2005, Molony 2005, Koch et al. 2006, Gilman et al. 2006, 2007). While the occurrence of bycatch is widespread, the available data on the extent of interactions by gear type, area, and season are poor for high seas fisheries (EA). The high seas fisheries with the most available data pertaining to incidental takes of sea turtles are longline and purse seine fisheries. While extensive information on bycatch of turtles in trawl fisheries exists for fishing areas within nations' EEZs, there is less information available for high seas trawl fisheries. Because the FAO does not distinguish between catches

taken within EEZs and those taken on the high seas, it is difficult to assess high seas trawl fishing effort or bycatch. (FAO 2009). Information on bycatch by region is summarized in Table 5. Measures adopted by regional fishery bodies to manage interactions between sea turtles and fishing gear are summarized in Table 3.

Bycatch of sea turtles in pelagic longline fishing gear has been of great concern in numerous areas in the world's oceans. In the Atlantic, leatherback and loggerhead sea turtles are the species most predominately captured in pelagic longline fishing gear (EA). Estimated takes in this gear in 2000 for loggerheads was 1256 individuals and for leatherbacks was 769 individuals (Yeung 2001). In 2001 and 2002, NMFS closed a portion of the pelagic longline fishery in the U.S. EEZ and implemented stronger bycatch reduction methods than previously required; however, takes of sea turtles continued outside of the closed area, with 312 loggerheads and 1208 leatherbacks estimated in 2001 and 575 loggerheads and 962 leatherbacks estimated in 2002 (Garrison 2003).

In addition to being caught in pelagic longline gear in the Atlantic from Florida to Maine, sea turtles are also incidentally taken in this gear in the Gulf of Mexico, Caribbean Sea, and outside of the U.S. EEZ. Additionally, sea turtles have been documented as bycatch in longline gear in the western and central Pacific Ocean. Brogan (2002) estimated that sea turtles interacted with gear 2,182 times per year in this area, with between five and six hundred of these encounters resulting in mortality. However, these estimates are based on extremely low observer coverage of the fishery (<1%) so the confidence intervals for these estimates are wide.

Fishermen and scientists around the world have worked to develop, test, and implement fishing techniques and gear modifications to decrease bycatch in pelagic longline gear and to increase post-release survivability of bycaught animals (NMFS 2008). Numerous methods have been successful at reducing bycatch of sea turtles in longline gear including the use of largecircle hooks (16/0-18/0) instead of traditional J hooks, use of fish bait rather than squid, restrictions on branch line and mainline lengths, use of non-stainless steel corrodible hooks, reduced effort at shallow depths, and moving away from areas with known interactions (NMFS 2008). The latter is often done through vessel communication systems within fishing fleets to inform other vessels of areas with high rates of interaction, such as NMFS Sea Turtle Watch in the Pacific (http://

www.pifsc.noaa.gov/eod/turtlewatch.php). Setting gear at deeper depths, such as below 100 meters to target bigeye tuna, is believed to be effective at reducing interactions with sea turtles (Beverly 2004).

Research on circle hooks and fish bait have been conducted in the Azores, northwestern Atlantic (U.S. and Canadian fisheries), Gulf of Mexico, and Pacific waters. They have been conducted in the Japanese far seas, Japanese western North Pacific, Korean eastern Pacific, Spanish Indian Ocean, and Italian Mediterranean Sea fisheries (NMFS 2008). NMFS also has funded work in Indonesia, Vietnam, Costa Rica, Guatemala, El Salvador, Nicaragua, Ecuador, Peru, Uruguay, and other areas. Specific results from each fishery are available at NMFS 2008. In general, research has found that circle hooks reduced the severity of hooking and the likelihood of being hooked when compared to traditional J hooks (NMFS 2008). Deeply ingested hooks are believed to result more often in mortality. Fish bait have also decreased catch of sea turtles when compared to squid bait (NMFS 2008). Effectiveness of these bycatch mitigation measures is dependent on the size and degree of offset of the circle hook and in some cases on the type and size of bait; thus, it is important that research results include hook and bait specifications (NMFS 2008). Standardized hook measurements and terminology are still needed.

In addition to pelagic longlines, purse seine gear on the high seas is also responsible for incidentally taken sea turtles. These encounters are prevalent in the Pacific Ocean. Brogan (2002) found that bycatch is more prevalent in the western areas of the western and central Pacific Ocean fishery, which is due to the type of set. When gear was set on drifting logs and anchored fish aggregating devices (FADs), sea turtle encounters were more likely to be caught then when gear was set on drifting FADs or free-swimming target schools of tuna (Brogan 2002). Sea turtles encounters per year in the western and central Pacific Ocean purse seine fishery were estimated at 105 individuals with less than 20 resulting in mortality (Brogan 2002). Once again, these estimates have wide confidence intervals due to low observer coverage of the fishing effort (<5%) (Brogan 2002).

Incidental take of sea turtles have also been estimated for the eastern tropical Pacific (ETP) tuna purse seine fishery for observers from the Inter-American Tropical Tuna Commission (IATTC). This fishery has been the focus of bycatch mitigation measures designed for dolphin

entanglements. Sea turtles are also vulnerable to sets on logs, floating objects, and FADs in the ETP due to their tendency to associate with flotsam in the open ocean (EA). Arenas et al. (1992) found during study of communities associated with floating objects that 75% of sea turtles caught in ETP purse seine gear were olive ridley sea turtles. Olive ridley sea turtles are prevalent throughout the ETP and are often found in large groups and associate with floating objects. They were also the species most often recorded as bycatch between 1993 and 2002 (IATTC 2004).

The mean annual turtle mortality between 1993 and 2002 was estimated at 136 individuals with olive ridley followed by green and loggerhead sea turtles comprising the highest number of mortalities (IATTC 2004). One hawksbill mortality was estimated each year in this fishery, and only one leatherback was caught during the study in 1994 (IATTC 2004). During this period, the highest sea turtle mortality was contributed to floating object sets, with these sets having twice as high mortality for sea turtles than dolphin or school sets (IATTC 2004). However, observer records indicate that 88% of caught turtles were released unharmed between 1997 and 2002 (IATTC 2004). In addition, the mean annual turtle mortality of sea turtles decreased between 2003 and 2006 to only 5 individuals (IATTC 2007b).

2.4 Sharks

About 1200 living species of sharks, rays, and chimaeras (the cartilaginous fishes of the Class Chondrichthyes) are found in all of the world's oceans, and occupy niches in almost every marine environment (Fowler *et al.* 2005). From a life history perspective, chondrichthyans are more like large mammals than fish: they are generally slow-growing, late to mature, and produce few young (Hoenig and Gruber 1990; Camhi *et al.* 1998). These traits result in low productivities that make the vast majority of species highly vulnerable to exploitation and slow to recover even when fishing stops. Because of energy (and other) constraints, sharks and rays are rarely found living below 3000m (the "abyss") and therefore are confined to about 30% of the total ocean environment. As a result, all cartilaginous fishes – no matter how deep or how far they are distributed from shore – are readily within reach of human fishing capabilities (Priede *et al.* 2006).

2.4.1 Species distribution and productivity

The nearly 90 PLMR shark and ray species ("elasmobranchs") addressed in this document vary widely in distribution (from tropical, temperate, and polar waters), habitat (semipelagic, oceanic, deepwater benthic), life history (although almost all are strongly K-selected) and productivity, and therefore their exposure to and ability to sustain or recover from fishing pressure (Table 6). Most of these species undertake periodic (often seasonal) migrations, which lead them across jurisdictional boundaries. All are known to reside in or frequent international waters of the high seas, as well as the Exclusive Economic Zones (EEZs) of some coastal and island nations, making them vulnerable to fisheries of multiple nations and gears, which complicates their management and protection. Distribution maps for 27 PLMR sharks are available from FAO although they are lacking for many of the threatened requiem and hammerhead species (Table 7; www.fao.org/fishery/species/distribution/en); GIS shape files for these maps are also available from FAO).

The species considered here can be roughly divided into two habitat groups: pelagic and deepwater species, although these are not mutually exclusive (e.g., a species can be a deepwater pelagic). Pelagic elasmobranchs are highly mobile, free-swimming species that live in the water column and are not closely associated with the bottom. They are among the most cosmopolitan marine taxa, occurring in every ocean basin and across most latitudes. Diversity in this group is very low relative to those inhabiting the continental shelves and slopes. Compagno (2008) classified 64 species of sharks and rays as pelagic; together they represent less than 6% of the world's cartilaginous fishes. Pelagic elasmobranchs can be further divided into oceanic and semipelagic species. "Oceanic" sharks spend most of their time far from land masses but may come close inshore to feed and breed, and are dominated in diversity by the orders Squaliformes and Lamniformes, but by order Carcharhiniformes in biomass. "Semipelagic" species spend most of their time over the continental slopes nearer to shore and venture occasionally farther offshore; they are represented largely by species in the orders Carcharhiniformes, Rajiformes, and Squaliformes (Compagno 2008). Tagging studies are providing new insight into the depth ranges (up to 6000m) of some of the larger species (Gore *et al*. 2008; Graham *et al*. 2006; Pade *et al*. 2009; Skomal *et al*. 2009). No pelagic shark or ray, however, lives below 1500m (Priede *et*

al. 2006); most are encountered near the surface in the sunlit epipelagic zone (up to 200m depth; Table 6), making them highly accessible to fishing gear.

Thirty eight of the PLMR sharks and rays in this report are classified as pelagic based on Compagno (2008). These include many of the most well-known and best-studied sharks (e.g., blue shark, shortfin mako, threshers, silky) prevalent in both target and bycatch fisheries of the open ocean. Indeed, only 14 pelagic sharks (all PLMR species) account for approximately 40% of the fins auctioned in the Hong Kong fin markets (Clarke *et al.* 2006) and are listed as threatened on the IUCN Red List (IUCN 2009; Table 8). It is estimated that as many as 73 million sharks (of all species) enter into the fin trade every year (Clarke *et al.* 2006b). The conservation status of all 64 known pelagic elasmobranchs has been summarized in Camhi *et al.* (2008), and the biology and ecology of 13 of the commercially important pelagic sharks of the open ocean in Snelson *et al.* 2008 and Camhi *et al.* (2008).

Deepwater sharks and rays, by definition, spend most of their time or are restricted to depths greater than 200m, which is the depth recognized as the edge of the continental shelf (Kyne and Simpfendorfer 2007). They include both benthic (those occurring on or near the ocean bottom) and pelagic (those occurring in the water column) species. About 581 species, or 49% of the world's chondrichthyans, are considered deepwater species, and are represented largely by the orders Squaliformes, Carcharhiniformes, and three families of skates (Arhynchobatidae, Rajidae and Anacanthobatidae). The systematic relationships, however, among some deepsea elasmobranchs remain complex and unresolved. Some groups, such as the heavily exploited gulper sharks of the genus *Centrophorus*, may consist of many local endemic species rather than a single wide-spread species as traditionally believed, which could influence how these "species" should be managed (Kyne and Simpfendorfer 2007). The top five FAO areas for deepsea chondrichthyan diversity (from the most biodiverse) are the Northwest Pacific (Area 61), Eastern Indian Ocean (Area 57), Western Central Pacific (Area 71), Southwest Pacific (Area 81) and Western Central Atlantic (Area 31) (Kyne and Simpfendorfer 2007).

Demersal or bottom-living chondrichthyans are largely confined to areas less than 3000m deep because they are unable to fulfill their energy needs at greater depths (Priede *et al.* 2006). Life history information is available for very few of these species: Kyne and Simpfendorfer

(2007) were able to assess (using the intrinsic rebound potential method of Smith *et al.* 1998) the productivity of only 13 of the 581 identified deepwater elasmobranchs. Where productivities are known, however, they are among the lowest of all chondrichthyans and generally decline with increasing maximum depth (Kyne and Simpfendorfer 2007). As a result deepwater species are highly vulnerable to fishing pressure, which is intensifying as shallow stocks become overexploited (IUCN SSG 2007). Once overfished, deepwater sharks and rays may take decades – and possibly centuries – to recover.

Many of the PLMF shark and ray species in this report are also considered to be migratory, defined by the Convention on Migratory Species (CMS) as those whose members "cyclically and predictably cross one or more national jurisdictional boundaries" as well as those that move between national waters and the high seas. A recent analysis by the IUCN Shark Specialist Group (IUCN SSG 2007) has identified about 140 species considered to be migratory or potentially migratory, along with summaries of their migratory behavior. Some sharks undertake extensive migrations across or around entire ocean basins and are considered "highly migratory species." From a legal perspective and relevant to the management efforts of regional fisheries bodies, "highly migratory species" are defined as those included in Annex I of UN Convention on the Law of the Sea (UNCLOS, see Table 9). Large-scale movements can complicate management for species that regularly cross jurisdictional boundaries.

Much less is known of the movements and migrations of deepwater cartilaginous fishes because of the logistical difficulties of tagging and tracking these species (Kyne and Simpfendorfer 2007). Some of the species in this report (e.g., the bignose shark *Carcharhinus altimus* and bigeye thresher *Alopias superciliosus*) also undertake regular vertical migrations, moving from the depths to the surface at night, exposing them to potential capture in both deep-set and surface fishing gear.

2.4.2 Conservation Status

Over the past decade, the IUCN Shark Specialist Group has undertaken and completed its Global Shark Red List Assessment, an evaluation of the conservation status of all described chondrichthyan fishes using the IUCN Red List Categories and Criteria (IUCN 2001; Fowler et

al. 2005; the Global Assessment is due to be published in late 2009). Chondrichthyans are the first marine taxa subject to a comprehensive assessment, which provides an important baseline for monitoring the health of these species and effectiveness of management efforts. The most current available global Red List assessments for the PLMR sharks and rays in this report are listed in Table 8; where the data allow, some species are also assigned regional or subpopulation Red List categories for different parts of their range. Cavanagh and Kyne (2005) and Camhi et al. (2009) provide an overview of the conservation status of deepwater and pelagic elasmobranchs, respectively.

The breakdown of the global Red List assessments for the 86 PLMR shark and ray species under consideration here is shown in Box 2.

Box 2. Sharks and Rays on Global Red List

# PLMR species	Red List category	Comments
1	CR	Smalltooth sawfish Pristis pectinata
5	EN	Includes the large hammerheads; the NE and NW Atlantic populations of porbeagle Lamna nasus are CR and EN
19	VU	Includes most of the pelagic migrants, including those involved in the fin trade
18	NT	
21	LC	Includes many of the wide-ranging smaller sharks of higher productivity.
22	DD	Most of these are deepwater species.

[1] Red List Categories: CR = Critically Endangered; EN = Endangered; VU = Vulnerable; NT = Near Threatened; LC = Least Concern; DD = Data Deficient. See IUCN 2009 for an explanation of how these categories are assigned.

For those species that have been assessed, migratory chondrichthyans appear to be at greater risk of extinction than non-migratory species: about 48% of the 80 migratory sharks and rays evaluated fell into a threatened Red List category (i.e., Critically Endangered, Endangered, or Vulnerable) compared to only 19% (79 of 418 species evaluated) for non-migratory species (IUCN SSG 2007). The PLMR species at greatest risk of extinction include pelagic sharks of commercial importance (e.g., hammerheads, threshers, makos, etc.; Table 8). Although the blue shark Prionace glauca is only listed as Near Threatened, it is the most prevalent shark in the

bycatch of most high seas longline fisheries and therefore should be monitored closely. There is a dearth of information on the life histories and ecology of deepwater chondrichthyans. Kyne and Simpfendorfer (2007) were only able to estimate the productivity of 13 of the 581 described deepwater cartilaginous fishes. As a result, many deep-sea species could not be assessed and so are categorized as Data Deficient on the Red List (Table 8; Cavanagh and Kyne 2005). In general, deepwater species are among the least productive of the cartilaginous fishes. This is due to slower growth and late maturity, in part as a result of their cold water environment, which also limits available food resources. Most sharks and rays are highly vulnerable to exploitation but the deepwater species are even more so: recovery from depletion may take decades, if not centuries. It has also been noted that the intrinsic rebound potential (i.e., the ability of a population to rebound from fishing pressure) of deepsea sharks, which are among the lowest for all chondrichthyans assessed, declines with depth. Where life history data are lacking, maximum depth could serve as a potential indicator of the ability of a species to withstand fishing pressure.

2.4.3 Interactions with fisheries

Fishing represents the number one threat to the conservation status of pelagic and deepwater PLMR sharks and rays (Fowler et al. 2005; Cavanagh and Kyne 2007; Camhi et al. 2009; Table 8). Between 2000 and 2007, annual elasmobranch landings reported to FAO averaged 832,000t (FAO 2009), although these landings are known to be grossly underestimated (Bonfil 2004; Clarke et al 2006b). In 2007, 21 fishing nations reported over 10,000t of elasmobranch landings to FAO, and together accounted for 93% of the global total (781,000t):

Country	2007 elasmobranch landings (t)
Indonesia	116820
India	84093
Taiwan	48707
Spain	46187
Argentina	44112
Mexico	34638
United States	34287
Malaysia	21764
France	19622

Country	2007 elasmobranch landings (t)
Portugal	18464
New Zealand	17409
Japan	17257
Brazil	17233
Thailand	16925
Pakistan	16284
Nigeria	15292
Iran[b]	13187
Yemen	12387
Korea, Rep. of	11374
Venezuela	11294
Canada	10258
Subtotal	730196

Although the species-specific landings of these top shark-fishing nations were not analyzed, it is likely that they are responsible for the vast majority of PLMR catches, and therefore should shoulder most of the responsibility for the conservation and management of these species. Domestic management action taken on behalf of sharks by these major shark-fishing nations, including finning bans, the status of development of their National Plan of Action – Sharks (FAO 1999), and their membership in relevant RFMOs and conservation treaties, is summarized in Camhi *et al.* (2008c), Cavanagh *et al.* (2008), and Camhi (2009).

Because of their widespread distribution, sharks and rays may interact with fisheries in virtually all marine waters less than 3000m depth (Priede *et al.* 2006). Pelagic sharks and rays spend the majority of time in the epipelagic zone, where they are most readily accessible to fishing gear, especially longlines, purse seines, and gillnets. Benthic species of the open are taken by bottom trawls and deepset longlines (see Priede *et al.* 2006). In addition, many elasmobranchs tend to aggregate by age, sex, or reproductive state, which can increase their vulnerability to fisheries.

As targeted fishing for pelagic and deepwater elasmobranchs is the exception rather than the rule, most PLMR sharks are taken incidentally, although shark bycatch is increasingly retained ("secondary catch") and some species (e.g., shortfin makos, threshers, and blue sharks)

are increasingly targeted. The demand for shark fins for the Asian soup fin market is a driving force behind many recent targeted shark fisheries and increased shark retention rates. Pelagic sharks are often a significant, if not the largest component of the catch, especially in fisheries targeting tunas and tuna-like species. Indeed, 50% of the world catch of chondrichthyans may be taken incidentally in fisheries directed at teleost species (Stevens *et al.* 2000). Nonetheless, shark bycatch is poorly documented because it is often discarded and/or of low priority in data collection programs relative to more valuable commercial target species like tunas, swordfish, and other teleosts. Repeated calls to expand and improve species-specific reporting of elasmobranch catches, especially for high seas fisheries, have largely gone unheeded by fishing nations (Bonfil 1994; Camhi *et al.* 1998; Fowler *et al.* 2005; Camhi *et al.* 2008b; Dulvy *et al.* 2008; ICCAT 2008a). Compared to pelagic fisheries, catch and discard data for deepsea fisheries are even more incomplete, underreported, and complicated by taxonomic uncertainties. This precludes generating reliable estimates of global and regional catch and mortality for deepsea chondrichthyans. Where fisheries data are available, it has been noted that fishing has quickly and severely depleted many deepwater shark populations, often in less than 20 years (see Kyne and Simpfendorfer 2007).

Table 10 identifies the known occurrence of each PLMR by FAO Fishing Area based on the scientific literature. This table also highlights the areas where PLMR landings have been reported to FAO since 2000, along with the relative size of some of these landings. FAO shark landings data, however, are incomplete and fraught with problems (see Clarke *et al.* 2006a; Kyne and Simpfendorfer 2007; Camhi *et al*. 2008b; Camhi *et al*. 2009). For example, although landings are reported in the FAO database for 102 species or groups of elasmobranchs, less than 20% of the landings are reported to species and there is no indication whether these landings were targeted or taken as bycatch (FAO 2009). Landings and trade data are also generally lacking for deepwater chondrichthyans (Cavanagh and Kyne 2005). An analysis of the international trade in shark fins suggests that the global catch of sharks (including many PLMR species) may be three to four times higher than the “official” FAO capture statistics (Clarke *et al.* 2006b). Nonetheless, the landings information in Table 10 provides initial insight into potential

fishery interaction hotspots for PLMR sharks, at least for commercially important species, as relatively few landings for deepwater sharks are reported in the FAO database.

Longline fishing for highly migratory species (like tuna and swordfish) is second only to shrimp trawling in terms of overall discard rates, and the blue shark is the most commonly discarded species from longlines (Maguire *et al.* 2006). Shark and ray bycatch rates vary by species, fishery, region, and gear. Bonfil (1994, 2000) suggests that longlines, drift gillnets, and tuna purse seines (in tropical waters) are the top three sources of elasmobranch bycatch on the high seas. Because there is no global repository of data on elasmobranch bycatch or discards, nor for spatial data on commercial fishery catches, a clear picture of global bycatch of PLMR elasmobranch by fishery and gear would require a comprehensive review of the literature, including the scientific papers of the RFMO working groups on bycatch: such a review was beyond the scope of the current project. [Although a bit dated, Bonfil (1994) provides an overview of regional elasmobranch bycatch on the high seas; a more recent summary of species-specific bycatch for some pelagic sharks and can be found in the species accounts and Red List assessments in Camhi *et al.* (2009).] However, in this project we present a GIS methodology that uses available spatial data in an effort to create an initial bycatch footprint for a dozen priority PLMR sharks.

Although pelagic sharks are usually classified as bycatch in high seas fisheries, they often represent a significant, if not dominant, part of the total catch. As demand and prices paid for shark fins and meat continues to grow, fewer and fewer sharks are being discarded. For example, virtually all blue sharks taken in the bycatch of the Spanish swordfish longline fleet in the Pacific – which used to be discarded – are now being retained (Mejuto *et al.* 2007). Shark bycatch in deep-water fisheries are often 10-50% of the target species catch (Bonfil 2000). In addition, some sharks (once considered unwanted bycatch) are increasingly targeted, as traditional target species (e.g., tunas and swordfish) become less available seasonally or due to overexploitation and management (Mejuto *et al.* 2006a; Hareide *et al.* 2007; Aires-da-Silva *et al.* 2008).

In the Atlantic, sharks and rays are caught on longlines, gillnets, hand lines, rod and reel, trawls, trolls and harpoons. In 2007, nearly 300,000t of elasmobranch landings were reported to FAO from the Atlantic and pelagic PLMR sharks accounted for about 15% of these landings

(FAO 2009). In recent years, ICCAT has reported landings for about 50 elasmobranchs taken on longlines, gillnet, purse seine, and other gear in the Atlantic. Most ICCAT contracting parties still do not report their shark catches, despite resolutions making species-specific reporting mandatory (Table 9). But of the 26 nations that did report in 2007, Spain, Portugal, Japan, Brazil, Taiwan, and Argentina were the top elasmobranch producers (ICCAT 2009). Between 1980 and 2005, two species strongly dominated the catch: blue sharks (73% of the shark catch by weight) and shortfin mako (12%). In the Spanish longline fishery targeting swordfish, pelagic sharks accounted for 70% (by weight) of the total landed catch and nearly 87% of this "bycatch" was blue sharks (Mejuto *et al.* 2006a). Hammerheads *Sphyrna* spp. and threshers *Alopias* spp. are also important in the pelagic shark bycatch in the Atlantic, whereas porbeagles are still targeted. All of these species (except the blue shark) have been assessed as globally Endangered or Vulnerable (IUCN 2009), but the Atlantic populations of some of these species are even in worse shape (Table 8) and in need of immediate management attention.

The Pacific Ocean supports the largest industrial tuna fisheries in the world (Williams 1999; Joseph 2003), taking large numbers of pelagic sharks in their bycatch. FAO-reported elasmobranch landings in 2007 were about 263,000t, of which 11 % were identified as pelagic species or groups (FAO 2009). As a group, threshers (*Alopias* spp.) dominated the landings but large numbers of blue and silky sharks were also reported. Although two RFMOs in the region – WCPFC and IATTC – have passed resolutions to improve species-specific shark catches, compliance is low, obscuring the actual size and composition of the catch and impeding population assessments and management. Of the 33 countries that reported landings, Indonesia, Taiwan, Mexico, New Zealand, Malaysia, and Japan all reported landing over 10,000t from the Pacific.

In the Spanish surface longline fleet targeting swordfish in the Pacific, 43% of the total catch consisted of "bycatch" species, of which 96% (by weight) was of pelagic sharks (Mejuto *et al*. 2007). Blue sharks accounted for 59% (by weight and numbers) of the shark bycatch, with shortfin mako the second most prevalent species (39%). Retention rates for blue shark bycatch have steadily increased in this fishery.

2.4.4 Managing PLMR shark bycatch and IUU fishing

Fishing is the most important source of mortality for most sharks and rays, yet elasmobranchs remain a low conservation priority for domestic fishery managers and for the regional fisheries management organizations (RFMOs) that are charged with the management of multi-national fisheries in international waters. No RFMOs have been established specifically to manage sharks and rays on the high seas. Instead, these species fall under the purview of existing RFMOs dedicated to the management needs of valuable teleost fisheries. RFMOs with management authority for "tunas and tuna-like species" oversee pelagic sharks (e.g., ICCAT in the Atlantic, IATTC and WCPFC in the Pacific); management for deepwater elasmobranchs largely falls to other RFMOs, such as NAFO in the Northwest Atlantic. See Fowler and Cavanagh (2005) and Camhi *et al.* 2008c for overviews of international and regional fishery management and conservation initiatives for elasmobranchs.

With the exception of recent shark finning bans and calls for improved catch reporting, few shark-specific management measures have been implemented by any RFMO (Table 9, and compliance among contracting parties is poor even for the few measures that have been adopted (Lack and Sant 2006). In theory, management for PLMRs that are listed on Annex I of UNCLOS should be subject to the principles and obligations under UNCLOS, as well as the UN Fish Stocks Agreement (UNFSA) and the Code of Conduct of Conduct for Responsible Fisheries, requiring cooperation among fishing nations and application of the precautionary approach to ensure population sustainability. No RFMO has developed or implemented a Regional Shark Plan as called for under FAO's International Plan of Action – Sharks (FAO 1999).

Over the past decade, however, many RFMOs have established bycatch working groups and have passed resolutions aimed at improving the quality and quantity of elasmobranch catch data, encouraging their live release, prohibiting the practice of finning, and promoting research into gear selectivity (Table 9; Camhi *et al.* 2009). To date, catch and catch rate data as reported to RFMOs by member fishing nations have been too incomplete to allow for comprehensive assessments, but Atlantic fisheries taking sharks are among the best documented. ICCAT has conducted preliminary population assessments for Atlantic shortfin mako *Isurus oxyrinchus*, blue, and porbeagle *Lamna nasus* sharks, and an ecological risk assessment for 12 species of sharks and rays taken in ICCAT fisheries (Dulvy *et al.* 2008; ICCAT 2008b). No high-seas

fishery in any ocean regularly reports elasmobranch discards, and few data exist to delineate the spatial distribution of elasmobranch bycatch.

Concerns over bycatch and IUU fishing for sharks are growing (Lack and Sant 2008). It is widely acknowledged that the capture of sharks in domestic and international waters is largely unregulated and – even where management measures exist – landings and discards of sharks are underreported and not species-specific (Fowler *et al.* 2005; Lack and Sant 2006). To be considered illegal, regulations must exist in the first place (Lack and Sant 2008). But only a handful of nations have actually implemented management for elasmobranchs: In most waters of the world, there are no legal constraints on the numbers or species of sharks or rays that can be taken in target or bycatch fisheries, and this is especially true on the high seas (Camhi *et al.* 2008c; Camhi *et al.* 2009). The main exception to this rule is the growing number of shark finning bans in domestic and international waters, but most of these have significantly loopholes and are poorly enforced (Camhi *et al.* 2008c). The first and only international catch limit established for an elasmobranch was set by NAFO for thorny skates (*Amblyraja radiata*) in the North Atlantic in 2005 – but even this quota is higher than the scientific advice (NAFO 2006).

In 2007, Australia commissioned TRAFFIC to undertake a review of IUU shark fishing (Lack and Sant 2008). Although illegal shark fishing occurs globally, areas off Central/South American and the Western and Central Pacific Oceans may be IUU shark fishing “hotspots” and that longlines and gillnets are the most common offending gear (Lack and Sant 2008). Most of the illegal fishing involves the retention of shark fins in contravention of various shark finning bans (probably because these are the only regulations in place in international waters). The report also revealed the species and species groups most likely to be at risk (Table 8): hammerhead sharks *Sphyrna* spp. and the silky shark *Carcharhinus falciformis* were taken most often in illegal fishing operations. It concluded, however, that at this time it is not possible to determine the extent and quantity of IUU shark fishing taking place, the importance of IUU fishing relative to legitimate shark fishing, nor how it is affecting the status of the species involved (Lack and Sant 2008).

The Convention on International Trade in Endangered Species (CITES) monitors and controls trade in species that are overexploited by such trade. Many of the PLMR sharks,

especially the pelagic species, appear to be appropriate candidates for CITES listing given their Red List status and the substantial trade in their fins and meat. To date, the whale *Rhincodon typus*, basking *Cetorhinus maximus*, and white shark *Carcharodon carcharias* and the smalltooth sawfish *Pristis pectinata* are listed on the CITES Appendices (Table 8). Efforts to list the porbeagle *Lamna nasus* and spiny dogfish *Squalus acanthias* on CITES in 2007 were unsuccessful. CITES has also begun to explore the linkages between the shark fin and meat trade and IUU fishing (AC 23 Doc. 15.3 and AC24 Doc. 14.3). Many other elasmobranchs may be appropriate candidates for CITES listings, given the number of sharks taken in the international fin trade and the bleak conservation status of the many of the species involved.

One of the greatest challenges facing the conservation of migratory species as they move across national boundaries and into international waters is the lack of coordinated and collaborative management of the fisheries that capture them. A listing on the Convention of Migratory Species appendices highlights the management needs of such migratory species, and is a first step toward collaborative international management (see Fowler *et al*. 2005; Camhi *et al.* 2009). A taxonomic review by the IUCN Shark Specialist Group has identified approximately 140 migratory or potentially migratory chondrichthyan fishes (IUCN SSG 2007). Six sharks are currently listed on the CMS Appendices: white, basking, shortfin *Isurus oxyrhinchus* and longfin makos *Isurus paucus*, porbeagle and whale sharks (Table 8). Evaluation of the remaining migratory sharks and rays identified about 40 more that could benefit from CMS listing and follow-up action (IUCN SSG 2007); 15 of these are PLMR species and are identified in Table 8.

Although frequently taken on the same gear and fisheries, efforts to develop and implement measures to reduce elasmobranch bycatch have lagged well behind mitigation efforts for sea turtles, seabirds, and marine mammals. A study of 12 pelagic longline fisheries revealed current practices and industry attitudes in addressing the shark bycatch (Gilman *et al.* 2007). Shark avoidance methods in pelagic longline fisheries include avoiding areas of high shark concentration, leaving an area where shark interaction is high, changing bait used for target species, and setting longlines deeper to reduce interaction. Although circle hooks have been successful at reducing sea turtle bycatch on longlines relative to traditional J-hooks (NMFS 2008), recent studies indicate that the use of circle hooks on North Pacific longlines had little

impact on the catch rate and mortality of blue sharks (Yokota *et al.* 2006). Another study in an Australian tuna longline fishery, however, found that switching from metal to nylon leaders reduced pelagic shark bycatch while increasing catches of target tunas (Ward *et al.* 2008). Further research is needed to improve methods to release sharks from fishing gear that would simultaneously increase post-release survival of the sharks and reduce gear loss and injury to fishermen.

Nursery areas have not been found for deepwater species; it is possible that gravid females move into deeper waters making them less accessible to capture (Kyne and Simpfendorfer 2007). Given the very low productivities of deepwater sharks, closed areas can provide refugia from incidental capture and may be one of the few management tools available to enable recovery of depleted deepwater elasmobranchs (Cavanagh and Kyne 2005). Despite their wide-ranging habits, fishery closures of carefully selected areas on the high seas, may hold promise for the conservation of pelagic sharks (Watson *et al.* 2008).

Given the declining status and the growing fishing pressure on many PLMR shark species, conservation and management actions must be accelerated. This should include efforts to delineate areas of high bycatch and research into methods to reduce bycatch mortality.

2.5 Marine Mammals

The world's oceans are home to more than 100 species of marine mammals, including whales and dolphins, seals and sea lions, manatees and dugongs, otters and polar bears. Of these, 21 are listed under the Endangered Species Act, and all are protected under the Marine Mammal Protection Act. More than 20 are also listed on CITES Appendices (See Table 12 and Box 1) and others are protected by the International Whaling Commission. (See Annex to Biennial Report to Congress)

U.S. management and protection of these animals is divided between the U.S. Fish and Wildlife Service and the National Marine Fisheries Service Office of Protected Resources. Although this summary may note species managed by USFWS, the focus of this section is on species under NMFS management authority—cetaceans and pinnipeds—because of statutory direction on bycatch in fisheries. A complete list of all the species is provided on the Marine Mammal Commission website. http://mmc.gov/species/speciesglobal.html International

management authorities related to ocean areas where marine mammals occur are summarized in Tables 3 and 12.

In the list of 17 marine mammals titled “species of special concern” highlighted by the Marine Mammal Commission, 14 are subject to incidental capture or entanglement in fishing gear. In 2005, the U.S. Ocean Commission found that the “biggest threat to marine mammals worldwide is their accidental capture or entanglement in fishing gear (bycatch), which kills hundreds of thousands of them each year.” (Ocean Commission 2005). This report will discuss those that are known to occur in international waters. NMFS regularly evaluates the status of about 165 marine mammal species, and stock assessment reports are available online. http://www.nmfs.noaa.gov/pr/species/statusreviews.htm A summary of status under ESA and MMPA is summarized on the Protected Resources website. http://www.nmfs.noaa.gov/pr/species/mammals/

2.5.1 Status and Distribution

Cetaceans are relatively large and have streamlined bodies adapted to the marine environment. Some species and populations are found in discrete areas, but others are highly migratory and are found worldwide. They can cover vast distances in search of food or migrating to breeding or calving grounds. The approximately 78 cetaceans—species of whales, dolphins and porpoises for which NMFS has authority under MMPA and ESA— include 11 species of baleen whales (*Mysticeti*) and 67 species of toothed whales (*Odontoceti*). Worldwide threats to cetaceans include pollution, acoustic noise, ship strikes, habitat degradation, human exploitation, and global climate change. Bycatch of small cetaceans is reported in the NOAA Tech Memorandum Worldwide Bycatch of Cetaceans (Young and Iudicello 2007).

Pinnipeds are so-called because of their flippered feet and include seals (*Phocidae*: earless seals or true seals), sea lions (*Otaridae*: eared or fur seals and sea lions), and walruses (*Odobenidae*). They must come ashore to breed, give birth, and nurse their young. Pinnipeds are carnivores and consume fish and shellfish. All pinnipeds are protected under the MMPA, and several species are under consideration for designation under the ESA. Although pinnipeds are primarily coastal, they may range to the open ocean and therefore into international waters. All

pinnipeds except walrus are known to have interactions with fishing gear.

2.5.2 Interactions

Bycatch threatens marine mammals worldwide in nearly every type of fishing gear (Northridge 1991, Read and Rosenberg 2002). The first global bycatch estimate predicts hundreds of thousands of marine mammals are incidentally captured annually (Read et al. 2006). This incidental capture poses the greatest conservation threat worldwide to many marine mammal populations (Read et al. 2006). For several marine mammal species, including the harbor porpoise (*Phocoena phocoena*), vaquita (*Phocoena sinus*), finless porpoise (*Neophocaena phocaenoides*), Burmeister's porpoise (*Phocoena spinipinnis*), and Hector's (*Cephalorhynchus hectori)*, Maui's (*Cephalorhynchus hectori maui*), humpback (*Sousa chinensis*), bottlenose (*Tursiops truncatus*), Irrawaddy (*Orcaella brevirostris*), and dusky (*Lagenorhynchus obscurus*) dolphins, interactions with fisheries may threaten their recovery or survival (Young and Iudicello 2007).

Incidental capture occurs in high seas waters in purse seine, longline, driftnet, and trawl fisheries; however, stock status and bycatch of pelagic marine mammals are poorly documented (NOAA 2009c). There are large areas of the world where interactions between marine mammals and gear are likely but where interactions have not been documented. This lack of data does not indicate that such interactions do not exist or are not a problem but instead that such interactions have not been observed or reported (Young and Iudicello 2007).

The most widely known bycatch of marine mammals in international waters occurs in the Eastern Tropical Pacific (ETP) tuna purse seine fisheries. Offshore stocks of marine mammals, specifically of spotted dolphins (*Stenella attenuata*) and spinner dolphins (*Stenella longirostris*), have historically been set on by purse seine fishing gear (NOAA 2009c). The northeastern offshore and coastal stocks of spotted dolphins are those that most frequently interact with the purse seine fishery in the ETP. The offshore stock occurs in aggregations of more than several hundred animals, usually mixed with large herds of spinner dolphins, and the coastal stock can be found in herds of less than 100 animals (NMFS 1991). Total annual fishing mortality for the

northeastern offshore stock between 2000 and 2006 for United States and foreign fleets ranged from 147 to 592 spotted dolphins, with an average of 328 each year (IATTC 2007).

In addition to spotted and spinner dolphins, fishing gear has also been set to a lesser extent on common dolphins (*Delphinus delphis*). Striped (*Stenella coeruleoalba*), rough-toothed (*Steno bredanensis*), bottlenose, and Fraser's (*Lagenodelphis hosei*) dolphins also have been found to associate with tunas and are thus subject to incidental capture of gear targeting tuna (NRC 1992). Other marine mammal species that have been known to use the ETP and that may interact with tuna purse seine gear in the area include long- and short-finned pilot whales (*Globicephala spp*.), Risso's dolphins (*Grampus griseus*), sperm whales (*Physeter macrocephalus*), beaked whales (family *Ziphiidae*), Bryde's whales (*Balaenoptera edeni*), blue whales (*B. musculus*), sei whales (*B. borealis*), fin whales (*B. physalus*), southern right whales (*Eubalaena australis*), and humpback whales (*Megaptera novaeangliae*) (Wade and Gerrodette 1993, NOAA 2009c). Pinnipeds have also been recorded in the ETP, but they have not been known to interact with tuna purse seine gear (NOAA 2009c).

An agreement by the IATTC represents the only action by a RFMO to monitor or limit marine mammal bycatch or to implement an observer program to document marine mammal bycatch in international waters (NOAA 2009c). The IATTC's Agreement on the International Dolphin Conservation Program (AIDCP) has taken measures in the ETP to capture large yellowfin tuna that are not in association with dolphins. The AIDCP has also taken measures to reduce dolphin bycatch and mortalities in the ETP tuna fishery to levels approaching zero (NOAA 2009c). Parties to the AIDCP include Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, United States, Vanuatu, and Venezuela (Dept. of Commerce 2009). Parties applying the Agreement provisionally include Bolivia, Colombia, and the European Union (Dept of Commerce 2009).

The measures taken by the AIDCP include dolphin mortality limits (DMLs), or a limit on total incidental dolphin mortality in the tuna purse seine fishery to fewer than 5,000 individuals annually (see NOAA 2009c). It also provides incentives for captains of purse seine vessels to reduce dolphin mortality beyond what is required by the DMLs, with the goal of eliminating bycatch mortality altogether (Dept. of Commerce 2009). In addition to conservative DMLs, the

AIDCP includes the establishment of a tuna tracking and verification system; 100% observer coverage on large purse seine vessels; measures to ensure dolphins are released from nets unharmed before tuna is brought on board; the exchange of scientific research data; and the conduct of research for the purpose of seeking means to capture tuna without capturing dolphins (Dept. of Commerce 2009, NOAA 2009c).

In 2006, dolphin mortalities in the EPO were recorded at less than 900 dolphins. This number represents a reduction in mortality in this fishery of marine mammals by over 99% from an estimated 133,000 mortalities in 1986 (Dept. of Commerce 2009). As a result, the AIDCP has been recognized as the most successful and comprehensive bycatch agreement of its kind (Dept. of Commerce 2009).

In addition to the ETP, purse seine gear is used in other areas of the Pacific including the Western and Central Pacific Ocean (WCPO) area; yet, in this area, there is little evidence that fishing gear is set around dolphins associated with tuna (Dept. of Commerce 2009, NOAA 2009c). A few records do exist that indicated Risso's dolphins and pilot whales have been encircled during sets around logs in some areas (NOAA 2009c). In some equatorial areas, gear has been set around sei whales though the animals are usually released unharmed (NOAA 2009c).

Other marine mammals encountered in the Western Pacific have included humpback, sperm, blue, fin, and sei whales. Marine mammals also interact with longline gear in the WCPO, including false killer whales (*Pseudorca crassidens*) and pilot whales that engage in depredation of bait and catch (Dept. of Commerce 2009, NOAA 2009c).

The Northwest Pacific, according to the FAO, is one of the most productive fishing regions in the world (Young and Iudicello 2007). A high seas driftnet fishery once operated in these areas, but has now been banned by a United Nations Moratorium. Driftnets do continue to operate within EEZ waters within this region (IWC 2002c). Bycatch of marine mammals, including finless porpoise, also occurs in gillnet, setnet, trap net, longline, and purse seine fisheries in national waters within this area. While bycatch of finless porpoise is known to occur

in several fisheries, they generally utilize shallow water habitats, and as a result, bycatch is primarily restricted to fisheries within EEZs (IUCN 2009).

In the Northeast Pacific, driftnet fisheries for salmon and squid in U.S. waters have been banned (Young and Iudicello 2007). Bycatch of marine mammals occur in fisheries within EEZs, and little is known about mortality in international waters. Compared to marine mammal bycatch in other areas of the world, incidental mortality is less consequential in the Northeast Pacific (Young and Iudicello 2007).

Pinnipeds in the Northeast Pacific that are known to interact with fishing gear include Stellers sea lions, Northern fur seals, spotted seals, ringed seals and bearded seals.

The western population of Stellers is listed as endangered under ESA, the eastern stock is listed as threatened. Incidental mortality in fishing gear is one of several sources of mortality causing the decline of sea lions (NPFMC 2004, NOAA 2008). Incidental mortality of sea lions has been documented from the 1970s during the years of the foreign and joint venture trawl fisheries in the Bering Sea and Gulf of Alaska, to more recent domestic fisheries. (NOAA 2008) Sea lions are incidentally taken in drift and set gillnets, on troll gear and in trawls. (NPFMC 2004)

Northern fur seals were designated as depleted under the MMPA in 1988. Their range extends across the Pacific Ocean, between southern California and the Okhotsk Sea and Honshu Island, Japan. Breeding rookeries in the North Pacific and Bering Sea are located on the Pribilof Islands, Bogoslof Island and San Miguel Island in the United States, and Commander Islands, Kuril Island and Robben Islands in Russia. Although the severe decline in population before the 1980s is attributed to commercial sealing, northern fur seals face a variety of threats including bycatch in fishing gear. http://www.nmfs.noaa.gov/pr/species/mammals/pinnipeds/northernfurseal.htm

The three ice seal species are candidates for possible listing under the ESA. All three, as well as ribbon seals, are considered “species of concern,” which are species that face threats about which NMFS has concerns regarding status, but for which insufficient information is available for listing under the ESA. Although climate is suspected to be a greater threat than

bycatch for these species, they are subject to incidental takes in fisheries.

Spotted seals range in arctic and sub-arctic waters from the coast of Alaska throughout the Bering Sea, Sea of Japan and Sea of Okhotsk. They are found in the open ocean during summer months and within outer margins of shifting ice at other times. Bycatch in fishing gear, such as groundfish trawls, may occur, but annual mortality of spotted seals incidental to fishing is very low. Additionally, spotted seals are incidentally entangled in salmon trap nets off of the Nemuro Peninsula in Japan. http://www.nmfs.noaa.gov/pr/species/mammals/pinnipeds/spottedseal.htm

Ringed seals occur worldwide in arctic waters of the Northern Hemisphere ranging from 35°N to the North Pole. They are commonly associated with ice floes and pack ice, upon which they depend for habitat. Though loss of this habitat through climate change is a threat, they are known to be incidentally caught in fishing gear such as trawls. http://www.nmfs.noaa.gov/pr/species/mammals/pinnipeds/ringedseal.htm

Bearded seals reside in arctic waters and are distributed throughout the Northern Hemisphere up to 80 80°N. commonly found with drifting sea ice. They inhabit waters less than 650 ft (200 m) deep, and though bycatch in trawl gear is known to occur, mortality incidental to fishing is very low. http://www.nmfs.noaa.gov/pr/species/mammals/pinnipeds/beardedseal.htm

In the Atlantic, bycatch of marine mammals occurs in pelagic longline, purse seine, driftnet, trap, pot and trawl fisheries. Similar to the Pacific, longline interactions usually occur from marine mammals engaging in depredation. Hooked animals are often released alive, although some of the hookings result in serious injuries and the animals may die after being released. Two species that interact with longline gear in the Atlantic include pilot whales and Risso's dolphins. Short- and long-finned pilot whales are difficult to differentiate; thus, reference to these species is usually combined into one, commonly referred to as *Globicephala spp*. (NOAA 2009c).

In the Eastern Central Atlantic, the largest marine mammal bycatch occurs in the large-meshed drift gillnets that target tuna, sharks, billfish, manta rays, and dolphins (Young and Iudicello 2007). In this fishery, clymene (*Stenella clymene*), bottlenose, pan-tropical spotted,

Risso's, common, and rough-toothed dolphins are captured along with pilot and melon-headed whales (*Peponocephala electra*) (Reeves et al. 2003). Also in this region, pelagic trawlers off of Mauritania capture common dolphins and *Stenella spp*. at a minimum estimated rate of about 500-1,000 animals per year (Young and Iudicello 2007).

In the Mediterranean and Black Seas, one major driftnet fishery was banned since 1992; however, a high-seas driftnet fishery for swordfish continues and has been known to incidentally capture large numbers of sperm whales. This bycatch has caused considerable mortality since the mid-1980s (IWC 1994). The number of sperm whales found dead or entangled from 1971-2004 in Spain, France, and Italy was 229. Bycatch of striped dolphins in this high-seas driftnet fishery for swordfish may be responsible for decreased abundance of these dolphins in the Mediterranean (IWC 1994). Striped dolphin mortality annually in this fishery may number in the thousands. Other interactions with fishing gear in Atlantic and Mediterranean fisheries have included minke (*Balaenoptera bonaerensis*), sei, Bryde's, fin, North Atlantic right (*Eubalaena glacialis*), and humpback whales in addition to other dolphin species (Dept. of Commerce 2009).

In the Southern Ocean, bycatch of marine mammals occurs in longline and trawl fishing gear. The RFMO, CCAMLR, has focused efforts on assessing and avoiding incidental mortality of Antarctic marine mammals in commercial fisheries through the establishment of an Ad hoc Working Group on Incidental Mortality Associated with Fishing (Dept. of Commerce 2009). Only three marine mammals were reported in longline gear during 2006-2007 in the Southern Ocean compared with zero mortalities during the previous year (Dept. of Commerce 2009). In the krill trawl fishery in 2006-2007, no marine mammals were reported entangled or killed; however, 142 Antarctic fur seals (*Arctocephalus gazelle*) were caught in the 2004-2005 fishing season and one in the 2005-2006 season (Dept. of Commerce 2009). CCAMLR recommends that vessels participating in this krill fishery use seal excluder devices, which in fact became regularly used beginning in the 2005-2006 fishing season (Dept. of Commerce 2009). No marine mammals have been reportedly captured in the Southern Ocean finfish trawl fisheries.

2.6 Summary of Marine Spatial Planning Projects

The application of GIS technology to display oceanographic, fisheries and protected species information is increasing. From efforts in marine spatial planning related to coastal development and designation of marine protected areas to mapping the paths of highly migratory species, the advance of technology in satellite tracking, remote sensing and global positioning systems have fed the development of mapping of living resources, habitats, environmental conditions and interactions.[20]

The most comprehensive project, and the source of databases upon which many other projects rely, is the FAO's Fisheries Global Information System. It includes mapping tools, fact sheets, and the FAO fisheries database, as well as spatial descriptions of both statistical areas and RFB jurisdictions. Online maps include species distribution maps that users can browse and an atlas of global distribution of catches for tuna species.[21]

The Sea Around Us Project is a collaboration between the University of British Columbia and the Pew Charitable Trusts. Using web-based tools, the project has used FAO and other global databases of catches, distribution of commercial marine species, countries fishing access agreements, and other data, and mapped them. The information has contributed to journal articles, book chapters and other products. Among the analyses produced by the project are maps of fuel consumption by fishing fleets,[22] a characterization of gear used by fleets,[23] modeling for

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[20] St. Martin, K. and M. Hall-Arber. "The Missing Layer: Geo-technologies, Communities, and Implications for Marine Spatial Planning" Marine Policy (2006).

[21] FAO Online Mapping Webpage - Fishery Distribution and Catches http://www.fao.org/fishery/topic/14793/en; Fisheries mapping and GIS. Topics Fact Sheets. Text by Fabio Carocci. In: FAO Fisheries and Aquaculture Department [online]. Rome. Updated 27 May 2005. [Cited 15 July 2009]. http://www.fao.org/fishery/topic/14793/152930/en

[22] Tyedmers, P., Watson, R. and Pauly, D. (2005) Fuelling global fishing fleets. Ambio: a Journal of the Human Environment 34: 59-62.

[23] Watson, R., C. Revenga and Y. Kura. 2006. Fishing gear associated with global marine catches, *in* Fisheries Research 79 (2006) 97-102.

overlap between fisheries and seabirds,[24] modeling marine mammal distribution[25] and interactive graphics of catches by FAO statistical area, by high seas, by species and by gear.[26]

Other examples of mapping projects include OBIS Seamap at Duke University,[27] a spatially referenced online database, aggregating marine mammal, seabird and sea turtle data from across the globe, the Census of Marine Life, a global network of researchers in more than 80 nations engaged in a 10-year scientific initiative to assess and explain the diversity, distribution, and abundance of life in the oceans,[28] and specific projects such as the seabird mapping workshop that produced the volume Tracking Ocean Wanderers, the TOPP website[29] that tracks satellite tagged turtles, sharks, seals and other species, and Project GloBAL (Global Bycatch Assessment of Long-lived Species) that aims to characterize the bycatch of marine mammals, seabirds, and sea turtles by synthesizing existing information to quantify spatial and temporal trends in bycatch using a cross-taxa, cross-gear approach.[30]

Not all of these resources are readily usable. Some map locations of studies while others indicate paths of tagged individual animals. Still others map habitat types. One criticism of GIS models is that they are mapping the environment and resources, but not how humans use ocean areas. St. Martin and Hall-Arber describe this human use aspect as the "missing layer" in GIS products and recommend several possible approaches for filling the gap. This gap is also evident in the FAO mapping system, which does not have information to locate effort, activity of fishing fleets, or areas of fishing operations. The website of The Sea Around Us indicates placeholders

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[24] Karpouzi, V.S., Watson, R. and Pauly, D. (2007) Modelling and mapping resource overlap between fisheries and seabirds on a global scale: a preliminary assessment. Marine Ecology Progress Series 343: 87-99.

[25] Kaschner, K., Watson, R., Trites, A.W. and Pauly, D. (2006) Mapping world-wide distribution of marine mammal species using a Relative Environmental Suitability (RES) model. Marine Ecology Progress Series 316: 285-310.

[26] Available online at http://www.seaaroundus.org/eez/highseas.aspx. Last accessed July 31, 2009.

[27] Ocean Biogeographic Information System Spatial Ecological Analysis of Megavertebrate Populations. Available online at http://seamap.env.duke.edu/. Last accessed July 31, 2009.

[28] Available online at http://www.coml.org/about.

[29] Tagging of Pacific Pelagics (TOPP) - Tag/Tracking data on movements of pelagic species including sharks and mammals http://www.topp.org/

[30] Project GloBal Reports http://bycatch.env.duke.edu

for marine catch maps and footprint analyses, but these products are not live on the site as of this writing. Further discussion of possible methods to fill this gap are provided in Section IV.

Section III. International Agreements to Promote Bycatch Reduction

International frameworks for protecting specific species such as birds, whales or endangered animals are summarized in the Biennial Report to Congress (see text accompanying note 13), in the NOAA Technical Memorandum Worldwide Bycatch of Cetaceans, in the background appendices accompanying the Draft Environmental Assessment, and in Ocean and Coastal Law and Policy (Baur et al 2008). The most current list of relevant agreements concerning PLMRs of interest to the United States can be found on the NOAA website at http://www.nmfs.noaa.gov/ia/. The statement of work called for discussion of international and bi-lateral agreements.

3.1 Global Agreements

The Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention) seeks to conserve terrestrial, marine and avian migratory species throughout their range. It is an intergovernmental agreement concluded under the aegis of the United Nations Environment Program, concerned with the conservation of wildlife and habitats on a global scale. CMS acts as a framework Convention. Arrangements concluded under it may vary from legally binding treaties (called Agreements) to less formal instruments, such as Memoranda of Understanding, and can be adapted to the requirements of particular regions.

The Convention was signed in Bonn on 23 June 1979, came into force on 1 November 1983. The U.S. is not a signatory, but has signed a memorandum of understanding for Indian Ocean turtles, a less formal mechanism for meeting the goals of the agreement.

The Convention on International Trade in Endangered Species (CITES) is a multilateral treaty regarding the export, import and transit of certain species of wild animals and plants—trade that poses a threat to their continued survival.[31] The goal of CITES is to prevent overexploitation of listed species whose survival is jeopardized.[32] The U.S. has urged the parties

[31] Convention on International Trade in Endangered Species of Wild Fauna and Flora, Done at Washington 3 March 1973. Entered into force 1 July 1975. 27 UST 1087, TIAS 8249 (hereinafter CITES).

[32] Id. at Article II.

and CITES secretariat to work cooperatively with the FAO in implementing action plans reducing incidental capture of seabirds and sharks.[33] CITES also has been a vehicle for a variety of shark bycatch measures (see discussion in shark Section 2.4, above).

CITES entered into force July 1, 1975, and contains Appendices that list species based on a set of criteria. Parties to CITES may not trade in species listed in the Appendices of the Convention, except as prescribed.[34] Appendix I lists species threatened with extinction, Appendix II lists species that may become threatened with extinction unless trade is subject to regulation, and Appendix III lists species that are protected by individual states parties. Commercial trade is generally prohibited for Appendix I species.[35] Commercial trade in Appendix II species requires an export permit verifying that trade will not be detrimental to the survival of the species.[36] "CITES allows the imposition of bans against the export of listed species to any signatory nation in order to diminish the economic incentives for continued taking" of the species.[37]

The Conference of the Parties (CoP) is the decision-making body of CITES, made up of all its member states. It has adopted a set of biological and trade criteria to help determine whether a species should be included in Appendices I or II. At each regular meeting of the CoP, Parties submit proposals based on those criteria to amend these two Appendices. Those amendment proposals are discussed and then submitted to a vote. Assessment of marine species has become a priority of the International Union for the Conservation of Nature (IUCN), which began a comprehensive regional assessment of marine species groups in 2006. The IUCN publishes the Red List of Threatened Species, which in 2008 included 2,544 marine species, up from 1,372 in the 2006 list.[38]

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[33] Doc. 11.14, CITES, 11th meeting of the Conference of the parties, April 2000.

[34] CITES, Article II.

[35] Id. at Article III, 2.

[36] Id. at Article IV, 2-6.

[37] Global Marine Biological Diversity: A strategy for Building Conservation into Diversity (Elliot A. Norse ed., 1993) at 209.

[38] IUCN Available at http://www.iucn.org/about/work/programmes/species/red_list/2008_red_list_summary_statistics/ Last visited 31 July 2009.

3.2 Regional Fishery Bodies' Approaches to Bycatch Reduction

Although regional fishery management organizations (RFMOs) have existed since the 1940s and earlier, their importance has increased significantly with the adoption of treaties such as the United Nations Fish Stocks Agreement, which calls for creation of such bodies. In its Oceans Atlas, FAO editors point out that "under existing international law, and within the current paradigm for the governance of high seas fisheries to regulate straddling, highly migratory and high seas fish stocks, [Regional Fishery Management Organizations] provide the only realistic mechanism for the enhanced international cooperation in their conservation and management."[39]

As of 2009, there were 44 regional fishery bodies including RFMOs, advisory bodies and scientific bodies. These organizations have, among other responsibilities, collecting and distributing fishery statistics, stock assessments, setting catch quotas, limiting vessels allowed in the fishery, regulating gear, allocation, research oversight, monitoring and enforcement.[40] Of these __ have adopted required measures to reduce bycatch of non-target species and PLMRs. Table 3 summarizes management measures in nine of these bodies.

Although the implementation of many of the regional agreements hinges upon the effectiveness of the relevant RFMO, the success of these organizations has been the exception rather than the rule. The RFMOs are only as strong as the members make them, and rely upon flag state enforcement of their provisions. Criticisms and shortcomings of these bodies include: inconsistent authority, failure by key fishing interests to join the RFMO or participate by its rules, illegal, unreported and unregulated fishing, lack of equity and disparate interests between developed states and developing states, conflicts of interest among parties, lack of funding and lack of political will.[41] These concerns apply to the success of bycatch measures as well as general fishery management. A number of innovations have been suggested to make RFMOs

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[39] Regional Fishery Organizations, Oceans Atlas USES: Fisheries and Aquaculture. http://www.oceansatlas.com/servlet/CDSServlet?status=ND0yOTQ, updated 25 Aug. 2003, last visited 31 July 2009.

[40] P.L. Devaney, Regional Fisheries Management Organizations: Bringing Order to Disorder, in, Papers on International Environmental Negotiation Vol. XIV, L.E. Susskind and W.R. Moomaw, eds. Harvard, 2005 at 4. See also, FAO, Regional Fishery Organizations available online at http://www.fao.org/fishery/rfb/search/en Last visited July 31 2009.

[41] Id. at 5-6. See also, Tim Eichenberg and Mitchell Shapson, "The Promise of Johannesburg: Fisheries and the World Summit on Sustainable Development, 34 Golden Gate University Law Review 587 at 624-626.

more effective including: audits, performance review, improvements through neutral bodies such as the FAO, a stronger role for port state enforcement, the use of technology such as vessel monitoring systems to track fishing, and modifying incentives for membership to ensure participation by all interested parties.[42]

This section describes regional agreements in the Eastern and Western Pacific, North and South Atlantic, South Pacific, Indian and Southern Ocean regions that have bycatch measures that could be used to reduce interactions with PLMRs. These regional agreements are representative of both the older, pre-Fish Stocks Agreement conventions, and the newer, more precautionary regimes that provide additional authority for coastal and port states to take action against distant water fleets fishing in their regions. Table 3 summarizes bycatch measures adopted by RFMOs that address bycatch of PLMRs.

3.2.1 Eastern Pacific

The Convention for the Establishment of an Inter-American Tropical Tuna Commission (IATTC)[43] defines its area of competence as the Eastern Pacific Ocean, but does not further define the area.[44] The IATTC focuses on skipjack tuna, yellowfin tuna, and fish used as bait, although it has studied bigeye tuna, black skipjack, bluefin tuna, albacore tuna and billfishes, as well as dolphins, turtles and sharks. Members are Costa Rica, Colombia, Ecuador, El Salvador, France, Guatemala, Japan, Mexico, Nicaragua, Panama, Peru, Republic of Korea, United States, Vanuatu and Venezuela. Belize, Canada, China, Cook Islands, the European Union, Honduras and Chinese Taipei are Cooperating Non Parties or Cooperating Fishing Entities.[45]

The IATTC is authorized to make recommendations to its members regarding measures that will maintain the fishes covered by the Convention at levels that will permit maximum

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[42] Id. at 7-12.

[43] The Convention for the Establishment of an Inter-American Tropical Tuna Commission. Done at Washington, 31 May 1949. Entered into force 3 March 1950. 1 UST 230, TIAS 2044. (hereinafter IATTC).

[44] The Eastern Pacific Ocean area is defined in the Convention for the Strengthening of the IATTC (Antigua Convention) Antigua, Guatemala, adopted by the IATTC in June 2003. The area of application of the Convention ("the Convention Area") comprises the area of the Pacific Ocean bounded by the coastline of North, Central, and South America and by the following lines: i. the 50°N parallel from the coast of North America to its intersection with the 150°W meridian; ii. the 150°W meridian to its intersection with the 50°S parallel; and iii. the 50°S parallel to its intersection with the coast of South America.

[45] IATTC website at http://www.iattc.org/HomeENG.htm. Accessed July 31 2009.

sustained catch. The Convention also calls for the Commission to collect, analyze, and disseminate information regarding the catches and operations of vessels in the fishery. Unlike other tuna management regimes, the IATTC maintains an independent scientific staff that collects catch and other information and prepares recommendations for the member governments. IATTC has also carried out a program to estimate bycatch of non-target fishes and dolphins in the fishery.

At a September 1990 meeting in Costa Rica, representatives of Chile, Colombia, Costa Rica, Ecuador, El Salvador, France, Honduras, Japan, Mexico, Nicaragua, Panama, Spain, the United States, Vanuatu, and Venezuela agreed that the IATTC was the appropriate body to coordinate technical aspects of the program to reduce the incidental capture and mortality of dolphins in their EEZs and the adjacent high seas during purse seine operations. At a 1995 meeting, the member countries of the IATTC adopted a Declaration on Strengthening the Objectives and Operation of the IATTC, which called for implementing the Fish Stocks Agreement.

This body has been a leader in reducing interactions between fishing operations and dolphins, turtles and more recently, sharks. Their work to reduce such interactions began in the 1990s and has continued to the present. Additional agreements concluded under the auspices of IATTC, such as the AIDCP, are summarized in Table 3, described in detail in Worldwide Bycatch of Cetaceans, in the Biennial Report to Congress and in the Appendices to the EA. Specific bycatch resolutions and measures are described in Table 3 and Table 9.

Another agreement in the Pacific, the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean,[46] was one of the first treaties developed after the Fish Stocks Agreement. It was the culmination of complex negotiations among 25 nations including small island nations and developed countries with active distant water fleets. As of November 2007, Australia, Canada, China, Cook Islands, European Community, Federated States of Micronesia, Fiji, France, Japan, Kiribati, Korea (Rep. of), Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Philippines,

[46] Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. Done at Honolulu, 5 September 2000. Available at http://www.wcpfc.int/. Last accessed July 31, 2009.

Samoa, Solomon Islands, Chinese Taipei, Tonga, Tuvalu, USA, and Vanuatu had acceded to the convention.[47] There are also seven participating territories and one cooperating non-member.

Broadly speaking, the area of competence of the Commission is the Western and Central Pacific Ocean. Article 3 of the Convention provides a detailed delimitation. [Map]

The management focus is highly migratory fish stocks, defined as all fish stocks of the species listed in Annex 1 of the LOS Convention occurring in the Convention Area, and such other species of fish as the Commission may determine. The main objective of the convention is to ensure, through effective management, the long-term conservation and sustainable use of highly migratory fish stocks in the western and central Pacific Ocean in accordance with the LOS Convention and the UN Fish Stocks Agreement.[48]

This convention, the second regional fisheries management to be negotiated after conclusion of the 1995 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of December 10, 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, did not begin operations until late 2005.[49] Its major resource concerns are target bigeye, yellowfin, South Pacific albacore, and North Pacific albacore with bycatch issues involving sea turtles, sea birds and immature tuna and non-target species.

The Convention specifically outlines a precautionary approach that shall be used in management and details application methods.[50] It provides for the Western and Central Pacific Fisheries Commission (WCPFC) to carry out the business of the convention and specifically to adopt necessary conservation and management measures.[51] Other organizational elements

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[47] Western and Central Pacific Fisheries Commission website, http://www.wcpfc.int/ last visited July 31, 2009.

[48] Internet Guide to International Fisheries Law, http://www.intfish.net/orgs/fisheries/wcpfc.htm

[49] Secretariat of the Western and Central Pacific Fisheries Commission, Contribution to the Review Conference on the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of December 10, 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (New York, 22-26 May 2006, available at http://www.un.org/Depts/los/convention_agreements/reviewconf/wcpfc_reviewconference.pdf last visited July 29, 2009.

[50] Convention on the Conservation and Management of the Highly Migratory Fish Stocks of the Western and Central Pacific Ocean, Art. 5(c), 6, available at http://www.wcpfc.int/index.html last visited July 31, 2009.

[51] Id., Art 10.

include an administrative Secretariat,[52] a Scientific Committee,[53] a Technical and Compliance Committee to advise as to implementation of and compliance with conservation and compliance measures,[54] and a Northern Committee, which makes recommendations on stocks north of 20 degrees north parallel.[55]

The Convention has no specific bycatch language, but has adopted management measures and resolutions related to high seas driftnets, and bycatch of sharks, sea birds and turtles. These measures are described in detail in Table 3 and summarized in Table 9. The Convention's compliance and enforcement article addresses actions that may be taken in regard to illegal fishing or activities that diminish the effectiveness of the established conservation regimes.[56] Other articles give boarding and inspection rights[57] and provide very basic port state remedies to prevent landings and transfers if catch is identified as caught in contravention to conservation measures[58] and encourage cooperation with a list of other fisheries-related bodies.[59]

3.2.2. North Atlantic Ocean

The Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries established the Northwest Atlantic Fisheries Organization (NAFO).[60] Although the Convention applies to the whole of the northwest Atlantic, the regulatory powers of NAFO include only the high seas beyond the EEZs of its members.[61] This regulatory area is divided into six sub-areas.

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[52] Id. Art 15.

[53] Id. Art. 12, 13.

[54] Id. Art. 14.

[55] Id., Art. 11, para. 7.

[56] Id. Art. 25.Par. 6, 10.

[57] Id. Art 26.

[58] Id. Art 27, Par. 3.

[59] Id. Art. 22.

[60] The Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries. Done at Ottawa 24 October 1978. Senate Executive Treaty Series 96th Cong. 1st Sess. (Entered into force 1 January 1979).

[61] Id. at Article I.

NAFO's members are Bulgaria, Canada, Cuba, Denmark, Europe Union (EU), France (in respect of St. Pierre et Miquelon) Iceland, Japan, Korea, Norway, Russia, and the United States.[62]

A general council oversees the organization and coordinates the legal, financial, and administrative affairs of NAFO.[63] A scientific council serves as a forum for analysis and consultation among scientists from the member states.[64] The Fisheries Commission decides on management and conservation measures, with the purpose of ensuring consistency in the EEZs of member states.[65]

NAFO has jurisdiction over all fishes in the Regulatory Area with the exception of salmon, tunas, marlin, and the sedentary species of the continental shelf.[66] NAFO currently provides for the conservation and management of stocks of American plaice, yellowtail flounder, cod, witch flounder, redfish, Greenland halibut, capelin, and squid.

NAFO has general bycatch requirements[67] and specific measures for sharks, which are described in Table 3 and Table 9. The organization has developed comprehensive monitoring, reporting and surveillance measures that require observers, vessel monitoring systems, and effort reporting.[68]

Management regimes for the conservation of highly migratory species, such as salmon and tuna, which cross national boundaries, require international cooperation. In the Atlantic Ocean, the organization with responsibility for large ocean species is the International Convention for the Conservation of Atlantic Tunas (ICCAT).[69] ICCAT was established to

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[62] Estonia, Latvia, Lithuania, Poland, Portugal, Spain and Germany were contracting parties, but acceded to the European Union. Romania withdrew from the convention. NAFO website at http://www.nafo.int/about/frames/about.html. Last accessed July 31 2009.

[63] Supra note 60 at Article II (a).

[64] Id. at Article II (b), VI.

[65] Id. at Article XI.

[66] Id. at Article I (4).

[67] Id. Article 12.

[68] See Articles 24-27; summarized on NAFO Website at http://www.nafo.int/about/frames/about.html

[69] International Convention for the Conservation of Atlantic Tunas. Done at Rio de Janeiro, 14 May 1966. 20 UST 2887 (hereinafter ICCAT).

respond to concern about the dramatic decline of bluefin and other tunas.[70] Although it entered into force in 1969, the first measures to restrict catch were not adopted until the 1975 fishing season. Its efficacy as a conservation and management agreement has been controversial since its inception.[71]

ICCAT established the International Commission for the Conservation of Atlantic Tunas (Commission) which has responsibility for nearly all species of tuna, swordfish and billfishes in the convention area, as well as fishes exploited in tuna fishing if these are not under investigation by another international organization.[72] The principal goal of ICCAT is to maintain populations at levels that will permit maximum sustainable catch for food and other purposes.[73] The Commission may, on the basis of scientific evidence, make regulatory recommendations.[74] Commissioners set management policy.[75] They meet annually to review findings by the Standing Committee on Research and Science (SCRS). Unlike the Secretariat of the IATTC, which has its own scientific staff, the ICCAT Secretariat depends on member-country scientists, and the Commissioners have no independent source of scientific advice.[76] Scientists from several countries comprise the scientific committee that compiles catch statistics and models population trends. With the decline in some large pelagic populations in the Atlantic Ocean, discussion and decisions among Commissioners and within the scientific committee have become highly politicized.[77]

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[70] Ellen Peel and Michael L. Weber. 1995. No Place to Hide: Highly Migratory Fish in the Atlantic Ocean, Fishery Management and Status. Center for Marine Conservation. Washington, D.C. 125 pp.

[71] William Burke, The New International Law of Fisheries, 2-6 Clarendon Press (Oxford 1994), at 250.

[72] ICCAT, supra note 41 at Article IV(1).

[73] Id at Article IV (2)(b).

[74] ICCAT, supra note 41 at Article VII.

[75] ICCAT, supra note 41 at Article VIII.

[76] Michael L. Weber, and Frances Spivy-Weber. “Proposed Elements for International Regimes to Conserve Living Marine Resources. Report in fulfillment of Marine Mammal Commission Contract No. T30916119. NTIS, Springfield, VA, October, 1995. For more information on IATTC, see infra at notes 140-142 and accompanying text.

[77] Carl Safina. 1997. North Atlantic Fishery Resources at Risk. Prepared for the Pew Charitable Trusts. Unpublished manuscript. December 1997. 54 pages. See also, Carl Safina, Song for the Blue Ocean, Henry Holt and Co. (1997) at 92-99, which describes the difficulties of getting ICCAT members, especially Japan and Canada, to reduce quotas for bluefin tuna in 1992 despite 15 years of consecutive declining stocks and a 90% drop in population.

Although the Commissioners adopt management measures such as size limits and quotas, ICCAT has no authority to implement or enforce its recommendations, and relies on member nations to implement them. In its earlier years, ICCAT could not take action against non-members.[78] Since the late 1990s, ICCAT has had quota compliance rules on the books that allow for the imposition of penalties, including trade sanctions, against members for quota overharvests in the swordfish and bluefin tuna fisheries.[79] Sanctions have been applied to a member under the quota compliance rules once. In 2003, ICCAT adopted a comprehensive trade measures resolution that covers both members and non-members.[80]

Although ICCAT is one of the only RFMOs not to adopt the FAO guidelines on sea turtles, individual member nations have been responsive to proposals for measures to protect turtles, seabirds, and sharks from bycatch. The body has adopted general resolutions on bycatch and shark bycatch as well as specific measures for porbeagle, big-eye thresher, short fin mako, and blue sharks; research on and encouragement of use of circle hooks, report turtle bycatch, and use of deterrent devices to avoid bycatch of seabirds. These recommendations and resolutions are summarized in Table 3.

Recommendations of the General Fisheries Commission for the Mediterranean that its members implement the ICCAT measures for sharks are also summarized in Table 3.

3.2.3 South Atlantic Ocean

Until the late 1990s, there were no regional management regimes for fisheries in the Southeast Atlantic. Angola, Namibia, and South Africa had formed the Southern Africa Development Community (SADC), which includes a Marine Fisheries Policy and Strategy. These three coastal states of the southeast Atlantic negotiated access agreements with distant water fleets. In the late 1990s, Namibia, South Africa, and the United Kingdom began talks on the formation of a new fisheries organization, called the Southeast Atlantic Fisheries Organization, for the conservation and management of deepwater straddling stocks. Eventually

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[78] Id.

[79] Resolution 94-9 by ICCAT on Compliance with the ICCAT Conservation and Management Measures (including Addendum). (Transmitted to Contracting Parties: January 23, 1995).

[80] Resolution 03-15 by ICCAT Concerning Trade Measures. (Transmitted to Contracting Parties: December 19, 2003).

Angola, the European Community, Iceland, Namibia, Norway, Republic of Korea, South Africa, United Kingdom (on behalf of St. Helena and its dependencies of Tristan da Cunha and Ascension Islands) and the United States signed the Convention on the Conservation and Management of Fishery Resources in the Southeast Atlantic Ocean (Southeast Atlantic Convention).[81] States that have participated in the negotiations but have not signed the Convention are Japan, Russian Federation and Ukraine.

The Southeast Atlantic Convention is one of the first regional fisheries agreements negotiated since the adoption of the UN Fish Stocks Agreement, and closely follows that model.[82] It seeks to ensure the conservation and sustainable management of the fishery resources of the Southeast Atlantic, and establishes the South-East Atlantic Fisheries Commission (Commission) as the RFMO to implement the Convention.[83]

The Southeast Atlantic Convention sets long-term conservation and sustainable use as a goal. Articles 2, 3, and 7 set out principals such as the precautionary approach, ecosystem management, protection of biological diversity, and protection of the marine ecosystem. Recognition of the special position of developing states is taken in Articles 12 and 21. Species covered in Article 1 are all but sedentary species within the coastal states' jurisdiction. The geographic coverage of the convention is roughly FAO Statistical Area 47.

The Commission defines fishing broadly, taking in such activities as support operations, mother ships, transshipment and similar activities.[84] The responsibilities of the Commission include setting quotas, allocating fishing rights, determining participants in the fishery and other management duties. The Convention also creates a Scientific Committee and a Compliance Committee.[85] Flag states are responsible for authorizing their vessels to fish in the Convention

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81 Convention on the Conservation and Management of Fishery Resources in the Southeast Atlantic Ocean. Done at Windhoek. 20 2001 April. Entered into force April 2003 (hereinafter the Southeast Atlantic Convention). Available at http://www.seafo.org

82 Hedley, C. The South-East Atlantic Fisheries Organization (SEAFO) Convention: an initial review. OceanLaw On-Line Paper No. 2, April 2001. Internet guide to International Fisheries Law. Available at http://www.intfish.net/ops/papers/2.htm. Last accessed 4 May 2007. [Attempt to access July 2009: website down for maintenance]

83 Southeast Atlantic Convention, supra note 36 at Art. 5.

84 Id. at Art. 1(h).

85 Id at Article 10.

area, for keeping a record of such authorizations, for reporting catches and monitoring compliance. In addition, port states are authorized to develop control measures, conduct inspections and deploy observers.

The parties have adopted conservation measures to reduce bycatch of sharks and seabirds and passed a resolution to reduce incidental catch of sea turtles. These measures are described in detail in Table 3.

3.2.4 Indian Ocean

The Convention for the Conservation of Southern Bluefin Tuna (CCSBT)[86] arose from annual trilateral meetings among Australia, Japan and New Zealand. The three countries had operated under a voluntary management agreement, but negotiated the formal convention in response to continued heavy fishing that had resulted in significant declines of mature fish throughout the 1980s.[87]

Concerned that activity of non-party nations in the fishery was reducing the effectiveness of members' conservation and management measures, the parties in 1996 asked Taiwan, South Korea and Indonesia to become parties. On 17 October 2001 the Republic of Korea joined the membership. The Fishing Entity of Taiwan's membership of the Extended Commission became effective on 30 August 2002.[88]

In 2003, the CCSBT allowed countries with an interest in the fishery to participate in its activities as formal cooperating non-members. These parties must comply with the management and conservation objectives and agreed catch limits of the Convention and may participate in discussions, but cannot vote. The Philippines was accepted as a formal cooperating non-member in 2004, and parties continue discussions with Indonesia and South Africa.[89]

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86 Convention for the Conservation of Southern Bluefin Tuna. Done at Canberra, May 1993. Entered into force 20 May 1994 (hereinafter CCSBT).

87 Commission for the Conservation of Southern Bluefin Tuna. Website available athttp://www.ccsbt.org/docs/management.html Last accessed July 31, 2009.

88 CCSBT, supra note 86.

89 Id.

The CCSBT goal is conservation and optimum utilization of bluefin tuna.[90] Though the scope of the Convention limits its attention to bluefin tuna, definitions include consideration of all "ecologically related species."[91] The CCSBT covers not just fishing activity, but support operations as well. State parties are required to enforce the provisions of the Convention, provide information including scientific and catch statistics and effort data, exchange scientific and fishing information, and report fishing by non-parties. Member countries are legally bound by decisions on total allowable catch and other conservation and management measures. Enforcement is by the parties on their flag vessels. Member countries also must act to deter non-parties from activities that undermine the objectives of the Convention. The measures adopted by the CCSBT are not limited to the high seas, but apply to the EEZs of all member countries.

CCSBT Commission duties include gathering and disseminating scientific information, statistical data, and legal information. It adopts regulations, sets catch limits, allocates catch, and operates a monitoring system.[92] All decisions are by unanimous vote.[93] The CCSBT created a Scientific Committee, and allows both non-party and NGO observers at meetings. The parties adopted a recommendation that members and cooperating non-members implement the IPOAs on Seabirds and Sharks and the FAO Guidelines on reducing sea turtle mortality. They also call for compliance with PLMR bycatch measures in place in the IOTC and WCPFC fishing areas when CCSBT members are fishing in those areas. Bycatch provisions for both CCBST and IOTC are summarized in Table 3.

3.2.5. Southern Ocean

The principal instrument for management of fisheries in the Southern Ocean is the 1980 Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR).94 By the time it came into force, CCAMLR had inherited significantly damaged fish stocks—12 of 13

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[90] Id. at Article III.

[91] Id. at Article II.

[92] Id. at Article VIII.

[93] Id. at Article VII.

[94] Convention on the Conservation of Antarctic Marine Living Resources, 20 May 1980. 33 UST 3476 (hereinafter CCAMLR). Current members are Argentina, Australia, Belgium, Brazil, Chile, the European Union, France, Germany, India, Italy, Japan, Namibia, Republic of Korea, Norway, New Zealand, Poland, Russian Federation, South Africa, Spain, Sweden, Ukraine, United Kingdom, United States, and Uruguay. Bulgaria, Canada, Cook Islands, Finland, Greece, Mauritius, Netherlands, Peru, and Vanuatu acceded to the Convention and are also parties.

assessed fish stocks were considered depleted.[95] The convention was established in response to concerns that an increase in krill catches in the Southern Ocean could have a serious effect on protected marine life such as birds, seals and whales.[96]

The purpose of CCAMLR is to ensure conservation of Antarctic marine living resources in the high seas within the Antarctic.[97] Unlike most other conventions on fisheries, CCAMLR requires rational use in accordance with the following ecosystem-based conservation principles:

- Prevention of decreases in the size of any harvested population to levels below those which ensure stable recruitment;
- Maintenance of ecological relationships among harvested, dependent, and related populations of Antarctic marine living resources and the restoration of depleted populations; and
- Prevention of changes or minimization of the risk of changes in the marine ecosystems that are not potentially reversible over two to three decades.[98]

The CCAMLR Commission coordinates research, gathers and analyzes catch and effort statistics, identifies and evaluates conservation measures, adopts conservation measures based on the best scientific evidence, and implements observer and inspection programs.[99] The Commission, not state parties, places observers on fishing vessels. Commission membership is open to the original participants in the negotiations, and countries who have acceded to the convention, upon approval of an application and indication of its willingness to abide by conservation measures that are in force under the Convention.[100]

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[95] Kwame Mfodwo, *Summaries and Evaluations of Selected Regional Fisheries Mangement Regimes* (February 1998) (unpublished manuscript prepared for the Pew Charitable Trusts, on file with MRAG).

[96] NOAA Tech Memorandum NMFS-OPR-36, at 70.

[97] CCAMLR, supra note 94 at Article I, II.

[98] Id. at Article II (3).

[99] Id. at Article X.

[100] Id. Website at http://www.ccamlr.org. Last visited zjuly 31, 2009.

The Commission may designate open and closed seasons, quotas, and regulate gear.[101] Decisions on matters of substance require a consensus. Observers from non-member countries and non-governmental organizations may attend most meetings with few restrictions, and may submit reports and views.

The Scientific Committee includes representatives from countries that are members of the Commission. The Committee regularly assesses the status and trends of Antarctic marine living resources, the effectiveness of conservation measures, and has established programs such as developing precautionary measures for krill exploitation, ecosystem monitoring, and acquiring catch and effort data.[102]

In design, CCAMLR is considered one of the most advanced of fisheries conservation regimes in the world.[103] It is consistent in many respects with the Fish Stocks Agreement. Besides a conservation-based management goal, CCAMLR also includes significant elements of the precautionary approach, including conservation controls over exploratory and new fisheries.[104] CCAMLR's observer and inspection programs are considered among the most developed in international fisheries management organizations. For example, members may board vessels of other members for the purposes of inspection; if a breach of CCAMLR rules is detected, the flag state must inform CCAMLR of the action it has taken against the offender.[105] CCAMLR also requires flag states to maintain an accessible registry of vessels, to insure that vessels are properly marked, and to report catch and other information in a timely fashion.[106]

CCAMLR has worked on the assessment and avoidance of incidental mortality of Antarctic marine mammals such as fur seals, including the use of seal excluder devices in trawls. The Convention parties also have adopted limitations on bycatch of sharks, skates and rays as well as other non-target fish. However, the priority has been the reduction of seabird bycatch in

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[101] Id. at Article IX(2).

[102] Id. at Articles XIV, XV.

[103] Mfodwo, supra note 95.

[104] CCAMLR, supra note 94 at Article IX.

[105] Id. at Article XXIV.

[106] Id. at Article XX.

longline fisheries, through establishment of the Ad hoc Working Group on Incidental Mortality Associated with Fishing.[107] As part of its continued efforts to minimize seabird mortality in longline fisheries, in 1996 CCAMLR published an educational book for fishers that promotes practical ways in which longline fishers can reduce incidental catches of seabirds in bottom longline operations.[108] The publication includes the CCAMLR conservation measures that establish seabird bycatch mitigation measures for longline fisheries.

Section IV: Gaps in information and possible methods to fill them

At the outset of the project one of the most fundamental assumptions was that by locating where fishing actually takes place, it might be possible to overlay this data with species distribution data to produce an inference or at least identification of a risk for bycatch of PLMRs. Halpern et al. (2008) reported that pelagic bycatch fishing impacts affect 45.1 million square km of ocean; in addition, they noted that these impacts are unequally distributed throughout the ocean. McCluskey and Lewison discuss the importance of understanding effort in a variety of contexts, including estimating catch of non-target species, calculating a probability of catching non-target species, or identifying areas where gear overlaps with known distribution of PLMRs.***[109]***

However, with a few exceptions in very localized settings,***[110]*** databases for fisheries do not include information on where fleets fish, gear and practices vary temporally and spatially, and fleets seldom report direct measures of effort.***[111]*** The largest database, that of the FAO, does report landings by statistical area, so some inferences can be drawn about where fleets are fishing. In addition, the Sea Around Us project has made an attempt to disaggregate landings into "high seas" and "EEZ" landings. The FAO, however, notes in its biennial State of World Fisheries and Aquaculture report (SOFIA) that "data on catches from the high seas cannot be

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[107] CCAMLR. Website at WG-IMAF. Accessed July 31, 2009.

[108]CCAMLR. Website at Fish the Sea, Not the Sky. Accessed July 31, 2009.

[109] S. McCluskey & R.L. Lewison (2008). Quantifying fishing effort: a synthesis of current methods and their applications. Fish and Fisheries 9: 188-200.

[110] See, e.g., Port Orford Ocean Resources Team community use mapping project; Atlas Project described in St. Martin and Hall-Arber, supra note 20.

[111] FAO, McCluskey, supra note 109.

obtained from data submitted to the FAO."[112] Some general observations can be made by understanding the range of species that can be classified as "epipelagic" or "deep water" and are not likely to be caught on the continental shelves within nations' 200-mile EEZs, but there is no information that is in the type of database that lends itself to GIS application.

To fill this gap, the FAO has begun an effort to move towards a better separation of catches taken inside and outside national EEZs by collaborating with the South East Atlantic Fisheries Organization to gather and report catch statistics according to revised statistical divisions that distinguish between catches taken within and outside the EEZs of the coastal states. SEAFO is the first RFMO to work with FAO in this manner, but the project is expected to be expanded to other areas.[113]

Another question that should be explored is whether co-location of PLMRs and fishing activity is sufficient in itself to allow drawing bycatch inferences. In recent discussions of marine spatial planning, experts such as Larry Crowder have pointed out that there is a temporal aspect that must be understood, as well.[114] That is, *when* are PLMRs in a given area, and is that the same time that fishing or transit or other vessel activity that might result in interaction is taking place? This not only would contribute to understanding the nature of interactions, it would aid in devising measures to avoid it. This concept has been integrated in some bycatch mitigation strategies already, for example, prohibition of "sundown sets" in the tuna purse seine fisheries or prohibition on retrieval of longline gear at night.

Species occurrence data is spotty. The FAO system contains species distribution data for sea turtles, many sharks, cape fur seal, Arctic hooded seal, harp seal, ringed seal, and seven sea turtles. Seabird distribution information is uneven. Much is available from BirdLife International, but there was insufficient time to follow up on initial inquiries to discover the breadth or availability of the information. Certainly data is held by researchers in the respective fields, but it is either at an incompatible scale or unavailable for general use.

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[112] State of World Fisheries and Aquaculture 2008. FAO Fisheries and Aquaculture Dept., UN FAO, Rome. 2009.

[113] Id. at 15.

[114] Pers comm., Nina Young, Marine Mammal Commission. June 24, 2009

Another gap is the lack of bycatch information for PLMRs. Even though many of the conventions have measures calling for bycatch avoidance and reporting, databases with sufficient information to generate GIS characterizations are available only from ICCAT, IATTC, NAFO and CCAMLR. Further, RFMOs such as CCAMLR report that IUU fishing makes bycatch information less reliable, because the amount of interaction or mortality in illegal and unreported operations is completely unknown.

This project attempted to employ a GIS methodology to initiate the identification of global bycatch based on geographic area, species groupings, fishing regions, and jurisdictional boundaries. A preliminary picture of global bycatch scenarios becomes clear by mapping the footprints of these human activities as well as species distributions. In addition, this methodology represents an initial examination of existing global data sets for not only oceanic species but also jurisdictional areas.

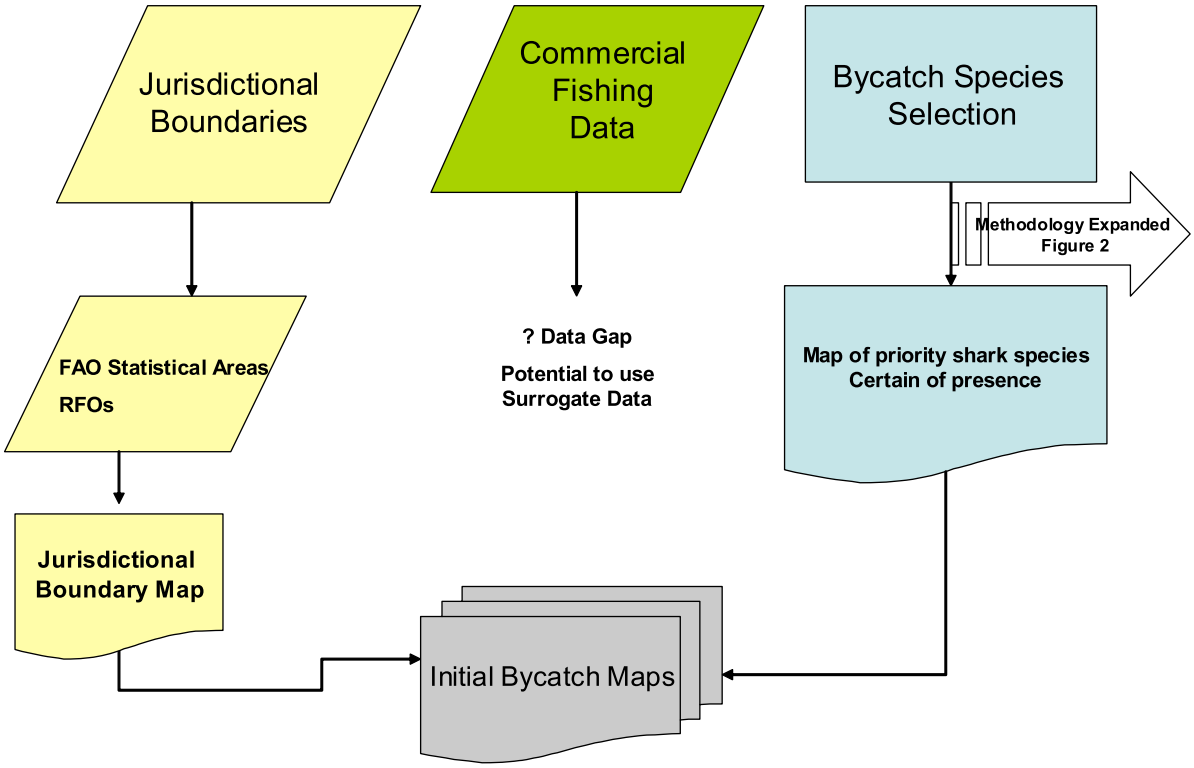
4.1 Methodology used to produce "proof of concept"

While many groups of species are susceptible to the gear types used by commercial fishing, this analysis focused on species in the broad taxonomic group "sharks." The methodology for the GIS component of this project consisted of three steps; first jurisdictional boundaries were examined and acquired, second, an attempt was made to locate geospatial fishing data, and finally bycatch species selection maps were derived from analyzing and combining species occurrence maps (Figure 2). The following geospatial datasets are used in this analysis: FAO statistical areas for fisheries purposes, regional fisheries bodies/organizations (RFB/Os), and species distribution data. In addition, tabular data was used to augment and prioritize shark mapping efforts.

According to the metadata associated with the FAO Major Fishing Areas for Statistical Purposes, these are "arbitrary areas, the boundaries of which were determined in consultation with international fishery agencies on various considerations, including (i) the boundary of natural regions and the natural divisions of oceans and seas; (ii) the boundaries of adjacent statistical fisheries bodies already established in inter-governmental conventions and treaties; (iii) existing national practices; (iv) national boundaries; (v) the longitude and latitude grid

system; (vi) the distribution of the aquatic fauna; and (vii) the distribution of the resources and the environmental conditions within an area." (http://www.fao.org/geonetwork/srv/en/main.home).

Figure 2: Methodology for identifying bycatch based on available datasets. Jurisdictional Boundary Map

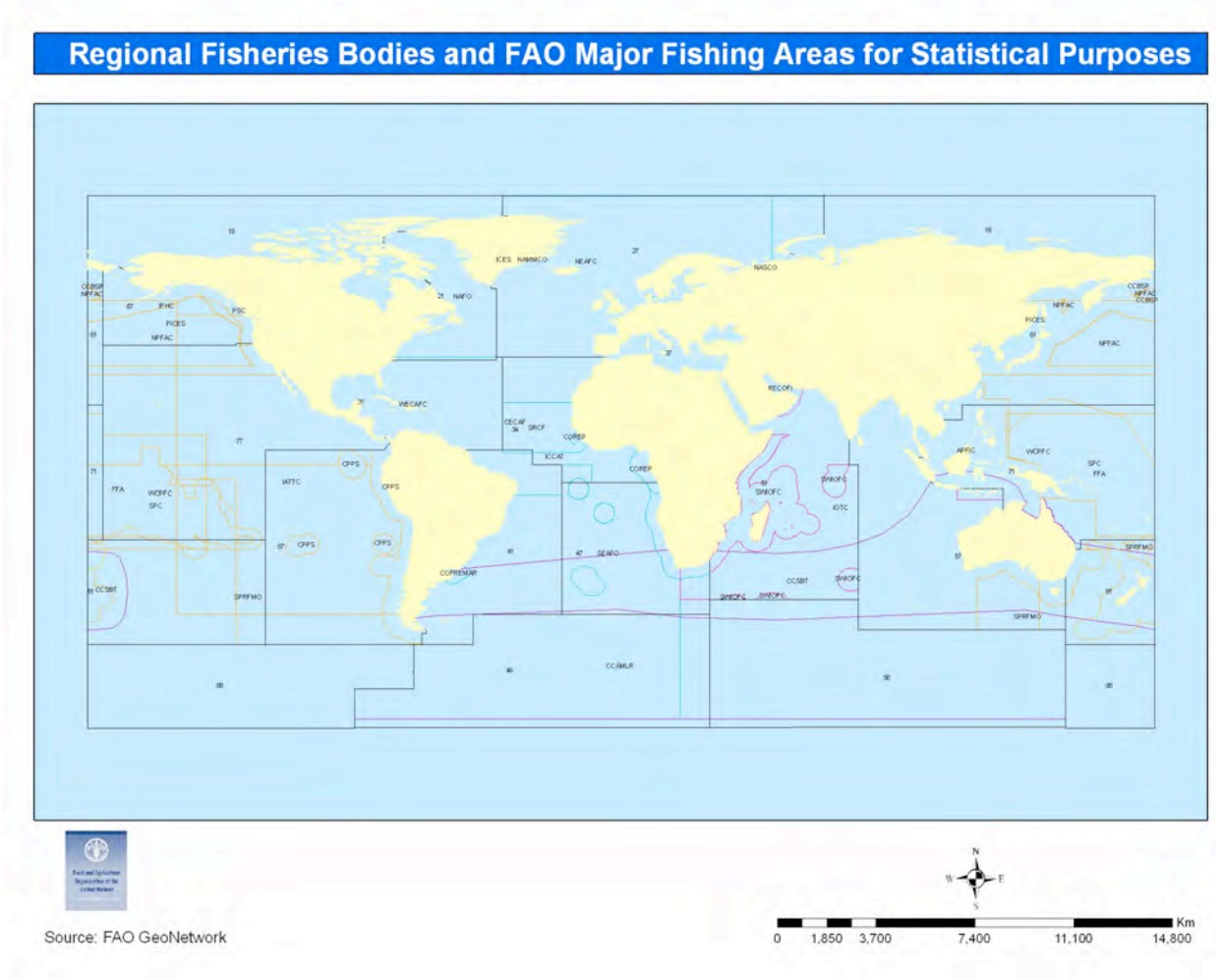


The Regional Fishing Bodies represent 40 established Fishery Bodies (FAO and non-FAO RFBs) that cover the world's marine and inland regions. This project focuses on the marine-based RFBs. Some RFBs are regulatory while others focus on management of fish stocks, these differences are not reflected in the geographic data.

Figure 3 depicts the oceanic RFBs as well as the major fishing areas designated by the FAO. The RFBs are grouped by region and ocean, for example, PSC, IPHC, NPFAC, IATTC, WCPFC, SPRFMO, SPC, FFA, PICES, NPFAC, and CCBSP are considered Pacific RFBs and share orange colored boundaries. Atlantic RFBs share blue boundaries; Indian Ocean RFBs share magenta boundaries, and trans-ocean RFBs share purple boundaries. FAO statistical areas are symbolized by black boundaries and are labeled using the area number. Overlaying both of these

datasets clarifies the complexities of maritime jurisdiction and management. Many of the RFBs overlap, or straddle major fishing areas, in addition, some RFBs are small "islands" embedded in larger RFBs. By illustrating the complexities on the map, it is clear that regulating bycatch will cross jurisdictional and management boundaries.

Figure 3: Regional Fisheries Bodies and FAO Statistical Areas



4.1.1 Commercial Fishing Data Gaps

McCluskey and Lewinson (2008) synthesized current methods to quantify fishing efforts. They note that quantification efforts based on spatial distribution best represent fishing effort on a global or large regional scale, however, these spatial distributions are seldom accessible to scientists and managers.

Spatial data can be difficult to obtain at any scale; however, the global scope of this project creates additional difficulties. FAO's GeoNetwork is essentially the sole clearing house

for global spatial data. Therefore the GIS analysis was restricted to a few relevant datasets available for public download on FAO's GeoNetwork. A major data gap related to this project is lack of commercial fishing data. While the FAO keeps records of commercial **fishery landings,** there are no available datasets that symbolize global commercial fishing areas. The addition of vessel monitoring systems on ships will be useful for capturing this data.

Often specific footprints delineating activities or impacts are not available, in these cases many GIS analysts use surrogate data to describe geographic phenomena.[115] Spatial surrogates are used to allocate geographically distributed data to geographic areas based on some form of activity or socio-economic data. For this project, the three fundamental components to the spatial surrogate process[116] are:

- The raw data to be spatially allocated, in this case, global commercial fisheries landings, and commercial fishing fleet fuel consumption;[117]
- The spatial surrogate itself, which typically takes the form of a digital map representing some form of activity or socio-economic data, in this case international ports known to host large fishing fleets, areas delineating the continental shelf (assuming best fishing at this area);
- A higher resolution geo-political map or model grid to which fishing data will be allocated, in this case, FAO statistical areas or RFO polygons.

4.1.2 Prioritizing Shark species for Data Acquisition and Mapping

The Magnuson-Stevens Fishery Conservation and Management Act identifies over 85 sharks as "protected living marine resources." For the initial mapping effort, twelve species of sharks were mapped. These species were chosen based several criteria (table 1); however, one of the main drivers for species selection was the availability of spatial data. It was important to capture shark species that are vulnerable to not only commercial fishing pressures, but are also listed by various international and national treaties and legislation. The following criteria were

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[115] See specifically, studies using spatial surrogates for air quality modeling, and using surrogate species groups for conservation planning.

[116] Adapted from Boulton et al. (2002)

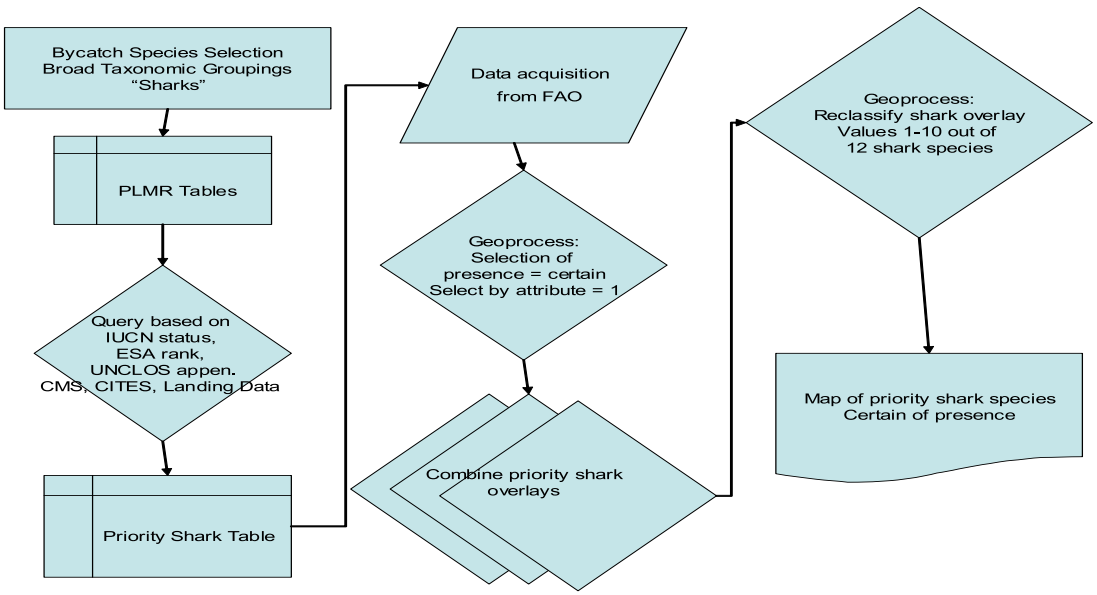
[117] See Tyedmers et al. (2005) Fueling Global Fishing Fleets. *Ambio*. 34:8.

used to produce a priority list of shark species: IUCN Red List status, U.S. ESA listing status, UNCLOS appendix listing, Convention on Migratory Species (CMS) Annex I listing, and FAO FishStat database catch statistics. Another consideration was the spatial representation of species, i.e. pelagic and deepwater species. Varying the spatial representation ensured that a variety of fishing methods were represented (i.e. longlines, gillnets, deepwater trawls, demersal longlines, etc.). Table 11 lists the priority species as well as the "protection" they fall under; grey bars represent the species for which shapefiles were acquired. Green bars represent species for which data exists but has not been acquired yet. White bars represent species for which data does not currently exist, but should be a priority for acquisition.

Figure 4 illustrates the methodology used to describe the priority shark species map. This methodology represents an iterative process. The first step focused on sharks as a subset of bycatch, next, using the PLMR tables, sharks were prioritized based on protection level, next species distribution maps were acquired from FAO's fisheries monitoring program. The data were then geoprocessed by selecting, in each data set, the attributes describing certainty of presence; the geoprocessed data was then overlayed to create a composite map. This map was reclassified to reflect the overall global shark species occurrence.

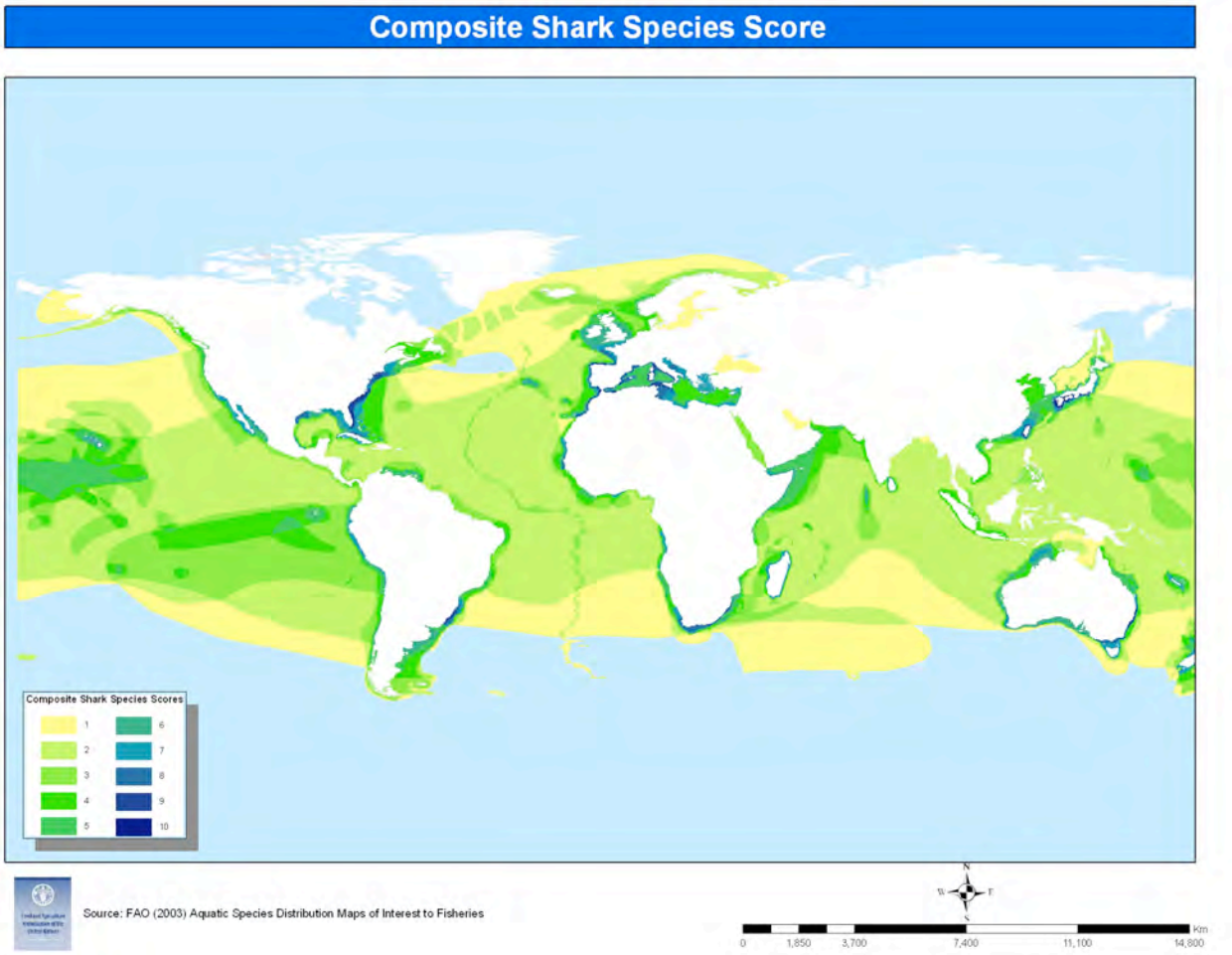
Figure 4: Methodology for the creation of priority shark species map

Figure 1, repeated here and in the Introduction, represents the results of the above methodology. Note that the highest value (number of sharks) is ten, not twelve. This represents



the goal of capturing different spatial aspects of the shark species maps (i.e. bottom dwelling, pelagic, coastal). Species were chosen that are associated with different habitats and therefore spatial locations. The highest numbers of sharks are found in tropical coastal areas, with species presence decreasing towards the poles. There are a few exceptions around South Africa, off the south eastern coast of South America, and off the southern coast of Australia.

Figure 1: Composite Shark Species Scores for World Oceans (based on 12 priority species)



4.1.3 Future Research/Analysis

An important next step for this project is to gain access to commercial fishing geospatial data. In addition, a pilot project that focuses on a smaller area of the global map should be considered. Spatial data is available at the regional level, and in this case, by ocean or regional fishing bodies. A smaller scale pilot project should be initiated in order to create a more robust GIS methodology, since these methods are contingent on the quality and quantity of geospatial

data available. A pilot project in the SEAFO region, since the FAO is beginning to acquire catch statistics for high seas fisheries separately, may be a likely candidate.

Another step for future analysis is the use of surrogate data to quantify global fishing effort. Without data to symbolize fishing effort, the methodology to illustrate global bycatch is incomplete. However, by using existing global datasets (i.e. FAO major fishing areas) and tabular catch data, it would be possible to infer fishing effort. To further resolve the depiction of fishing effort, gear type and fishery could be included in the analysis. Some sources of information that could contribute to a finder resolution would be observer reports and logs of VMS reporting. This information would have to be acquired in a manner that preserved confidentiality and was consistent with agreements and regulations under which observers are deployed and by which different RFMOs specify VMS programs. More time is needed to create a model for fishing effort.

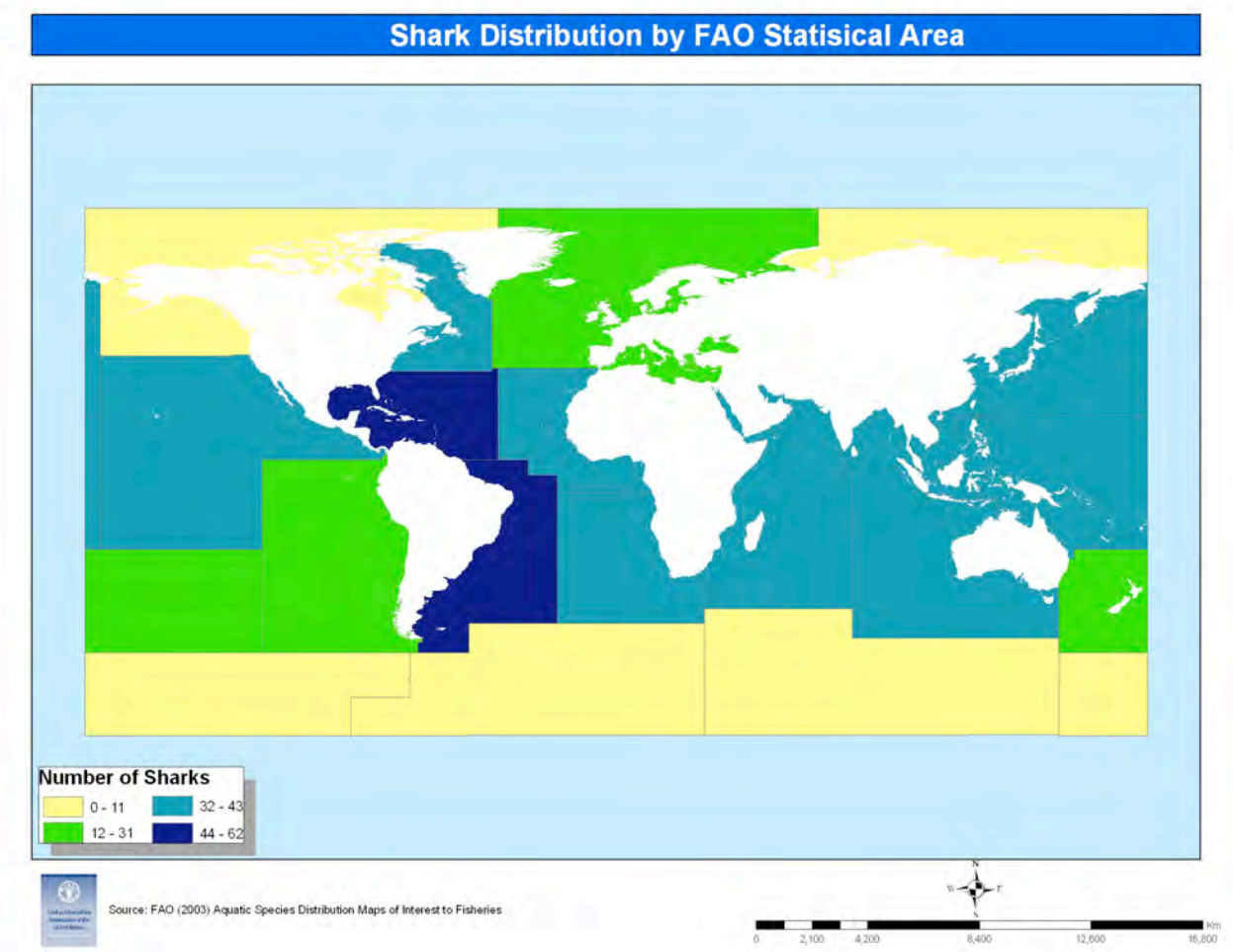
Finally, steps should be taken to acquire additional priority shark species distribution maps. Based on the analysis of the PLMR tables and additional research into protection status, both the blue shark (*Prionace glauca*) and hammerhead sharks (Sphyrna spp.) are highlighted as a priority species for data acquisition. Currently the FAO FIGIS website does not list these species as having distribution maps, and when FAO was directly asked for these shapefiles, they were not provided, leading to the conclusion that they do not currently exist. According to FAO catch data, both of these species/species groups are being targeted through fishing or caught as bycatch in large numbers. Species distribution maps of these sharks could be easily integrated into the current composite distribution map. Another species group that should be targeted for data acquisition is the sawfish/sawsharks species, which are critically endangered according to the IUCN and also are being targeted or incidentally caught during commercial fishing according to the FAO.

The preliminary GIS methodology used to create the composite map of shark species can easily be applied to additional taxonomic groups, such as turtles, birds, and marine mammals. However, the acquisition of species data remains an issue, as not all globally endangered and threatened species have associated distribution maps.

It is also possible to relate the tabular information in the species tables to spatial objects

such as FAO statistical areas, or RFOs. Figure 5 illustrates this association by placing shark observations onto FAO statistical area polygons. This map is adapted from Table # PLMR Sharks of interest by FAO Major Fishing Area for Statistical Purposes.

Figure 5: PLMR Shark Distribution Summarized to FAO Statistical Area



Tables

(Tables are provided as separate documents)

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APPENDIX K

ADVANCED NOTICE OF PROPOSED RULEMAKING IMPLEMENTATION OF FISH AND FISH PRODUCT IMPORT PROVISIONS OF THE MARINE MAMMAL PROTECTION ACT

Government property includes both Government-furnished property and Contractor-acquired property. Government property consists of material, equipment, special tooling, special test equipment, and real property.

(b) *Policy for Contractor Reporting of Government Property Lost, Stolen, Damaged, or Destroyed.*

(1) The Contractor shall use the Defense Contract Management Agency (DCMA) "e-Tools" software application for reporting of loss, theft, damage, or destruction of Government property. Reporting value shall be at acquisition cost. The "e-Tools" system can be accessed from the DCMA home page External Web Access Management application at *http://www.dcma.mil.*

(2) Unless otherwise provided for in this contract, the requirements of paragraph (b)(1) of this clause do not apply to normal and reasonable inventory adjustments, *i.e.,* losses of "low risk" consumable material such as common hardware, as agreed to by the Contractor and the Government Property Administrator. Such losses are typically a product of normal process variation. The Contractor shall ensure that its property management system provides adequate management control measures, *e.g.,* statistical process controls, as a means of managing such variation.

(3) Reporting requirements apply to losses outside such variation. For example, due to theft of; or when losses occur due to a failure to provide adequate storage or security, *e.g.,* failure to repair a leaky roof; or due to "acts of God," *e.g.,* tornado damages warehouse or stockroom.

(4) The aforementioned reporting requirements in no way change the liability provisions or reporting requirements under the clauses at FAR 52.245–1, Government Property, or FAR 52.245–2, Government Property Installation Operation Services.

(End of clause)

[FR Doc. 2010–9890 Filed 4–29–10; 8:45 am]

BILLING CODE 5001–08–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 216

Docket No. 0907301201–91203–01

RIN 0648–AY15

Implementation of Fish and Fish Product Import Provisions of the Marine Mammal Protection Act

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Advance notice of proposed rulemaking; request for comments.

SUMMARY: NMFS issues this advance notice of proposed rulemaking to announce that it is developing procedures to implement provisions of the Marine Mammal Protection Act for imports of fish and fish products. NMFS is seeking advance public comment on the development of these procedures and on the types of information to be considered in the process.

DATES: Written comments must be received by 5 p.m. on June 29, 2010.

ADDRESSES: You may submit comments by any of the following methods:

(1) Electronic Submissions: Submit all electronic public comments via the Federal eRulemaking Portal at *http://www.regulations.gov*.

(2) Mail: Director, Office of International Affairs, Attn: MMPA Fish Import Provisions, NMFS, F/IA, 1315 East-West Highway, Silver Spring, MD 20910

(3) Fax: (301) 713–2313

All comments received are a part of the public record and will generally be posted to *http://www.regulations.gov* without change. All Personal Identifying Information (e.g., name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit Confidential Business Information or otherwise sensitive or protected information.

NMFS will accept anonymous comments (enter N/A in the required fields, if you wish to remain anonymous). Attachments to electronic comments will be accepted in Microsoft Word, Excel, WordPerfect, or Adobe portable document file (pdf) formats only.

FOR FURTHER INFORMATION CONTACT: Michael Simpkins at *Michael.Simpkins@noaa.gov* or 301–713–9090.

SUPPLEMENTARY INFORMATION:

Background

The Marine Mammal Protection Act (MMPA), 16 U.S.C. 1361–1423h, contains provisions addressing bycatch, or the incidental mortality and serious injury, of marine mammals in both domestic and foreign fisheries. With respect to foreign fisheries, section 101(a)(2) of the MMPA (16 U.S.C. 1371(a)(2)) states that "[t]he Secretary of the Treasury shall ban the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of United States standards. For purposes of applying the preceding sentence, the Secretary [of Commerce]- (A) shall insist on reasonable proof from the government of any nation from which fish or fish products will be exported to the United States of the effects on ocean mammals of the commercial fishing technology in use for such fish or fish products exported from such nation to the United States."

This rulemaking would define the "United States standards" referred to in MMPA section 101(a)(2), along with any associated criteria by which the United States would assess foreign fisheries that supply fish and fish product imports to the United States (hereafter "import-supplying fisheries") with respect to marine mammal bycatch. The rule also would describe procedures for ensuring the established standards and their associated criteria are met, as well as procedures for developing recommendations regarding import prohibitions if those standards and associated criteria are not met. In defining the standards and associated criteria by which marine mammal bycatch in import-supplying fisheries would be evaluated, this rulemaking would consider U.S. statutory provisions and regulations applied to the management of incidental mortality and serious injury of marine mammals, including provisions of the MMPA, the Endangered Species Act (ESA), and the High Seas Driftnet Fishing Moratorium Protection Act (HSDFMPA).

This rulemaking also would recognize existing bilateral or multilateral arrangements to address marine mammal bycatch in foreign fisheries as well as the potential for such arrangements in the future. In the case of eastern tropical Pacific yellowfin tuna purse seine fisheries, marine mammal bycatch is covered by section 101(a)(2)(B) and Title III of the MMPA (16 U.S.C. 1371(a)(2)(B) & 1411–1417, respectively), which incorporate requirements adopted under the auspices of the Agreement on the International Dolphin Conservation Program (AIDCP).

U.S. Incidental Marine Mammal Mortality and Serious Injury Statutory Provisions

Section 2 of the MMPA describes several broad goals, including (1) maintaining the health and stability of the marine ecosystem; (2) retaining marine mammals as a significant functioning element in the ecosystem of which they are a part; and (3) ensuring that marine mammals can remain at or recover to their optimum sustainable population. The term "optimum sustainable population" is defined in section 3(9) (16 U.S.C. 1362(9), 50 CFR 216.3) of the MMPA as "the number of animals which will result in the maximum productivity of the

population or the species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element."

Sections 117 and 118 (16 U.S.C. 1386 and 1387) of the MMPA describe the current U.S. program for regulating bycatch in domestic commercial fisheries. The program includes (1) evaluating marine mammal stock status; (2) evaluating bycatch in commercial fisheries; (3) developing bycatch reduction measures and regulations following consultation with stakeholder-based take reduction teams; and (4) implementing emergency regulations when necessary.

MMPA section 118(f)(2) defines both short- and long-term goals for take reduction plans created by take reduction teams. The short-term goal is to reduce and maintain marine mammal bycatch below the potential biological removal level for a given stock. MMPA section 3(20) defines "potential biological removal" (PBR) as "the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population." The long-term goal is to reduce bycatch "to insignificant levels approaching a zero mortality and serious injury rate," often referred to as the zero-mortality rate goal. MMPA section 118(f)(3) provides NMFS with discretion to prioritize and develop take reduction plans based on available funding. MMPA section 118(f)(2) provides additional discretion with respect to the long-term goal by requiring NMFS to take into account "the economics of the fishery, the availability of existing technology, and existing State or regional fishery management plans."

Section 118(g) of the MMPA empowers NMFS to prescribe emergency regulations to reduce marine mammal bycatch in a fishery if the Secretary of Commerce finds that such bycatch is having, or is likely to have, an immediate and significant adverse impact on a stock or species.

The ESA contains provisions that apply more broadly to any direct or incidental serious injury or mortality of species listed as endangered or threatened under the ESA. Specifically, section 7 of the ESA (16 U.S.C. 1536) requires Federal agencies to ensure that any action authorized, funded, or carried out by such agencies is not likely to jeopardize the continued existence of any species listed as endangered or threatened under the ESA, or any species proposed for such listing. If an action is determined to likely result in jeopardy to a species that has been listed or proposed to be listed under the ESA, the responsible Secretary (of Interior or Commerce) is required to develop reasonable and prudent alternatives, as necessary or appropriate, to mitigate such impact. If there is no reasonable and prudent alternative available, then section 7 of the ESA also provides that the Endangered Species Committee may decide whether to grant an exemption from the jeopardy prohibition.

Under section 610 of the HSDFMPA (16 U.S.C. 1826k), the Secretary of Commerce is required to identify nations whose fishing vessels engage in fishing activities or practices that result in bycatch of protected living marine resources (PLMRs), including marine mammals. In determining whether a nation's vessels have engaged in bycatch of a PLMR, the Secretary must determine whether the fishing activities in question result in bycatch of PLMRs in waters beyond any national jurisdiction or whether the bycatch involves stocks that are shared by the United States and occur beyond the exclusive economic zone of the United States. Such nations are identified if (1) the fishing activity in question occurred during the preceding calendar year; (2) the relevant international organizations for managing the fisheries or protecting the bycaught species have failed to implement effective measures to end or reduce such bycatch, or the nation is not a party or cooperating member of such organization; and (3) the nation has not adopted a regulatory program to reduce bycatch that is comparable to that of the United States, taking into account different conditions.

After a nation has been identified, the HSDFMPA requires that the Secretary, acting through the Secretary of State, notify and consult with the identified nation for the purpose of entering into treaties to protect the PLMRs in question. The HSDFMPA also authorizes the Secretary of Commerce to provide appropriate assistance to identified nations to assist those nations in qualifying for positive HSDFMPA certification, described below. Such assistance may include cooperative research, technology transfer, and assistance in designing and implementing fish harvesting plans.

Following consultation, an identified nation is certified positively only if it provides documentary evidence that the nation has adopted a regulatory program to conserve PLMRs that is comparable to that of the United States, taking into account different conditions, and also has established a management plan that will assist in gathering species-specific data to support international stock assessments and conservation efforts for PLMRs.

Failure by a nation to receive a positive certification under the HSDFMPA may result in denial of port privileges and prohibition of imports of some fish or fish products.

Possible Standards for Evaluating Marine Mammal Bycatch Associated with Fish and Fish Product Imports

NMFS is considering whether the statutory provisions described above rise to the level of "United States standards," and, if so, NMFS is considering several possible standards that could be used when evaluating marine mammal bycatch in import-supplying fisheries for the purposes of implementing MMPA section 101(a)(2). NMFS also is considering whether to use only one of these standards or a combination of two or more standards when evaluating marine mammal bycatch in import-supplying fisheries. The options under consideration as possible standards are described below.

Several possible standards that NMFS is considering are derived from the short- and long-term goals of take reduction plans developed under section 118(f)(2) of the MMPA. Specifically, NMFS is considering evaluating whether marine mammal bycatch in import-supplying fisheries is maintained at a level below PBR for impacted marine mammal stocks (option 1). Alternatively, NMFS is considering evaluating whether such bycatch has been reduced to insignificant levels approaching a zero mortality and serious injury rate to the extent feasible, taking into account different conditions (option 2). NMFS recognizes that these two goals have been met for many, but not all, U.S. domestic fisheries. Another alternative possible standard NMFS is considering is to evaluate whether marine mammal bycatch in import-supplying fisheries is maintained at levels below PBR or at levels comparable to those actually achieved in comparable U.S. fisheries, whichever is higher (option 3). With respect to all three of these possible standards, NMFS recognizes that section 118(f)(3) of the MMPA provides NMFS with discretion to prioritize and develop take reduction plans for domestic U.S. fisheries to achieve these goals subject to available funding.

NMFS also is considering possible standards derived from the population status goal described in MMPA section 2. Specifically, NMFS is considering evaluating whether marine mammal bycatch in import-supplying fisheries either causes the depletion of a marine

mammal stock below its optimum sustainable population or impedes the ability of a depleted stock to recover to its optimum sustainable population (option 4). Domestically, the United States manages marine mammal bycatch based on PBR levels to achieve the goal of allowing marine mammal stocks to reach or maintain their optimum sustainable populations. However, NMFS recognizes that foreign nations may have other approaches to achieving the same goal, and that some of these might be commensurate with the U.S. marine mammal bycatch management program.

NMFS also is considering possible standards derived from the trigger for emergency regulations in MMPA section 118(g). Specifically, NMFS is considering evaluating whether bycatch in import-supplying fisheries has, or is likely to have, an immediate and significant adverse impact on a marine mammal stock (option 5).

NMFS also is considering possible standards derived from the jeopardy criteria described in ESA section 7. Specifically, NMFS is considering evaluating whether bycatch in import-supplying fisheries is likely to jeopardize the continued existence of any endangered or threatened marine mammal species (option 6). For this option, NMFS is considering whether and how to apply such possible standards uniformly to bycatch of foreign or international marine mammal species that are endangered or threatened, but have not been evaluated or listed under the ESA. Alternatively, NMFS is considering evaluating more broadly whether bycatch by import-supplying fisheries is likely to jeopardize the continued existence of a marine mammal species (option 7).

NMFS also is considering possible standards derived from HSDFMPA section 610. Specifically, NMFS is considering evaluating whether marine mammal bycatch in a foreign nation's import-supplying fisheries is managed effectively by a relevant international fisheries management or conservation organization, or by the fishing nation itself (option 8). For this possible standard, NMFS would evaluate whether effective measures have been implemented by a relevant international fisheries management or conservation organization to which the nation is a party or cooperating member. If the relevant organization has not implemented effective measures, or the fishing nation is not a party or cooperating member of the organization, then NMFS would also evaluate whether the nation has adopted a regulatory program to reduce marine mammal bycatch that is comparable to that of the United States, taking into account different conditions.

Finally, NMFS is considering possible standards derived from regulations implemented to manage marine mammal bycatch in U.S. domestic fisheries. Specifically, NMFS is considering evaluating whether foreign nations that supply fish and fish product imports to the United States have implemented regulations to address marine mammal bycatch in the nations' import-supplying fisheries that are comparable to regulations implemented by the United States, taking into account different conditions (option 9). These U.S. domestic regulations are developed and applied on a regional and fishery-by-fishery basis, recognizing that different regional and fishery conditions bear on the effectiveness of the measures.

To the extent that the options described above are determined to rise to the level of "United States standards," NMFS anticipates selecting one or more of the possible standards described above to apply when evaluating marine mammal bycatch in a foreign nation's import-supplying fisheries and, in turn, to define those standards as "United States standards" for the purposes of section 101(a)(2)(A). NMFS intends to select clear standards and associated criteria that could be applied uniformly to all foreign fisheries that supply fish and fish product imports to the United States. NMFS also intends to select only standards and associated criteria that have been met by U.S. domestic fisheries.

NMFS requests comments on the standards to be used when evaluating foreign import-supplying fisheries, including any suggestions of other standards or associated criteria NMFS should consider or modifications of the standards suggested above; and whether to apply one or more standards.

Potential Procedures for Ensuring that U.S. Marine Mammal Bycatch Standards Are Met for Foreign Imports

NMFS is considering developing a process for evaluating bycatch in foreign import-supplying fisheries that would be consistent with both the U.S. process for managing domestic marine mammal bycatch, outlined in MMPA sections 117 and 118, and the process for assessing and certifying nations for bycatch of protected living marine resources, outlined in HSDFMPA section 610. In particular, NMFS is considering a process that would include (1) requesting that nations whose fisheries supply imports to the United States provide reasonable proof of the impact of those fisheries on marine mammals; (2) initiating consultation with nations who fail to provide such reasonable proof or whose import-supplying fisheries are known or likely to not meet U.S. marine mammal bycatch standards; (3) allowing some time for nations undergoing consultation to meet U.S. marine mammal bycatch standards by providing acceptable "reasonable proof" of the impacts of their import-supplying fisheries on marine mammals, by improving their assessment capabilities in order to provide such proof, or by implementing effective bycatch mitigation measures; and (4) recommending that the import of certain fish and fish products from a nation or fishery into the United States be prohibited if that nation or fishery fails to meet U.S. marine mammal bycatch standards after consultation.

With regard to (1) above, NMFS is considering defining "reasonable proof" as information that indicates that a nation's import-supplying fisheries meet U.S. marine mammal bycatch standards.

With respect to (2) above, NMFS is considering initiating consultation with nations to encourage each nation to take the necessary corrective action to meet the U.S. marine mammal bycatch standards. Such consultation would likely consider the efficacy of marine mammal bycatch measures adopted under multilateral agreements to which the nation is a party, as well as the nation's implementation of those measures. Such consultation also would likely identify different conditions that NMFS may consider when making decisions regarding foreign fisheries imports, including existing scientific capacity within the nation, differences in fishing practices, logistical and technical challenges to assessing status or bycatch of specific marine mammal stocks, and logistical and technical challenges to mitigating bycatch for some stocks or fisheries. As necessary, appropriate, and feasible, NMFS may provide capacity building, training, or technology transfer to address issues identified during consultation. Such consultation and capacity building would be consistent with the approach described in HSDFMPA section 610 for identifying and certifying nations for bycatch of protected living marine resources. Further, U.S. domestic consultations with take reduction teams also consider similar conditions, such as the quality of data available, logistical or technological challenges, and the feasibility of mitigation measures. NMFS also provides scientific support during domestic take reduction team consultations.

The time allotted in (3) above recognizes the need for some nations to improve their capacity to conduct suitable assessments, implement effective mitigation measures, or address unique challenges. NMFS is considering whether to include time to address these issues within the consultation period or to allow some time after consultation to assess the effectiveness of newly implemented measures before making import determinations. Both MMPA section 118(f) and HSDFMPA section 610 allow time for consultation before action is taken.

Finally, (4) refers to the implementation of import prohibitions themselves. NMFS would coordinate with other Federal agencies to make decisions regarding possible import prohibitions. NMFS also is considering whether and what kind of alternative procedures to establish for implementing import prohibitions on a shipment-by-shipment, shipper-by-shipper, or other basis if such imports were harvested by practices that do not result in marine mammal bycatch or were harvested by practices that are comparable to those of the United States. The HSDFMPA allows for the development of such alternative procedures.

NMFS is considering if and how intermediary nations should be addressed by the procedures under consideration. Intermediary nations are those that serve as intermediaries in re-exporting fish or fish products to the United States from the nation whose fisheries originally harvested the fish. With respect to yellowfin tuna harvested in the eastern tropical Pacific purse seine fisheries, section 101(a)(2)(D) of the MMPA requires that any intermediary nation certify and provide reasonable proof that "it has not imported, within the preceding six months, any yellowfin tuna or yellowfin tuna products that are subject to a direct ban on importation to the United States." NMFS is considering using a similar approach to ensure that imports from intermediary nations meet U.S. marine mammal bycatch standards.

NMFS is requesting comments on the procedures under consideration for ensuring that foreign fisheries imports meet U.S. marine mammal bycatch standards, including whether to apply one or more of the possible standards when evaluating import-supplying fisheries to make decisions regarding initiating consultation or banning imports, which standards to apply, and whether to apply different standards for making the decision to initiate consultation than are used to make the decision to ban imports. Further, NMFS is requesting comments on what issues and conditions should be considered during consultation and whether and what kind of alternative procedures should be established for implementing import prohibitions on a shipment-by-shipment or shipper-by-shipper basis. Finally, NMFS is requesting comments regarding if and how intermediary nations should be addressed by the procedures under consideration.

Petition for Rulemaking

On March 5, 2008, the U.S. Department of Commerce and other relevant Departments were petitioned to initiate rulemaking to ban importation of swordfish and swordfish products from countries that have not satisfied the MMPA section 101(a)(2) requirement. The petition for rulemaking under the Administrative Procedure Act was submitted by two nongovernmental organizations, the Center for Biological Diversity and the Turtle Island Restoration Network. The complete text of the petition is available via the internet at the following web address: *http://www.nmfs.noaa.gov/ia/*. Copies of this petition may also be obtained by contacting NMFS [*see ADDRESSES*].

On December 15, 2008, NMFS published a notification of receipt of the petition, with a January 29, 2009, deadline for comments (73 FR 75988). NMFS subsequently reopened the comment period from February 4 to March 23, 2009 (74 FR 6010, February 4, 2009).

Although the petition only requested action regarding imports of swordfish and swordfish products, the import provisions of MMPA section 101(a)(2) apply more broadly to imports from other foreign fisheries that use "commercial fishing technology which results in the incidental kill or incidental serious injury of ocean mammals in excess of United States standards". Therefore, this rulemaking would be broader in scope than the petition. Comments received on the petition were considered during the development of this advance notice of proposed rulemaking. Many of the comments were limited to the scope of the petition, but others are more broadly applicable. We have summarized all comments on the petition below.

Summary of Comments Received on Petition

NMFS received almost 45,000 comments on the petition during the two public comment periods, including comments from individual members of the public, environmental and industry groups, members of Congress, and swordfish exporting nations. The vast majority of public comments were submitted in association with mass comment campaigns by the Center for Biological Diversity and the Natural Resources Defense Council. NMFS developed this advance notice of proposed rulemaking in response to the comments received on the petition.

(1) *Support for the petition*—The vast majority of public comments supported the petition and recommended that NMFS implement the MMPA import provisions. Most of those comments recommended banning swordfish imports immediately, although a few comments recommended that NMFS request and evaluate information from nations before banning imports.

Some comments in support of the petition indicated that implementing the MMPA import provisions would (1) provide an incentive for foreign fisheries to implement bycatch reduction measures and data requirements similar to those of the United States; (2) provide added protection for marine mammals outside of U.S. waters; (3) level the "playing field" and protect U.S. fishers from unfair competition; and (4) ensure that U.S. consumers do not unwittingly contribute to the depletion of marine mammal populations as a result of poorly regulated fisheries. Several comments claimed that NMFS had failed to implement the MMPA import provisions and, thereby, had promoted the destruction of marine mammal populations and placed U.S. fishers at a significant competitive disadvantage. One comment suggested that NMFS did not need to develop regulations to implement a ban on swordfish imports because NMFS could "readily compare" foreign fishing operations to U.S. marine mammal bycatch standards.

(2) *Suggested alternative approaches to addressing international marine mammal bycatch*—Several comments suggested that working cooperatively with trading partners would be more effective than banning imports. Some of those comments suggested that the United States work to address international marine mammal bycatch through international organizations, such as regional fishery management organizations.

One comment suggested a capacity-building effort to bring about change in the fishing practices of trading partners. Another comment suggested developing a coalition of fish-importing companies in the United States to encourage suppliers in other countries to buy fish caught with "mammal safe" gear, which it suggested could be provided,

installed, and demonstrated by the U.S. government, industry, or non-governmental organization partners.

(3) *Possible standards*—A few comments pointed out the need to clearly define the "United States standards" regarding marine mammal bycatch in the context of section 101(a)(2) of the MMPA. Two comments recommended that NMFS consider the fisheries and fishing conditions of individual nations when evaluating those fisheries against U.S. marine mammal bycatch standards.

The majority of comments suggested that "United States Standards" should include consideration of the bycatch mitigation measures implemented by exporting nations. Comments suggested that foreign measures should be comparable to those used in U.S. fisheries, which include pingers (acoustic deterrents), net extenders, limits on longline length, time-area closures, safe handling and release training and equipment, and observer coverage.

Many comments suggested applying either the short- or long-term bycatch reduction goal of MMPA section 118 as a standard. The short-term goal specifies that bycatch should be reduced below a marine mammal stock's PBR level, while the long-term goal specifies that bycatch should be reduced to insignificant levels approaching a zero mortality and serious injury rate (sometimes referred to as the "zero mortality rate goal"). In contrast, one comment suggested that it would be inappropriate to hold exporting nations to the long-term goal until U.S. fisheries have achieved it. One comment recommended applying additional MMPA standards, including (1) maintaining the health and stability of the marine ecosystem; (2) recovering populations to, and maintaining them at, optimum sustainable populations; (3) ensuring that authorized take levels do not disadvantage affected stocks; and (4) requiring development of take reduction plans for fisheries that exceed a stock's PBR level. Several comments also pointed out that MMPA section 101(a)(2)(B) establishes standards for the eastern tropical Pacific purse seine fishery for tuna. Another comment suggested using the standards described in section 610 of the HSDFMPA.

(4) *Trade and economic issues*—Several comments discussed the relevance of the MMPA import provisions to intermediary nations. One comment recommended that NMFS apply the provisions to intermediary nations by requiring those nations to provide documentation as to how swordfish or swordfish products they export to the United States were harvested and what impact those fisheries had on marine mammals. Another comment suggested that harvesting nations should be responsible for issuing "mammal-free certifications" to vessels and that importers in intermediary nations should be required to obtain such "certifications" prior to landing fish at the nations' ports.

Numerous comments stated that a ban on swordfish imports would cause economic hardship for exporting nations. Another comment claimed that banning imports would financially harm importing companies in the United States because foreign harvesters would sell their fish to alternative markets.

Some comments voiced concern that implementing the MMPA import provisions could result in "unlawful barriers to international trade." Some comments suggested that any measures taken should not hamper trade in swordfish or any other fish caught by "proper fishing devices." A comment from one nation suggested that banning imports of swordfish would contradict the existing spirit of partnership and good relations with the United States. In contrast, one comment suggested that a ban on swordfish imports could be implemented in a manner consistent with the General Agreement on Tariffs and Trade and the World Trade Organization. That comment further suggested that NMFS is obligated to implement the MMPA import provisions, even if a ban on swordfish imports were found to be in conflict with international trade agreements.

(5) *Inaccuracies in petition and counter claims*—During its review of the petition, NMFS noted that the petition contained some factual errors. For example, some of the swordfish import amounts reported for Taiwan (referred to as China-Taipei in the petition), Mauritius, Mexico, New Zealand, and South Africa were incorrect. Corrections are available at *http://www.st.nmfs.noaa.gov/st1/trade/*.

NMFS also noted some discrepancies in the petition's description of the scope and timing of some U.S. fishery closures described in the petition. In particular, the description on page eleven of the petition underestimated the extent of longline closures in the Pacific, ignoring areas closed to longline fishing in Guam and the Northwestern and Main Hawaiian Islands. The description on page eight of the petition failed to recognize that the gillnet prohibition in the western Pacific fishery management area includes all U.S. EEZ waters around Hawaii, Guam, American Samoa, Commonwealth of the Northern Mariana Islands, and U.S. Pacific remote island areas. Further, the description on the same page of the timing of drift gillnet fishery closures on the U.S. west coast during El Niño events was incorrect; those closures are implemented from June 1 through August 31 when NMFS has forecasted or announced the occurrence of an El Niño event.

Several exporting nations offered counterclaims to those listed in the petition. Brazil noted that the petition claimed that Brazil expanded its longline fleet by leasing vessels from flag of convenience countries. In its comments, Brazil cited a law prohibiting vessels operating for Brazilian fishing companies from registering in other countries under flags of convenience. Taiwan provided comments questioning the validity of bycatch estimates for Taiwan fisheries in the petition. Taiwan argued that the estimates were derived using incorrect methods and data. Two nations commented that they believed there was no valid justification for the measures proposed by the petitioners.

A number of nations commented that their marine mammal protection programs were comparable to those of the United States. Those nations provided a variety of supporting information regarding their laws, regulations, and/or bycatch management measures.

One nation suggested that the provision of reasonable proof regarding the effects of fisheries on marine mammals is not a prior obligation of exporting nations, although the United States is entitled to request such information.

Classification

This advance notice of proposed rulemaking has been determined to be not significant for purposes of Executive Order 12866.

Dated: April 26, 2010.

Samuel D. Rauch III,

Deputy Assistant Administrator for Regulatory Programs, National Marine Fisheries Service.

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