DRAFT

ENVIRONMENTAL ASSESSMENT,

REGULATORY IMPACT REVIEW,

AND REGULATORY FLEXIBILITY ACT ANALYSIS

FOR A PROPOSED 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

January 2009

Proposed 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: Draft Environmental Assessment, Regulatory Impact Review, and Draft Regulatory Flexibility Analysis

Lead Agency: National Marine Fisheries Service

For Further Information:

Laura Faitel Cimo
Office of International Affairs
NOAA/NMFS
1315 East-West Highway: F/IA
Silver Spring, MD 20910
(301) 713-2276 or (301) 713-9090

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 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, as a component of public involvement in the development of the proposed certification procedures, NMFS has determined that an EA for this proposed action is appropriate for two reasons. First, although the proposed action does not change any underlying fishery management conventions for IUU fishing and PLMR bycatch, the EA provides the public with a context for reviewing the proposed certification action by exploring the impacts associated with IUU fishing and bycatch. Second, because future certification determinations would not require individual NEPA analysis, this EA enhances NOAA's capacity to seek public input on the proposed approach for such certifications.

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

---

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 the use of sanctions to enforce compliance.[13] These provisions add to existing authority related to compliance with international conservation

[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).

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 vessel 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 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 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."[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

---

[19] 16 U.S.C. 1631(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.

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. 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. Presidential actions that occur as a result of the certification listing are outside the scope of this assessment. Since subsequent action may be to deny port privilege for vessels of nations that do not receive a positive certification under the Act, the analysis in this document provides an overview of the port privilege denial process as additional information.

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 NEPA calls 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. There is little discretion in how the agency will implement these provisions, and the agency is implementing these provisions by regulation for transparency. Therefore, the alternatives considered here relate specifically to the proposed action of certification, as the agency has discretion in how the certification procedures are established. The law does leave some aspects of the implementation of the program to improve international compliance to agency discretion. The identification process will be used as a means to open discussion with other fishing nations regarding IUU fishing activity and the bycatch of PLMRs.

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 this 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 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 this 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 positively 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 ANPR 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. Given the narrow scope of these procedures and their limited applicability, the agency is not expected to invoke these procedures except in few circumstances. Additionally, an analysis of the impacts of these procedures was not conducted since there is no discretion in the agency's 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 nation took action or 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.

NEPA guidance calls 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

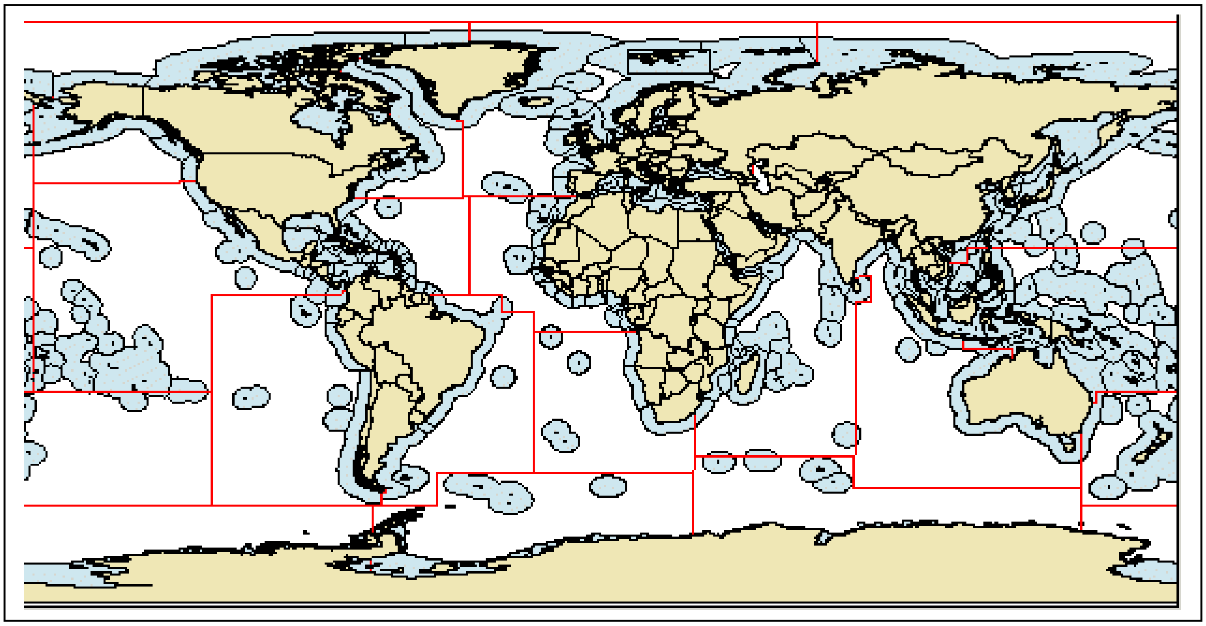


Figure 1. EEZs of the world. Source: The Sea Around Us. {http://www.seaaroundus.org/}

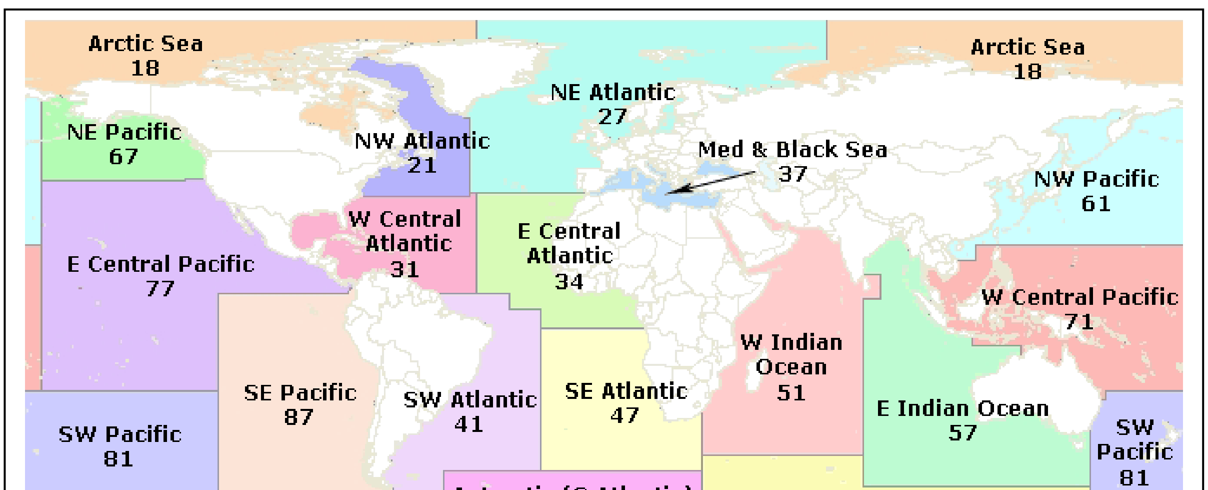


Figure 2. FAO Statistical Areas. Source: The Sea Around Us. {http://www.seaaroundus.org/}

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.

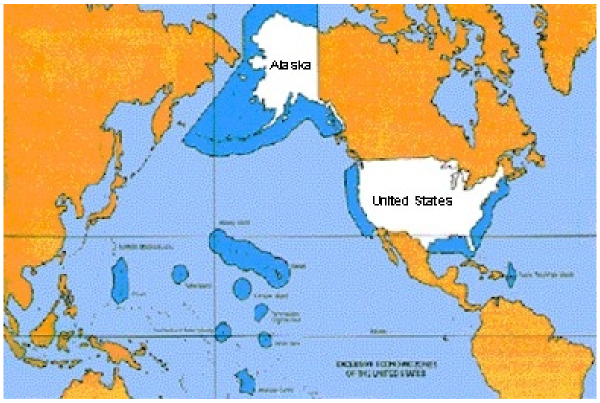


Figure 3. U.S. EEZ. Source: NOAA Photo Library.

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.

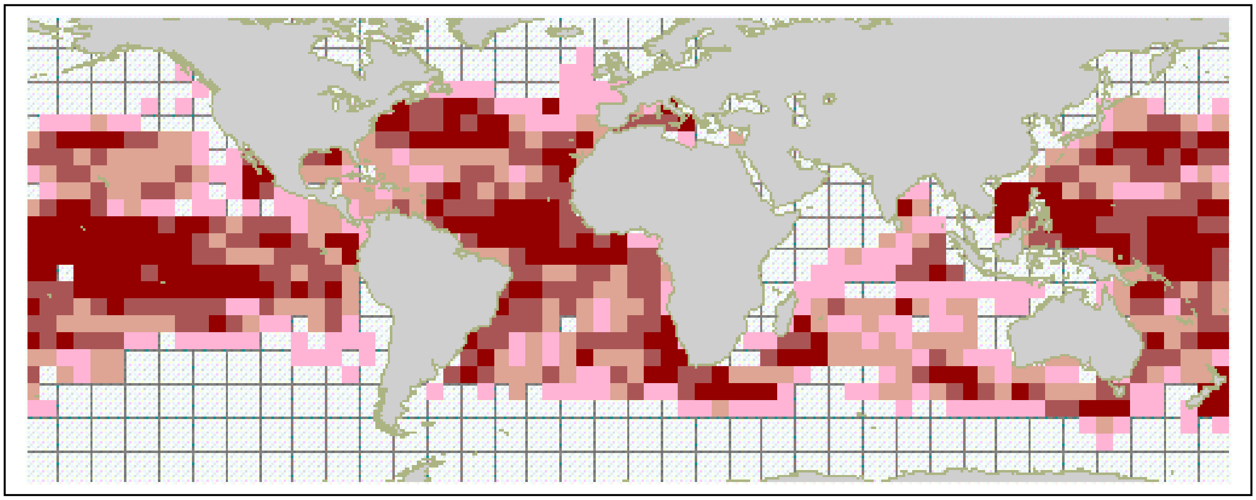


Figure 4. Longline fisheries for tuna and billfish. Source: FAO Atlas of Tuna and Billfish Catches. Mapping application available online at http://www.fao.org/fishery/geoinfo/applications

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 associate 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 limbatus*) 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. That report is currently in progress. Once completed, this report will be made 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.

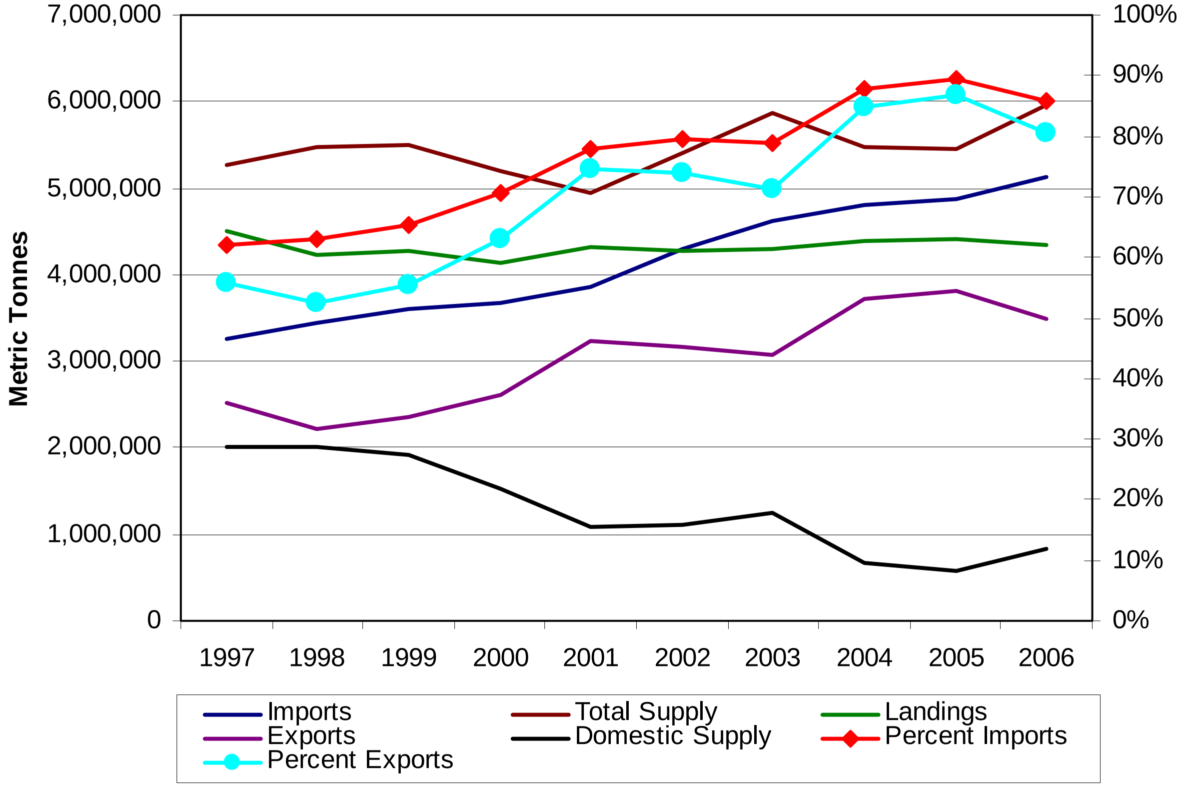
3.4.2 Balance of Trade

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.

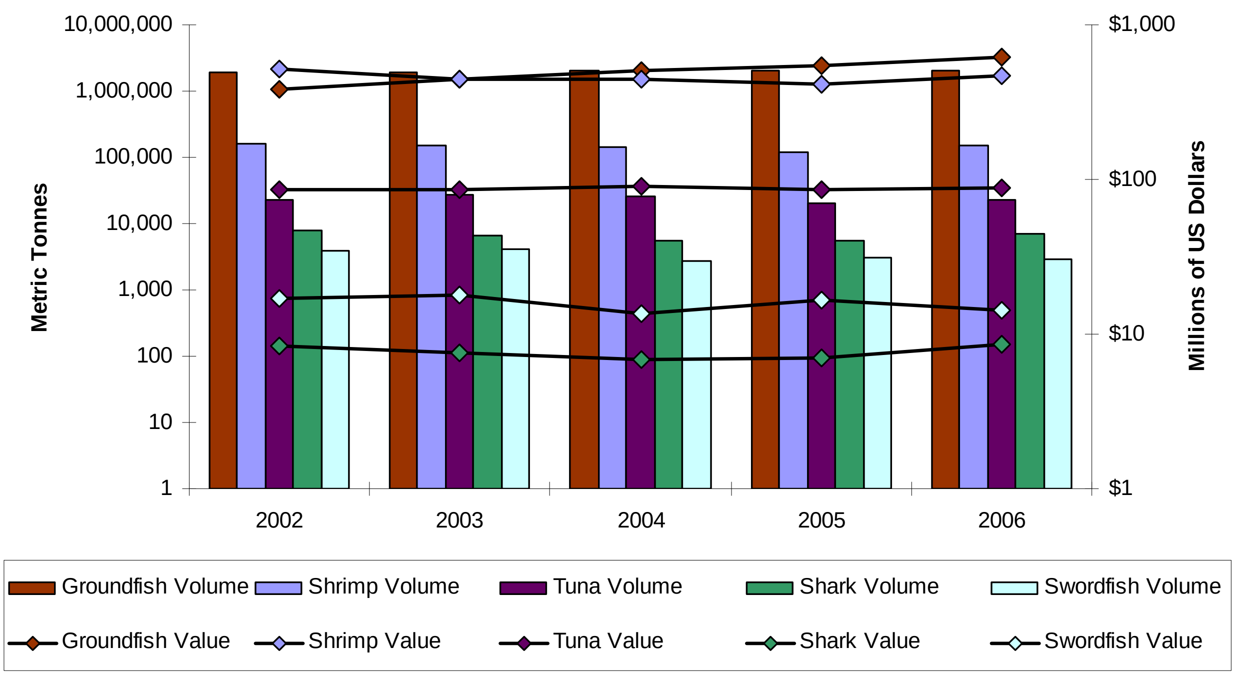
Top Twenty Trading Partners by Value Imported			Top Twenty Trading Partners by Volume Imported		
Origin Country	Metric Tons	Millions of USD	Origin Country	Metric Tons	Millions of USD
CANADA	354,131	$2,224,058,631	CHINA	579,908	$2,097,223,734
CHINA	579,908	$2,097,223,734	THAILAND	362,987	$1,813,569,359
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.

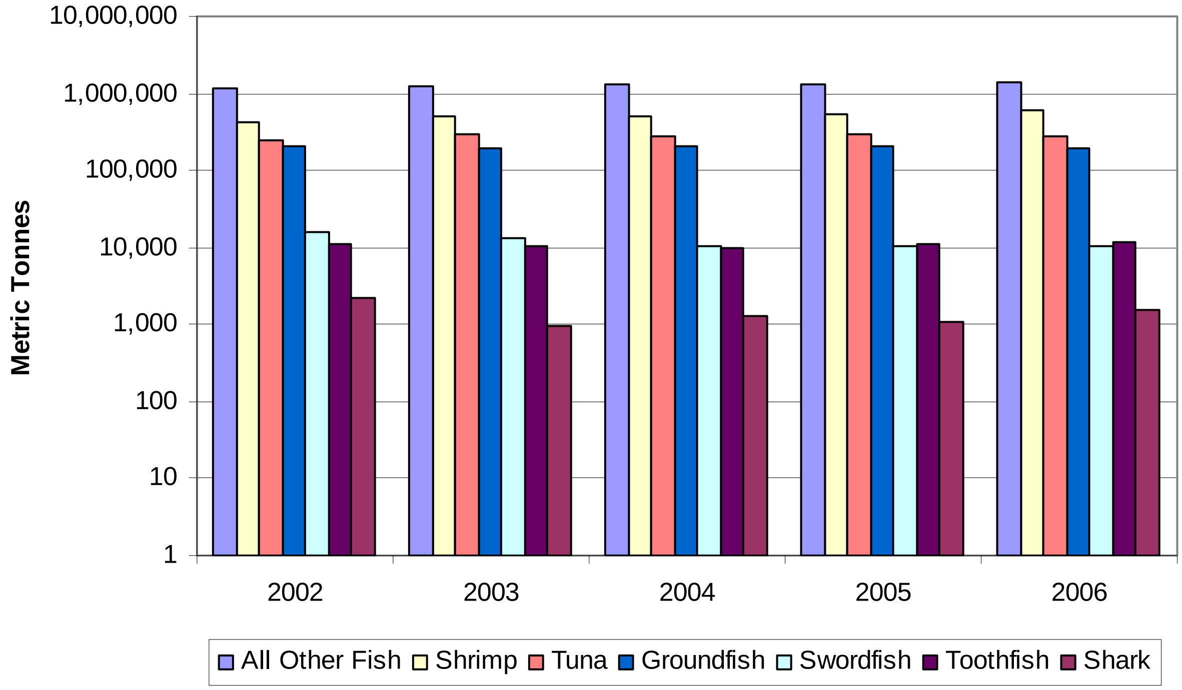
Figure 6. Volume and Value of Landings by Group.



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%.

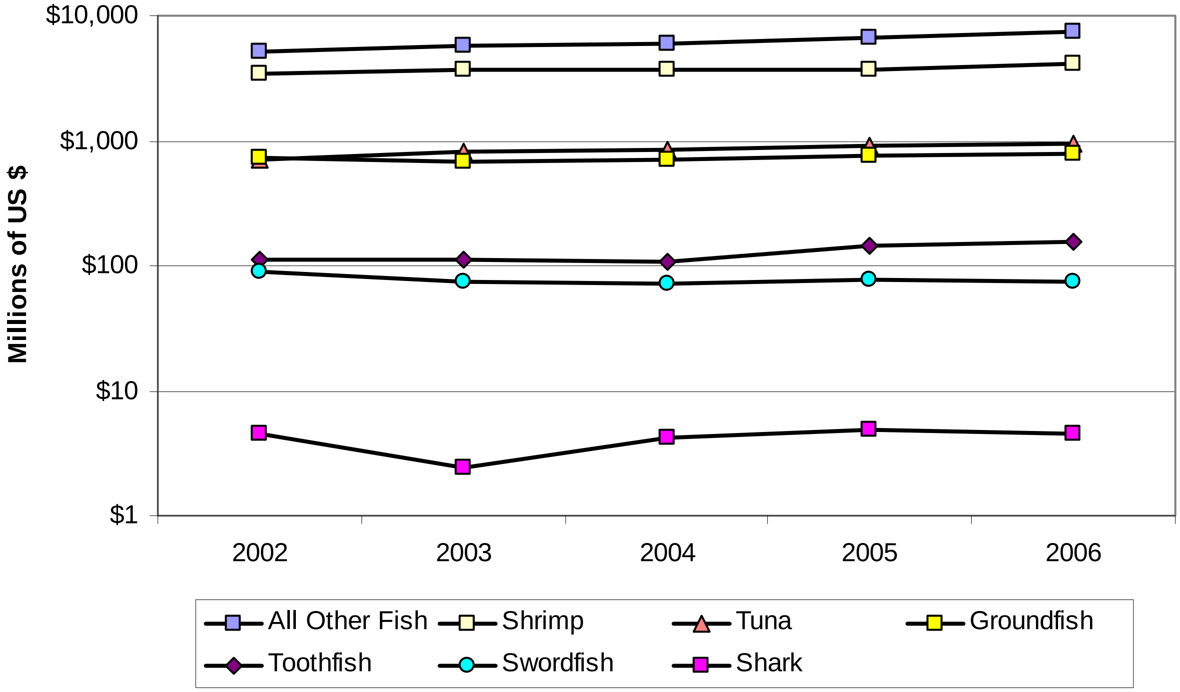
Figure 7 contains the volume of imports by species groups and Figure 8 contains the value of imports by species groups. The “All Other Fish” species grouping represents all other species not included in the groupings defined above. This group ranks highest with 1.4 million metric tons in 2006. Upon more 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 AS and Guam also granting these two territories duty free access to U.S. markets. There are two canneries in AS: 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 AS, 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 AS, 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. AS 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 AS and have it transshipped to the Starkist cannery in Ecuador. The cannery in Ecuador produces foil pouch tuna products that, if produced with US fish, are exempt from the import duties on canned tuna faced by the rest of the world. This is the same privilege that AS 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 US 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 AS 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

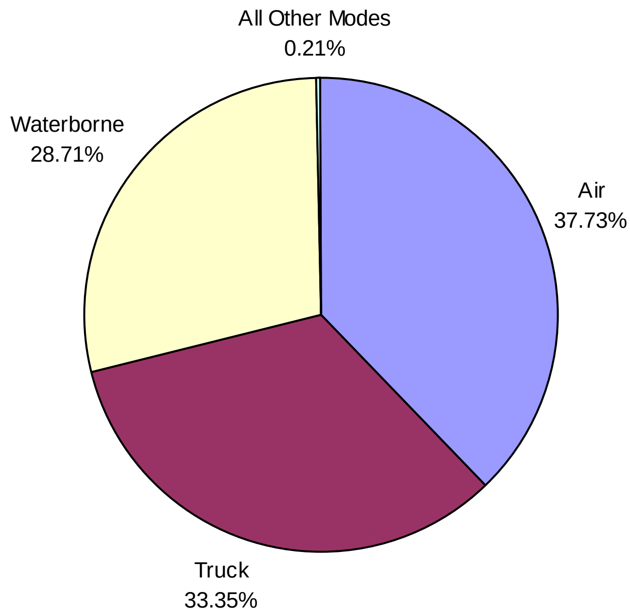
Overall, as illustrated by the information presented, the U.S. seafood industry is in the midst of challenging times. While domestic landings have generally been on the decline, the industry faces declining prices as lower priced foreign imports increasingly enter the market. Partly because of the lower 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%).

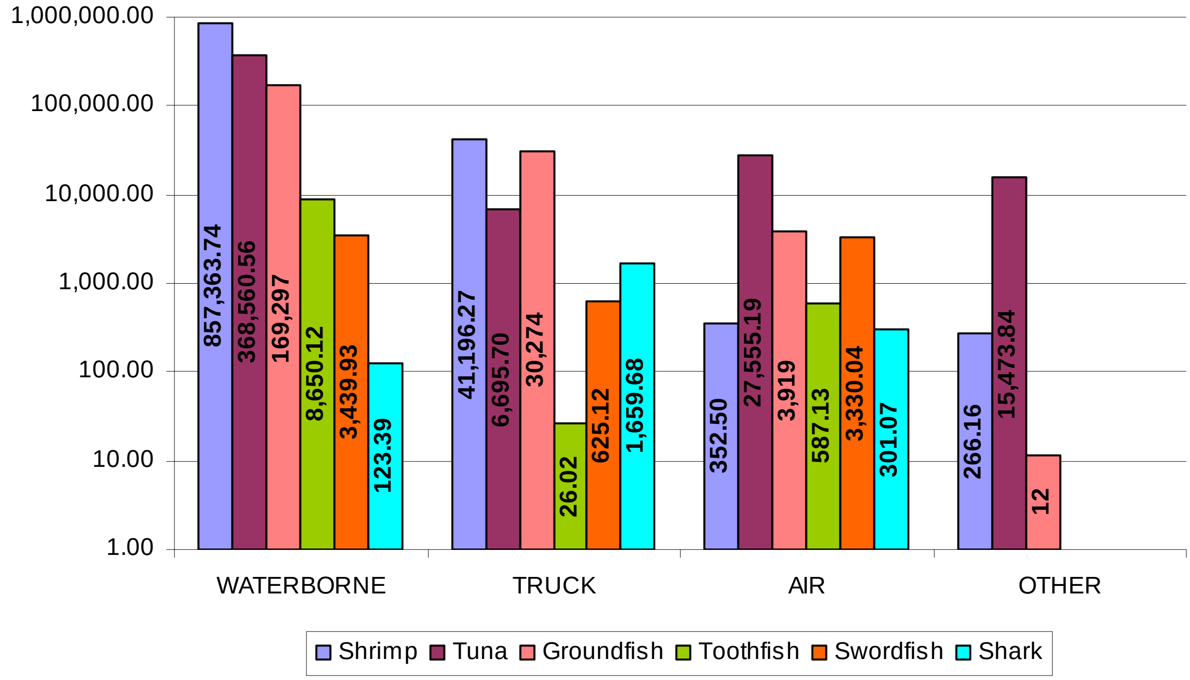
Figure 9. Seafood Import Transportation Mode by Percentage of Total Volume, 2006.



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

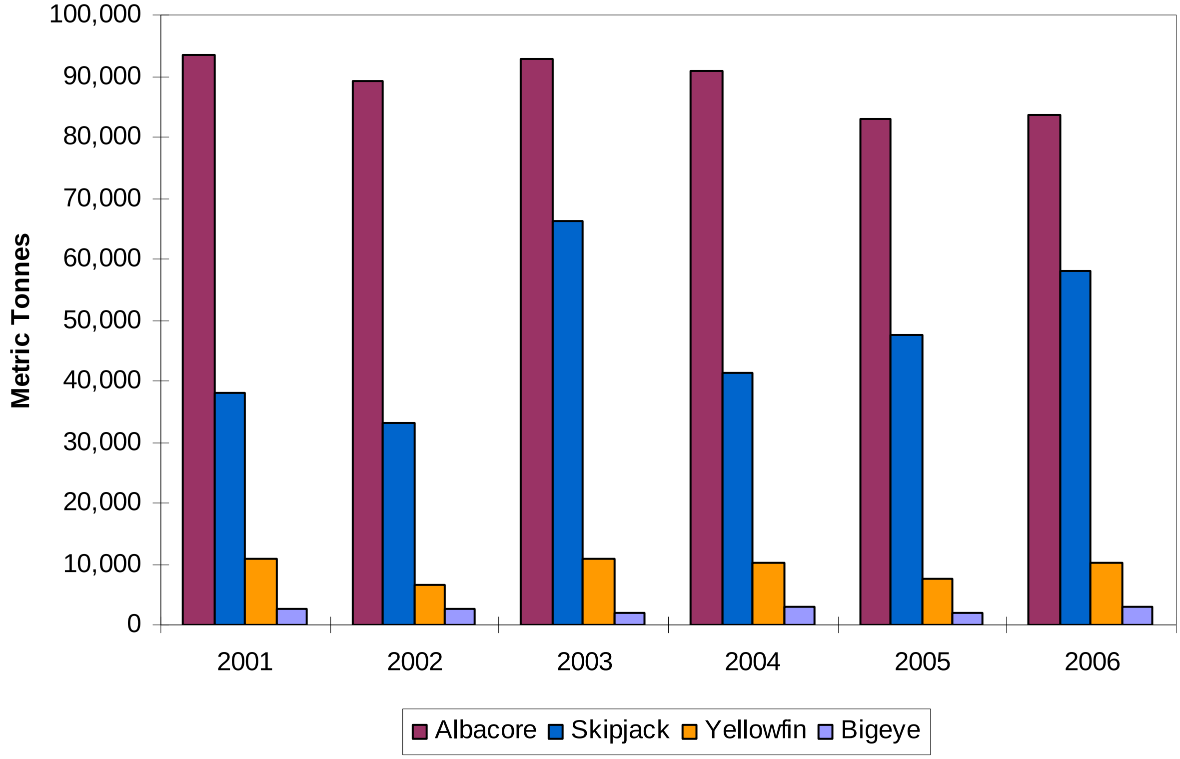
The United States was the first nation with a cannery, and for many years it was the largest tuna canning nation (Campling et al. 2007). Currently, however, there are only four canneries in the United States and only one in the continental United States (near Los Angeles, California). One cannery is 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.

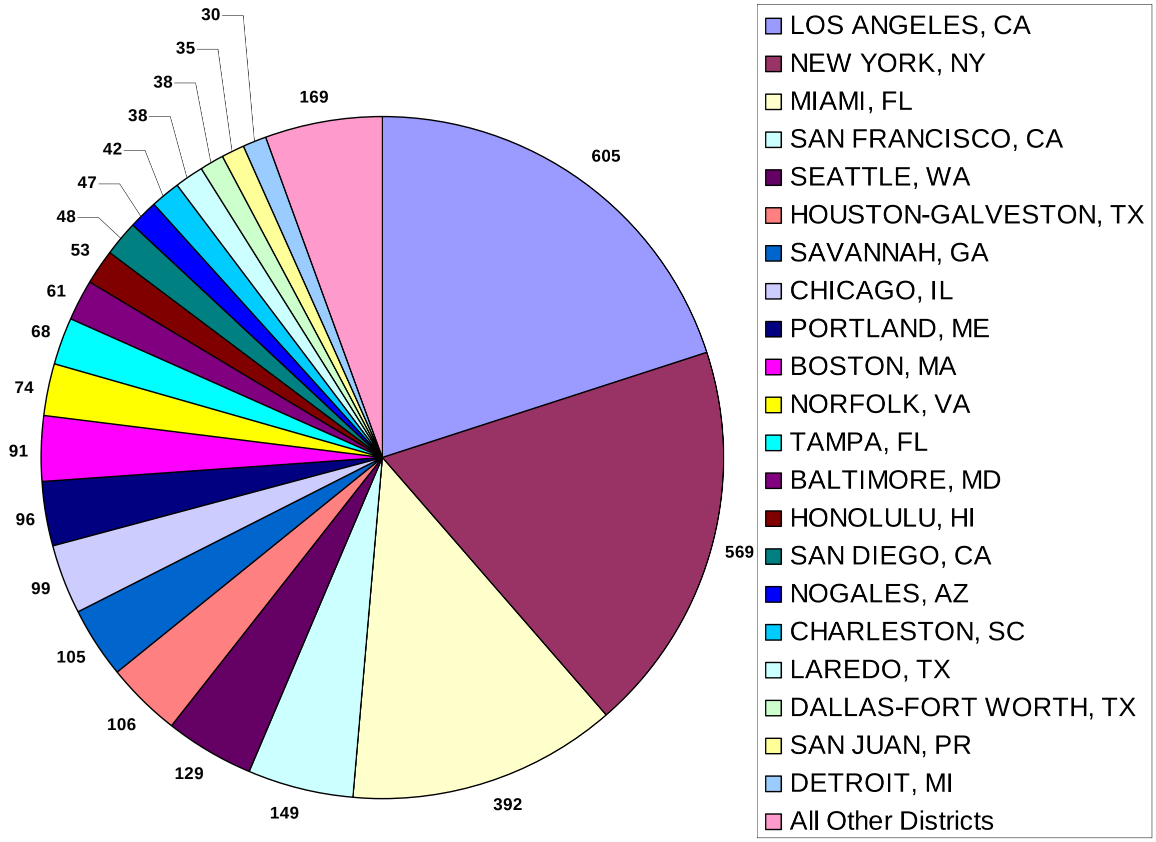
Table 18. Estimated Processing Volume, Value and Employment Supported by Imports in 2006.

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.



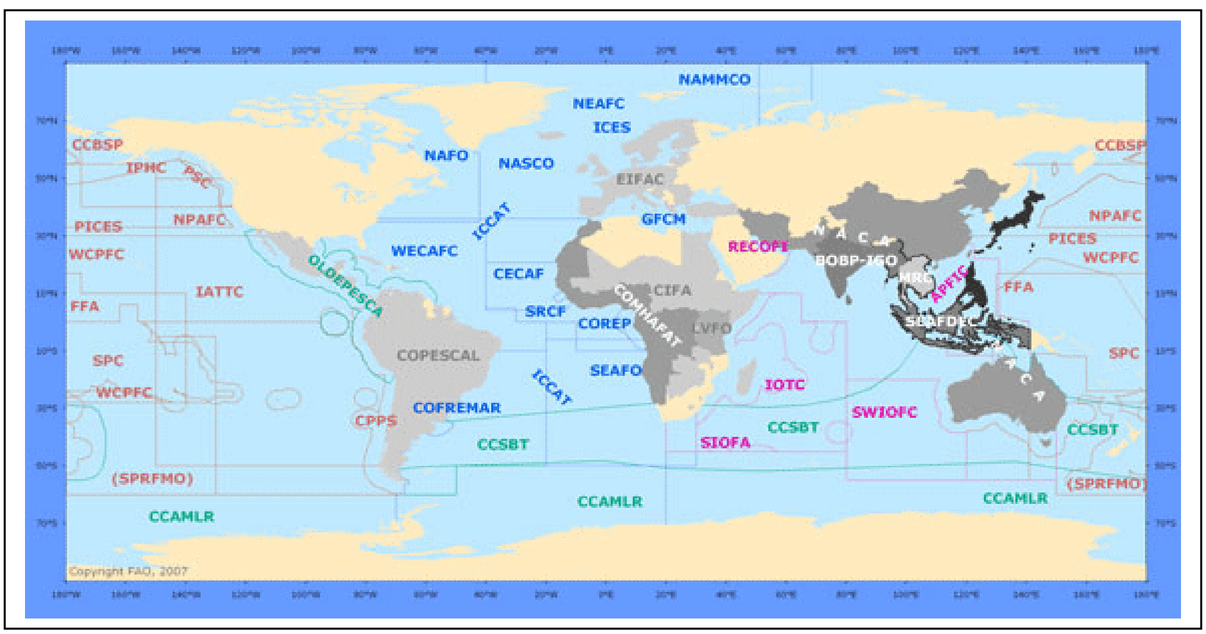
Importers provide warehousing and inventory management for retailers. In that respect, they are very similar to wholesalers that might deal with imports, exports, and/or domestic landings. There are 2,396 seafood wholesalers in the United States. Florida contains the most wholesalers with 300, followed by CA with 284, and, in third is NY 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 proposed 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.

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 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 U.S. 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 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.

Generally, although the certifications provided by NMFS via the Secretary of Commerce for presidential action could lead to trade sanctions, this analysis does not focus on trade sanctions, as trade sanctions are outside the purview of NOAA Fisheries. Instead, the focus is on the impact of potential denial of port privileges. 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 US 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 US by increasing costs for IUU fishers and fisheries with high bycatch, returning the US 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 US 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 U.S.

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 U.S. 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 preservation 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 will be instrumental in providing this capacity to foreign governments. U.S. industry will likely 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 deadhead into 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, it is likely that the economic benefits within the United States will 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. By expanding management coverage more than Alternative I-2, this alternative would be expected to reduce mortality of PLMRs valued by U.S. consumers. Additionally, capacity building benefits will be greater as more entities are encouraged to reduce IUU fishing.

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 increase foreign costs, consumer prices for imports stand to increase more than under Alternative I-2, resulting in a comparative reduction in consumer surplus. As a result, economic benefits under Alternative I-3 would be expected to 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, it is likely that the benefits will 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 US industries as outlined in Alternative B-2. This alternative has the potential to raise foreign fishing costs higher than alternative two, benefiting US industry and reducing more pollution. This alternative, by expanding management coverage more than alternative two, will reduce mortality of PLMRs valued by U.S. consumers. Additionally, capacity building benefits will be greater as more entities are encouraged to reduce bycatch.

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 stand to 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

NMFS has not yet identified a preferred alternative. A preferred alternative would be identified in the Final EA and any associated decision document the agency completes prior to any final rulemaking process. Note that the preferred alternative would consist of one alternative from I-1 through I-3 and one alternative from B-1 through B-3, or a modification of alternatives that may result from consideration of comments received on this draft EA or the proposed rule.

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: Use Value	Benefits: Non-Use Value	Costs
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. NOAA Fisheries 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. The preferred alternatives described in this document do not meet the above criteria. Therefore, under E.O. 12866, the proposed actions described in this document have been determined to be not 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

Congress, recognizing that the U.S. regulatory regime for fisheries management is regarded as stringent, amended the Moratorium Protection Act to strengthen the ability of international fishery management organizations, and the United States, to provide tools to end illegal, unreported, and unregulated fishing and bycatch of protected resources. These threats to sustainable fisheries worldwide have continued under existing law. The Congress has found there are few effective tools in place to ensure that international and regional management organizations can end these practices. In a new section 207 of the Magnuson-Stevens Act, the Congress established an international compliance and monitoring program (16 U.S.C. 1829). In addition, the Congress authorized measures to help reduce IUU fishing, promote international cooperation, and strengthen the ability of regional fishery management organizations to combat harmful fishing practices in sections 608-609 of the Moratorium Protection Act. In order to protect certain vulnerable species of concern to the United States the law provides in Section 610 a parallel mechanism to encourage use in high seas fisheries of new bycatch reduction methods comparable to methods used by U.S. fishermen. NOAA Fisheries is promulgating regulations to implement these provisions of the Moratorium Protection 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 Proposed 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 proposed 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

The proposed alternatives contain 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.

8.5 Relevant Federal Rules which may Duplicate, Overlap, or Conflict with the Proposed Rule

The proposed action does not duplicate, overlap or conflict with any other Federal rules.