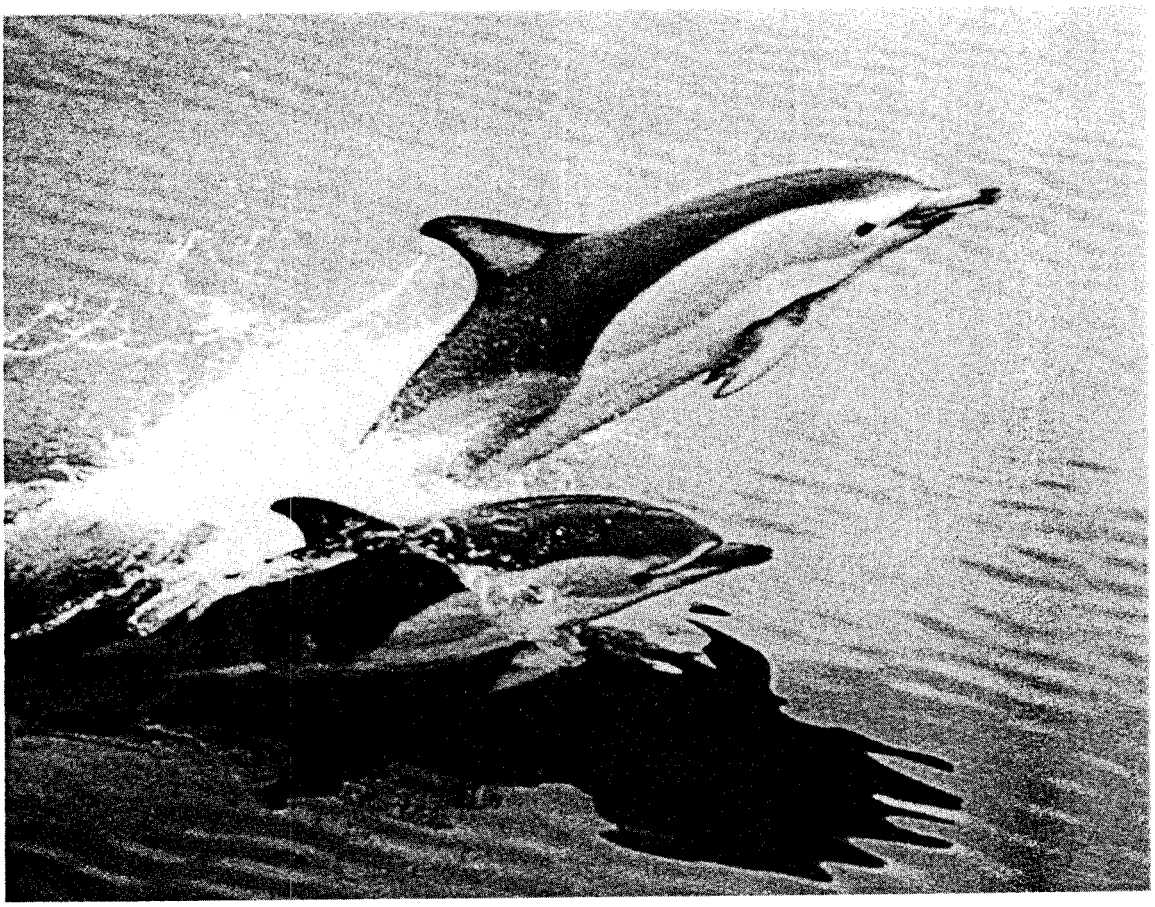
Marine Mammal Protection Act of 1972

Annual Report

January 1, 1990 to December 31, 1991



Prepared by
U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Office of Protected Resources

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1335 East-West Highway
Silver Spring, MD 20910
THE DIRECTOR

DEC 8 1993

The Honorable Ernest Hollings
Chairman, Committee on Commerce,
Science, and Transportation
United States Senate
Washington, D.C. 20510-2602

The Honorable Gerry E. Studds
Chairman, Committee on Merchant
Marine and Fisheries
House of Representative
Washington, D.C. 20515-2110

Dear Sirs:

I am pleased to submit the Annual Report of the National Marine Fisheries Service (NMFS) regarding the administration of the Marine Mammal Protection Act (MMPA) from January 1, 1990, through December 31, 1991, as required by section 103(f) of the MMPA. The report includes activities about the marine mammals that are the responsibility of NMFS. These include whales, dolphins, and porpoises of the order Cetacea and seals and sea lions of the suborder Pinnipedia.

Sincerely,

Nancy Foster for

Rolland A. Schmitten

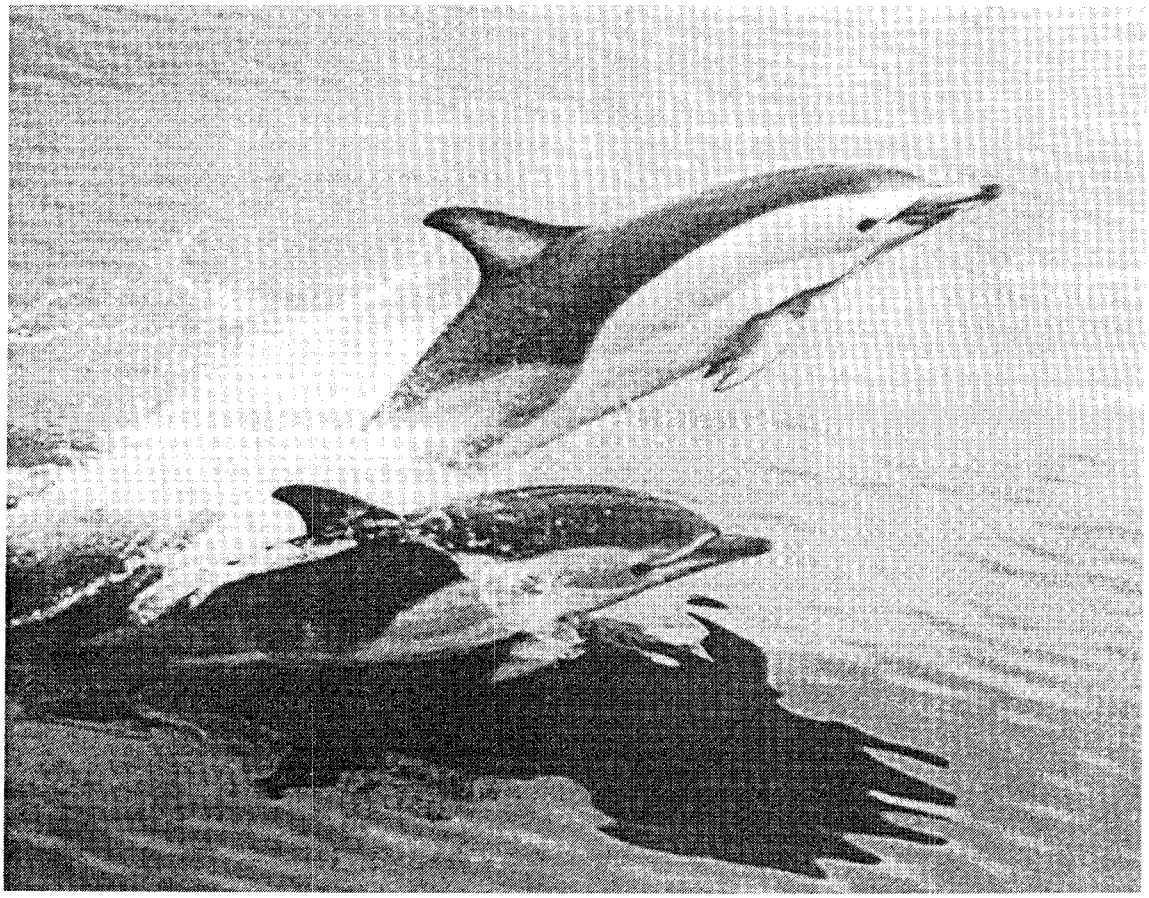
Enclosure

THE ASSISTANT ADMINISTRATOR
FOR FISHERIES

Marine Mammal Protection Act of 1972

Annual Report

January 1, 1990 to December 31, 1991



Delphinus delphis (Common Dolphin) Photo by: Scott Benson, NMFS

Prepared by
U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Office of Protected Resources

Table of Contents

I. Introduction

The Marine Mammal Protection Act (MMPA or Act) is the principal Federal legislation that guides marine mammal species protection and conservation policy. The MMPA vests responsibility for most marine mammals in the Department of Commerce, the parent agency of the National Oceanic and Atmospheric Administration (NOAA). Species of the order Cetacea (whales and dolphins) and species, other than walrus, of the order Carnivora, suborder Pinnipedia (seals and sea lions), are the responsibility of NOAA's National Marine Fisheries Service (NMFS or the Service). The Department of the Interior's Fish and Wildlife Service is responsible for the dugong, manatee, polar bear, sea otter, and walrus.

With few exceptions, the Act, as originally enacted in 1972, placed a moratorium on taking or importing into the United States of marine mammals or their products. The Act defines the term "take" to mean "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture or kill any marine mammal". The Department of Commerce could authorize the take of marine mammals for scientific research, for public display, and incidental to commercial fishing. The 1981 Amendments added two "small take" categories to the moratorium exception: one for commercial fishing and the other for activities such as oil and gas exploration.

Partially in response to litigation that made it virtually impossible for NMFS to issue incidental take permits to commercial fisheries, the 1988 Amendments to the MMPA were enacted. These Amendments established a five-year Interim Exemption to the take moratorium for commercial fisheries. The primary objective of the Interim Exemption was to provide a mechanism for collecting data about interactions between marine mammal and commercial fisheries while allowing commercial fishing operations to continue. During the Interim Exemption, the Amendments required NMFS to develop a new regime to govern the incidental take of marine mammals by commercial fisheries which would become effective following the expiration of the Interim Exemption. The 1988 Amendments also provided for permits to be granted for take of marine mammals to enhance the survival or recovery of a species or population.

NMFS implements MMPA activities through its Regional offices and Fishery Science Centers in cooperation with the States, conservation groups, the public, other Federal agencies, the Marine Mammal Commission, and constituents, including scientific researchers, the fishing industry, and the public display community. The Service's programs are coordinated by the Office of Protected Resources.

The 1990/1991 Annual Report addresses implementation of the 1988 amendments to the MMPA and other major activities undertaken by NMFS under the Act's authority.

- Chapter II describes NMFS activities related to interactions between marine mammals and commercial fisheries, including implementation of the Interim Exemption, development of a draft proposed regime for governing marine mammals/ commercial fishery interactions, and the tuna-dolphin interaction issues.

- Chapter III presents subsistence take quotas for bowhead whales and northern fur seals.

- Chapter IV discusses the permit program and notable permit requests.

- Chapter V summarizes species management actions including status reviews, conservation plans and recovery plans.

- Chapter VI presents the findings of stock assessment efforts.

- Chapter VII discusses stranding network activity and the marine mammal tissue bank.

- Chapter VIII describes international programs and activities.

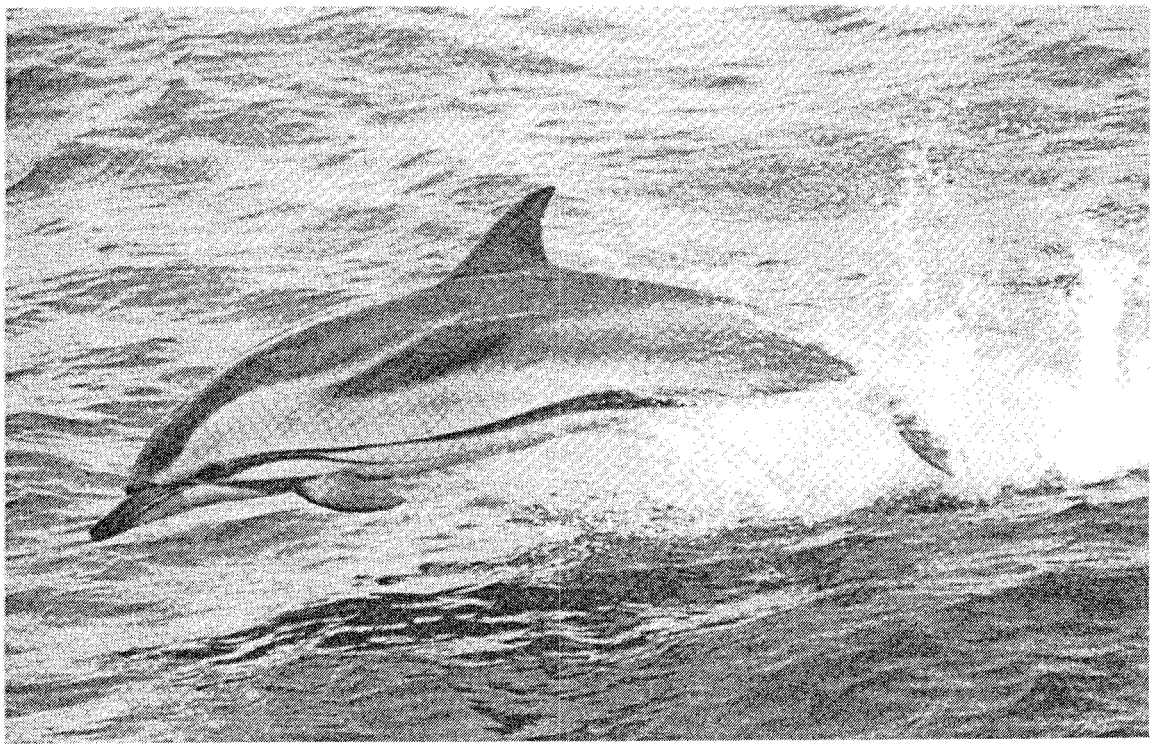
- Chapter IX presents highlights of NMFS enforcement activities.

- Chapter X summarizes major legal actions involving NMFS.

- Chapter XI presents a list of publications produced by NMFS staff.

The report concludes with four appendices that contain exhibits on classification of 1991 Category I and II fisheries, fishery registration and logbook interaction information, permit activity, and stranding data.

This Annual Report to Congress is prepared pursuant to sections 103(f), 104(h)(3)(C), and 115(b)(3) of the Marine Mammal Protection Act. Copies are available from the Office of Protected Resources, National Marine Fisheries Service, 1335 East-West Highway, Silver Spring, Maryland 20910.



Stenella coeruleoalba (Striped dolphin)
Photo by: Scott Benson, NMFS

II. Marine Mammal Interactions With Fisheries and Other Commercial Activities

A central focus of marine mammal protection program activities is the management of marine mammal interactions with commercial fisheries. The importance of this issue can be measured in terms of both public concern and the allocation of NMFS resources. The Marine Mammal Protection Act has attempted to address these interactions by establishing a zero mortality rate goal and creating a permit program to limit the incidental taking of marine mammals by commercial fisheries and other parties.

This chapter discusses NMFS activities to manage and reduce the incidental take of marine mammals by fisheries and other commercial activities. Issues covered include a general description of the Interim Exemption Program, implementation of the observer program, and development of the proposed regime to govern marine mammal interactions with commercial fisheries. Of particular concern to NMFS is the incidental take of dolphins in the eastern tropical Pacific yellowfin tuna purse seine fishery. The chapter, therefore, examines recent efforts to reduce dolphin mortality, discusses tuna importation issues, and summarizes interaction data.

Interim Exemption

A major component of the 1988 Amendments to the MMPA was the establishment of a five-year exemption program to allow the incidental taking of marine mammals by commercial fisherman until October 1, 1993. The primary objective of the interim exemption program is to provide a mechanism for obtaining data on interactions while allowing commercial fishing to continue. NMFS will use the information collected in the exemption system along with other data on marine mammal populations to develop a long-term program to govern the taking of marine mammals by commercial fisheries.

List of Fisheries

The 1988 Amendments required the Secretary of Commerce to compile a list of fisheries that interacted with marine mammals and the number of vessels or persons operating in each fishery. Fisheries were then to be divided into three categories:

- Category I fisheries, in which there is frequent incidental taking of marine mammals;
- Category II fisheries, in which there is occasional incidental taking of marine mammals; and
- Category III fisheries, in which there is a remote likelihood or no known incidental taking of marine mammals.

The fishery category determines the requirements that vessel owners/operators must meet under the interim exemption program. The Amendments require the Secretary to review the list annually. Changes may be made to the list after providing opportunity for public comment. In December of 1990, NMFS published the first list of Fisheries operating in U.S. waters and on February 7, 1991, NMFS published the first annual review of fisheries (56 FR 5138). The 1991 list identifies 11 Category I fisheries, 32 Category II fisheries, and 129 Category III fisheries, an increase of 5 Category II fisheries from the original 1989 list. Fisheries that are not classified are included in category III by default. Exhibit A-1 in Appendix A presents the 1991 list of Category I and Category II fisheries.

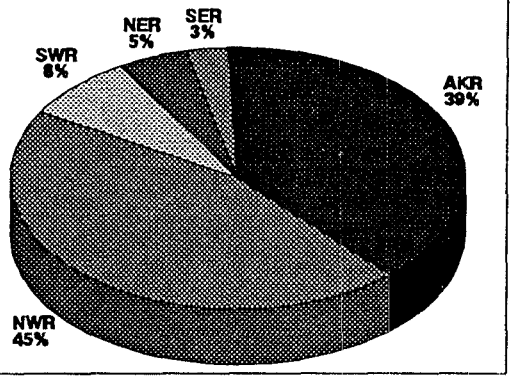
Registration and Reporting

Under the Interim Exemption, vessel owners must register with NMFS, obtain an Exemption Certificate, and fulfill specified reporting requirements to legally fish in any Category I or Category II fishery. Owners of vessels engaged only in Category III fisheries are not required to register, but must report marine mammals killed incidentally.

Vessel owners registered initially by submitting a registration form and a $30 fee to NMFS. In return, the owner received a decal, an annual sticker, a fishing log, and exemption compliance instructions. The Exemption Certificate must be renewed each year by submitting an updated registration form, required fee, and required reports covering all Category I and II fisheries in which the vessel was registered.

All registration data are entered into the Marine Mammal Exemption Program data base (MMEP), which allows NMFS to analyze the number and size of fishing vessels on a nationwide basis. In 1990, NMFS registered 15,756 vessels. The number of registered vessels declined to 12,156 in 1991. Exhibits 1 through 3 graphically summarize the distribution of registered vessels in 1991 by Region, fishery category, and gear type.

Exhibit 1
Registered Fishing Vessels by Region



Exemption Certificate holders must maintain accurate daily logs of fishing effort and incidental takes of marine mammals. For each fishing day, the log should include information on: the fishery, fishing effort, and gear type; the marine mammal species or a description of the marine mammals involved if the species is not known; number, date, and location of marine mammal incidental takes; type of interaction and any injury to the marine mammal; a description of efforts to deter animals by any non-lethal or lethal means; and any loss of fish or gear caused by marine mammals. A report, consisting of a copy of daily logs covering Category I and II fisheries, must be submitted annually to NMFS by December 31. Fishermen, however, are encouraged to submit log sheets at the conclusion of each fishing season or on a regular basis throughout the year.

NMFS received 11,588 log books in 1990 from vessel owners. In 1991, the number of log books received declined to 9,034. Appendix B contains tables that summarize the data submitted in the log books.

Exhibit 2
Registered Fishing Vessels by Category

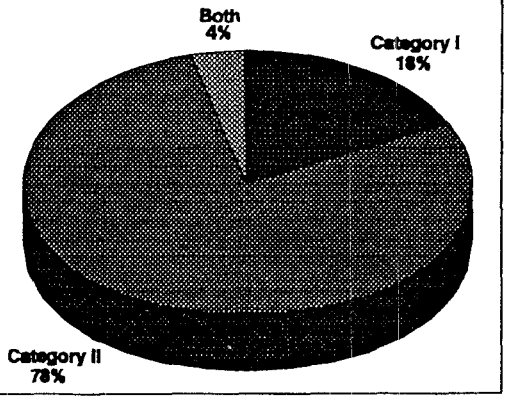
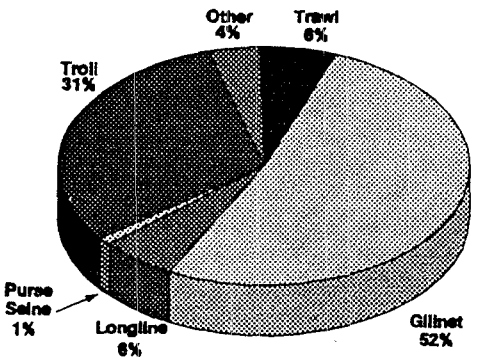


Exhibit 3
Registered Fishing Vessels by Gear Type



Observer Program

Section 114(e) of the MMPA requires the Secretary to place observers on Category I vessels to monitor between 20 and 35 percent of the fishing operations in each fishery. The purpose of the observer program is to: (1) obtain statistically reliable information on the species and number of marine mammals incidentally taken in a fishery; (2) verify the accuracy of self-reporting by fisherman; (3) identify possible means for reducing such takes; and (4) collect other biological information on marine mammals and the marine ecosystem.

If NMFS is unable to meet the required observer coverage level in any particular year, observers must be allocated among Category I fisheries according to the following priorities:

- Those fisheries that incidentally take marine mammals from stocks designated as depleted;
- Those fisheries that incidentally take marine mammals form stocks that are declining;
- Those fisheries, other than those described above, in which the greatest incidental take of marine mammals occur; and
- Any other Category I fishery.

If observers cannot be placed on Category I vessels at the required level, NMFS should establish observation and verification programs to supplement or replace the mandated on-board observer program. Alternative observer programs may include direct observation of fishing activities from vessels, airplanes, or points on shore. If sufficient resources are available, alternative programs or voluntary observer programs may also be established in Category II and Category III fisheries for which reliable information is not otherwise available.

NMFS designed its observer program to obtain statistically reliable information on the species and number of marine mammals incidentally

taken in as many Category I fisheries as possible. The specific design of the observer program was based on the size and nature of each Category I fishery, the desired precision for mortality estimates, and the resources available. Exhibit 4 summarizes observer coverage in 10 category I fisheries during 1990 and 1991. This exhibit is supplemented by descriptions of Regional programs presented below. Detailed analysis of 1990 and 1991 observer data is presented in separate reports.

The NMFS Southwest Regional Office (SWR) implemented an observer program for the California set and drift gillnet fisheries with assistance from the California Department of Fish and Game (CDFG). The Region reported that setnet fishermen shifted from single day runs to multi-day trips to avoid observer placement. Setnet boats are small vessels with

Exhibit 4
Observer Coverage in 1990 and 1991

Fishery	1990	1991
Gulf of Maine Sink Gillnet Fishery	1%	6%
Prince William Sound Drift Gillnet Fishery	4%	5%
Prince William Sound Set Gillnet Fishery	3%	--
Alaska Peninsula Drift Gillnet Fishery	4%	--
Makah (Washington Area 4, 4a, 4b) Set Gillnet Fishery	47%	62%
Columbia River, Willapa Bay, and Grays Harbor Drift Gillnet Fishery	--	4%
California Drift Gillnet Fishery	5%	11%
California Set Gillnet Fishery	4%	11%
Bering Sea/Gulf of Alaska Groundfish Trawl Fishery	70%	63%
Atlantic Swordfish Drift Gillnet Fishery	--	32%
Atlantic Foreign/Joint Venture Mackerel Trawl Fishery	100%	100%

little work room and no observer sleeping space. In response, NMFS chartered two vessels in 1990 as alternate platforms to observe the operations of setnet fishing vessels. NMFS established a joint venture in 1991 with the U.S. Fish and Wildlife Service to use their research vessel as a high seas platform to observe setnet fishing operations.

NMFS issued an emergency regulation that required, as of November 27, 1990, all bottomfish vessels operating in the Northwest Hawaiian Islands protected species zone to notify NMFS prior to departure, enabling SWR to place an observer on the vessel. A final rule was published on May 30, 1991 implementing this emergency regulation on a permanent basis. Currently, there are two observers to monitor the 28 permitted vessels in the fishery. SWR is seeking one additional observer to investigate the distribution of Hawaiian monk seals and other protected species in the zone.

The NMFS Alaska Regional Office (AKR) observer program has yielded important mortality data, resulting in changes in the categorization of some Alaskan fisheries. In 1990, observers reported no mortalities in the Prince William Sound salmon set gillnet fisheries and only one mortality in the South Unimak salmon drift gillnet fishery. Based on these findings, NMFS reclassified these fisheries from Category I to Category II. Classification of the Prince William Sound salmon drift gill net fishery will be reviewed in the future because only seven marine mammal mortalities were observed in 1991. The Bering Sea and Gulf of Alaska groundfish trawl fisheries were placed in Category III as a result of data that showed that the level of incidental take was very low.

The NMFS Northwest Regional Office (NWR) observer program monitors two Category I fisheries. NMFS, in cooperation with the Pacific States Marine Fisheries Commission, the Washington Department of Wildlife, and the Oregon Department of Fish and Wildlife, documented marine mammal interactions in the Washington, Oregon Lower Columbia River Region, Willapa Bay and Grays Harbors salmon drift gillnet fishery. Observers in these fisheries documented (1) the mortality of harbor seals and California sea lions and (2) damage to salmon stocks and fishing gear. Observation of the Makah set gillnet fishery documented entanglement of harbor porpoise and harbor seals.

California Sea Lion/Steelhead Conflict

The sea lion/steelhead salmon conflict in the Lake Washington ship channel, known as the "Herschel Problem," continues to be a well-publicized marine mammal issue. A simple statistic illustrates the severity of this conflict; during the 1988/89 winter run, 65 percent of returning steelhead were consumed by sea lions.

Under a cooperative program involving NMFS, the Washington Department of Wildlife, the Army Corp of Engineers, and the Muckleshoot and Suquamish Indian Tribes, researchers have attempted numerous non-lethal control methods. These efforts continued during the 1990 and 1991 steelhead runs.

During the 1990, a capture-relocation program was undertaken. Researchers, using a meshed cage secured to a mooring float, captured six adult male sea lions and transported them to the breeding colony located on San Miguel Island, approximately 1200 miles from Seattle. Monitored with radio transmitters, four of the six animals returned to Washington State waters, the first within 30 days of release.

Efforts during the 1991 run focused on potential enhancements for steelhead passage through the fishway. Based on the recommendations of an interagency task group, NMFS initiated two pilot studies. The objective of the first study was to assess the effects of fishway lighting on fish passage at night, when sea lion predation is at a minimum. The second study attempted to collect information on the salinity gradient between fishway attraction water and the water below the dam. Neither study produced conclusive results, and the study designs are being modified for future use.

Proposed Regime to Govern Interactions Between Marine Mammals and Commercial Fisheries

The MMPA, recognizing that a total prohibition on taking of marine mammals could seriously affect certain fisheries, authorized the Secretaries of Commerce and the Interior to allow the taking of marine mammals incidental to commercial fishing operations when such taking would not disadvantage the affected marine mammal species or stocks. The 1981 Amendments permitted the Secretaries to use streamlined procedures for granting exemptions for takes of small numbers of non-

depleted marine mammals incidental to commercial fishing operations if, after notice and opportunity for public comment, the Secretary finds that such taking would have a negligible impact on the affected species or stock. In response to litigation and recognition that the existing system was unworkable, the 1988 MMPA amendments required NMFS to develop a regime to manage marine mammal interactions with commercial fisheries. This section discusses the legal challenges to the original permit system, the 1988 amendment requirements, and NMFS' proposed regime.

Kokechik and the 1988 MMPA Amendments

In 1987, Alaska Native fishing groups and environmental organizations challenged a general permit that authorized the Federation of Japan Salmon Fisheries Cooperative Association to take Dall's porpoise incidental to its fishing operations. The suit (*Kokechik Fishermen's Association v. the Secretary of Commerce*, 839 F.2d 795) claimed that the general permit should not be issued because other marine mammals for which permits could not be issued (e.g., northern fur seal) would inevitably be taken. A District Court, ruling in favor of the plaintiffs, invalidated the permit, a decision that was upheld on appeal. NMFS, therefore, could not issue an incidental take permit for any species of marine mammal in circumstances where unpermitted taking of other species of marine mammals would occur.

To address the situation created by Kokechik, Congress amended the MMPA in 1988 to exempt most commercial fisheries from the Act's general permit and small take provisions for five years. Section 114 of the 1988 amendments to the MMPA required NMFS to develop a new regime to govern marine mammal/commercial fishery interactions (other than takings that occur in the ETP yellowfin tuna fishery) after the interim exemption expires on October 1, 1993.

Section 114 states that the regime should include:

- "(A) the scientific guidelines to be used in determining permissible levels of incidental taking;
- (B) a description of the arrangements for consultation and cooperation with other Federal agencies, the appropriate Regional Fishery Management Councils and Sates, the

commercial fishing industry, and conservation organizations; and

- (C) a summary of such regulations and legislation as would be necessary to implement the suggested regime."

According to the amendments, the Secretary should develop this regime in consultation with the Marine Mammal Commission, Regional Fishery Councils, and other interested governmental and non-governmental organizations.

NMFS' Initial Proposal

NMFS published its proposed regime on May 24, 1991. The proposal, which was based on the Marine Mammal Commission's recommended guidelines, would:

- Authorize incidental taking of depleted as well as non-depleted species;
- Reduce incidental mortality and serious injury of marine mammals to insignificant levels with minimum hardship to fisheries involved;
- Establish allowable biological removal (ABR) quotas for each marine mammal population affected by commercial fishery interactions, taking into account the status of the affected populations;
- Require actions to be taken (e.g., stopping fishing operations) to prevent ABR quotas from being exceeded;
- Provide a framework for allocating ABR quotas among user groups and fisheries, and create Regional Quota Boards to establish quotas for each fishery; and
- Require monitoring of incidental takes and ABR quotas, and charge fishermen an administrative fee (and, perhaps, fishery-specific user fees) to recover monitoring costs.

Public Comment and the Revised Draft Interim Proposal

NMFS received comments from 84 entities during the public comment period. In their comments, conservation groups expressed concern that there were (1) no provisions for judicial review, (2) no optimal sustainable population (OSP) or depletion determinations, (3) no final adjustment of ABR, and (4) no movement towards the Zero Mortality Rate Goal. Industry groups stated that the proposed regime was (1) not focused on problems areas, (2) too conservative on recovery factors and minimum abundance estimates, and (3) did not include subsistence takes in ABR allocations. Industry and conservation interests both rejected the Regional Quota Board proposal.

After reviewing the comments and consulting with the Regional Fishery Management Councils, the environmental community, and the fishing industry, NMFS revised its proposal and distributed the Revised Draft Interim Proposal for limited review on November 20, 1991. The revised proposal included the following significant changes:

- ABR was replaced with potential biological removal (PBR) to clarify that this level represented a maximum possible take level, and not necessarily the removal level that would be authorized;
- PBR allocations would be made based on recommendations made by Regional Fishery Management Councils and State fishery agencies with opportunity for public comment. This process would replace the Regional Quota Board concept;
- Additional criteria for determining when the fishing industry must finance special observer programs;
- OSP calculations would be based on current carrying capacity;
- The two-year implementation period was retained but removal limitations could be phased-in for some fisheries; and
- Safety factors for estimating maximum removals from various population levels were reduced, unless a higher factor is specified in a recovery or conservation plan.

Under the Revised Draft Interim Proposal, each marine mammal population would be categorized as Class A, B, or C based on its

abundance and the total number of projected removals compared to the PBR. Class A populations are those that are listed as endangered or threatened under the ESA, designated as depleted under the MMPA, or whose total annual estimated removal is greater than or equal to the calculated PBR. Class B populations are defined as populations that are in no immediate danger, but are "likely" to become Class A within five years. Class C populations are not "likely" to become Class A within five years. The revised proposal classified fisheries that interact with marine mammals according to the class of mammals with which they interact.

The deadline for submitting comments on the revised proposal was December 20, 1991. NMFS was reviewing and analyzing these comments at the end of 1991.

Tuna-Dolphin Issues

The best known interaction between marine mammals and commercial fisheries is the incidental take of dolphins by yellowfin tuna purse seiners in the Eastern Tropical Pacific (ETP). For reasons not fully understood, schools of yellowfin tuna associate with dolphin stocks. In the late 1950's fishermen began exploiting this association by deploying large purse seine nets around the more readily observed dolphin schools to catch the tuna swimming below. Despite the fishermen's efforts to release the dolphins, many became trapped in the nets and drowned.

Efforts to reduce dolphin mortality in the ETP has been a central focus of the MMPA since it was enacted in 1972. Recent activities have focused on domestic fishing operations, increased monitoring of foreign fishing fleets, actions to encourage foreign fishing fleets to reduce dolphin mortality, and international meetings and workshops. This section of the Annual Report discusses these activities and presents the most recent data on dolphin take by the U.S. purse seine tuna fleet.

Fishing Operations

During 1990-1991, a number of significant events occurred concerning changes to purse seine yellowfin tuna fishing. These events involve the use of explosives, the development of alternative fishing methods, and the development of operator performance standards.

Since the early 1980's, the U.S tuna fleet had used a variety of explosive devices to herd dolphins during fishing operations. The 1988 amendments to the MMPA prohibited the use of all explosive devices in the yellowfin tuna purse seine fishery. The amendments exempted Class C explosive devices, pending a determination that use of these explosives would physically impair or increase the mortality of marine mammals. Based on the finding of research sponsored by SWR, NMFS published an interim final rule on March 29, 1990 prohibiting the use of all explosives during sets on dolphins.

NMFS's alternative fishing method research has begun to focus on techniques that do not involve encirclement of dolphins. Areas under investigation include:

- Increasing the efficiency of searches to locate tuna not associated with dolphins;
- Pre-set separation of tuna and dolphins; and
- The aggregation of tuna using fish aggregating devices (FADs).

Implementation of the third project (FADs) has been hampered by the lack of participation of purse seine fishing vessels. For various reasons, fishing vessels have not participated in the program to the degree expected. Several research cruises to evaluate FADs and to assess other measures (e.g., tuna-dolphin separation and tuna location devices), however, were planned for 1992.

Tuna-Dolphin Interactions

In 1990, NMFS placed observers on 58 trips aboard U.S. fishing vessels and 49 trips aboard foreign flag vessels, a shared effort with the IATTC. NMFS placed observers on 29 trips aboard U.S. vessels and 18 trips aboard foreign flag vessels in 1991. Incidental mortality of dolphins in the U.S. ETP yellowfin tuna purse seine fishery has continued to decline. In fact, mortality in 1991 was the lowest since the fishery began. Exhibit 5 compares the take quota against 1990 and 1991 mortality data for U.S. vessels.

These reductions are the result of changes in fishing methods, including a combination of strict operator performance standards, a ban on sundown sets, prohibition of Class C pest control devices, and a noticeable concern by fishery operators to reduce mortality. A second factor contributing to mortality decline is the decision by the major U.S. tuna canners to no longer accept tuna caught by setting on dolphins.

There were also less U.S fishermen operating in the ETP, as many either re-flagged to foreign flags or moved fishing operations to the western Pacific.

Kill-per-set changed little from 1990 to 1991 based on calendar year data. When shifting to fishing year data, kill-per-set declined by more than 25 percent between 1990 and 1991. The shift from calendar year to fishing year measurement was required to complete the data verification and analysis process for making foreign country comparability evaluations.

Exhibit 5
Annual Quota and Catch of Dolphins in the U.S. Yellowfin Tuna Purse Seine Fishery in 1990 and 1991

Species/Stock	Quota	1990	1991
Spotted dolphin			
northern offshore	20,500	3,169	636
southern offshore	5,697	26	0
coastal	250	0	0
Spinner dolphin			
northern whitebelly	5,321	1,204	189
southern whitebelly	2,506	57	1
eastern	2,750	315	81
Common dolphin			
northern tropical	1,890	0	0
central tropical	8,112	231	93
southern tropical	4,045	0	0
Striped dolphin			
northern tropical	429	0	0
central tropical	1,822	0	0
southern tropical	4,095	0	0
Other/non-quota species	n/a	81	4
TOTAL (not to exceed 20,500)		**5,083**	**1,004**

III. Subsistence Take of Marine Mammals

MMPA Section 101(b) provides an exemption to the moratorium against taking marine mammals for Alaskan Indians, Aleuts, or Eskimos if the taking is for subsistence purposes or for purposes of creating and selling authentic native articles of handicrafts and clothing. The ESA also allows subsistence takes of threatened or endangered species. Takes of endangered, threatened, or depleted species, however, may be limited by quota and, in some cases, other regulation. Two subsistence takes, bowhead whales in the Beaufort and Chukchi Seas and the northern fur seals on the Pribilof Islands, are subject to such limitations.

Bowhead Whales

Catch limits for subsistence take of bowhead whales are set by the International Whaling Commission (IWC). NMFS works cooperatively with the State of Alaska, the Alaska Eskimo Whaling Commission, the North Slope Borough, and the Minerals Management Service to manage bowhead issues. Exhibit 6 presents the landed and strike quotas and actual take for bowhead whales in 1990 and 1991.

Exhibit 6
Subsistence Take for Bowhead Whales in the Bering, Chukchi, and Beaufort Seas

	Quota		Actual Take		
Year	Landed	Strikes	Landed	Lost	Strikes
1990	41	47	30	14	44
1991	41	54	27	19	46

Northern Fur Seals

Subsistence take of northern fur seals on the Pribilof Islands is governed by NMFS regulations issued in 1986. These regulations establish dates for an annual harvest and limit the take by age and sex both to protect the herd and to meet the needs of the Island residents. In 1990, 1,077 animals were harvested on St. Paul and 164 on St. George. The 1991 harvest levels were 1,645 for St. Paul and 281 on St. George.

IV. Permit Programs

The MMPA authorizes NMFS to issue permits for taking or importing marine mammals for public display, scientific research, and species enhancement. The Act also allows NMFS to authorize incidental/ unintentional takes related to activities other than commercial fishing. This chapter discusses NMFS permit and authorization programs and describes notable permit and authorization requests.

Scientific Research, Public Display and Enhancement Permits

Under this permit program, NMFS reviews applications and decides whether to issue requested permits, monitoring the animals as long as they are maintained under the permit's authority. Currently, NMFS monitors 273 permits for scientific research and public display.

During the period from January 1, 1990 through December 31, 1991, NMFS reviewed 95 permit applications. Of these, 44 were issued for scientific research and 17 were issued for public display. One application for a permit was denied, 28 applications were returned or withdrawn, and 5 were awaiting final action at the end of 1991.

NMFS also processes permit modifications or authorizations of activities under permits. During 1990 and 1991, 191 permit modifications and authorizations were processed. Exhibits C-1 through C-5 in Appendix C provide an overview of major permit-related activities during the reporting period.

Permit Program Review

During the 1988 reauthorization of the Marine Mammal Protection Act, NMFS began a comprehensive review of the permit program. Following the enactment of the 1988 amendments to the Act, the scope of this review was broadened to include implementation of the amendments. The review included several solicitations of public comments and conduct of workshops dealing with major issues including the definition

of public display; what constitutes an acceptable education or conservation program; how to determine if proposed research is bona fide and non-duplicative; how to implement new enhancement authority enacted in 1988; care and maintenance standards for captive marine mammals; and application of the National Environmental Policy Act. As a result of the permit program review, and 1988 amendments to the MMPA, NMFS is planning to revise the permit regulations.

A number of actions have already been undertaken. For instance, NMFS re-examined its policy regarding the applicability of the Marine Mammal Protection Act (MMPA) to marine mammals born in captivity, and on September 5, 1991, published notice of its interpretation of its regulations. This notice clarified that the Marine Mammal Protection Act's pre-Act exemption applies only to marine mammals "taken" before the effective date of the Act. Thus, existing regulations apply to all captive-born marine mammals, except for those in captivity as of December 21, 1972.

Notable Permit Requests

Bottlenose Dolphin Quotas: Based on Southeast Fisheries Center reviews of population status and reproductive rates for bottlenose dolphin management areas from Texas to Florida, NMFS had expected to publish interim quotas for the capture of dolphins from the wild for public display purposes in early 1990. However, from January to March 1990 an unusually high mortality of bottlenose dolphins occurred in the Gulf of Mexico (Gulf). Given the possibility that the high mortality rate could have been the result of a contagious disease, NMFS asked that all permit holders voluntarily agree to suspend capture of bottlenose dolphins in the Gulf for 90 days in order to evaluate the die-off.

On May 31, 1990, NMFS published a notice of proposed rulemaking to establish regulations and revise quotas for removal of bottlenose dolphins for purposes of public display, scientific research and enhancement. Further, NMFS announced that due to the high dolphin mortality in the Gulf, it had adopted conservative interim quotas; reducing the quota from 91 animals in 1989 to 35 animals in 1990 (of which no more than 17 could be female).

When definitive conclusions could not be reached regarding the long-term impacts of the die-off, NMFS wrote to permit holders on August 20, 1990, requesting they not collect bottlenose dolphins until 1991 or 1992 except in emergency situations where collection would be absolutely

necessary to maintain a public display. Permit holders agreed and no dolphins were removed from the Gulf of Mexico under the interim quotas for 1990 and 1991.

Dolphin Feeding: In February 1989, NMFS received a request for a public display permit to feed wild dolphins from a tour boat. Following consideration of these activities, the NMFS Southeast Regional Office (SER) concluded that feeding marine mammals in the wild could alter their normal behavior and place them at greater risk of injury or death. After receiving additional comments from the Marine Mammal Commission and the public, NMFS denied the request for a public display permit. NMFS subsequently amended its regulations to clarify that feeding marine mammals in the wild is a form of "take" prohibited under the MMPA on March 20, 1991 (56 FR 11693). A tour boat operator from Corpus Christi, TX, however, filed suit against NMFS to reverse the decision. The case is pending. (See Chapter X for further discussion.)

Swim-with-the-Dolphins (SWTD) Programs: In 1988, NMFS began an environmental review of SWTD programs. Four public display facilities were authorized to use Atlantic bottlenose dolphins on an experimental basis through December 31, 1989, while NMFS decided whether the use of these mammals should continue and whether the taking of additional animals for such programs should be authorized.

On November 11, 1989, NMFS published a Draft Environmental Impact Statement (DEIS) examining this issue and several policy alternatives. In July 1990, NMFS extended the four experimental programs to allow further evaluation of the programs. Dolphin behavioral studies to assess the impact of SWTD programs were designed on the basis of a workshop held by the Marine Mammal Commission in 1991, and will be conducted in 1992.

Incidental/Unintentional Take Authorizations

Section 101(a)(5) of the MMPA allows the incidental, but not intentional, take of small numbers of marine mammals by U.S. citizens in specified areas if NMFS finds that (1) the impact on the species will be "negligible" and (2) there is not an "unmitigable adverse impact" on the availability of species for subsistence uses. This section applies to activities other than commercial fishing. The 1986 Amendments to the MMPA expanded Section 101(a)(5) to include depleted species. Before NMFS can issue an authorization, it must make the findings stated above and issue

regulations that include requirements for monitoring impacts of the activity on the species.

Currently, three specific activities are authorized for the taking of marine mammals under Section 101(a)(5) of the Act. They are the taking of ringed seals incidental to seismic activities on the ice in the Beaufort Sea; the taking of six species of marine mammals incidental to energy exploration in the Beaufort and Chuckchi Seas; and the taking of seals and sea lions incidental to launches of Titan IV space rockets from Vandenburg Air Force Base, California.

V. Status Reviews, Conservation and Recovery Plans, and Other Species Management Actions

Section 115 of the MMPA, added by the 1988 amendments, establishes procedures for reviewing the status of marine mammal species or stocks to determine whether they are depleted, and directs NMFS to prepare conservation plans for depleted species or stocks as soon as possible. NMFS is not required to prepare a conservation plan if the plan would not promote conservation of the species or stock. Section 115 also provides specific deadlines for completing plans for north Pacific fur seals and Steller sea lions.

In addition to MMPA requirements for conservation plans, the ESA requires NMFS to prepare recovery plans for endangered and threatened species. NMFS is in the process of developing guidelines for recovery programs which will ensure that recovery plans also meet the conservation plan requirements of the MMPA. Of the 14 marine mammal species listed as endangered or threatened, recovery plans are needed for 9 of these species. NMFS recently developed plans for humpback whales and right whales and is developing a plan for the Steller sea lion. A recovery plan for the Hawaiian Monk Seal was completed in 1983.

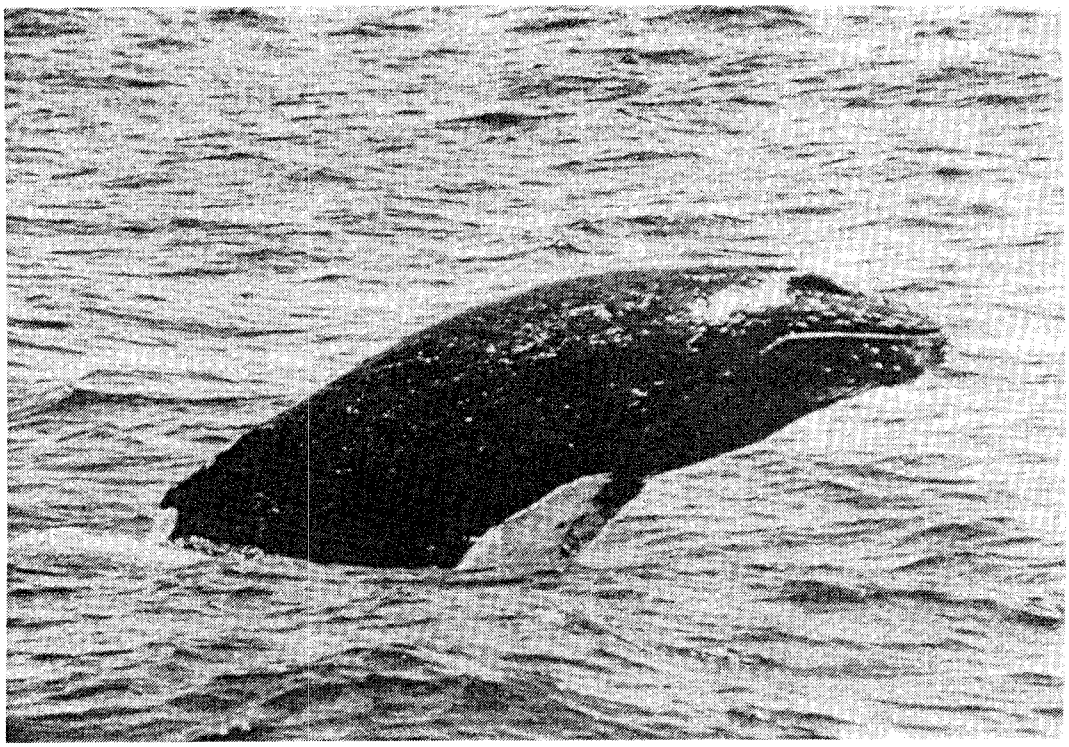
This chapter summarizes species management activities undertaken by NMFS during 1990 and 1991. It discusses the Steller sea lion recovery plan, the humpback and right whale recovery plans, and an Hawaiian monk seal recovery plan update. The chapter also describes activities related to species designation decisions for the eastern spinner dolphin, the northern offshore spotted dolphin, the Gulf of Maine population of the harbor porpoise, Atlantic bottlenose dolphins, and the Pacific gray whale. The draft recovery plan guidelines and the draft northern fur seal conservation plan were still under review at the end of 1991 and, therefore, are not discussed in this report.

Steller Sea Lion

On November 21, 1989, the Environmental Defense Fund and 17 other environmental groups petitioned NMFS to list the Steller sea lion as an endangered species. Via an emergency rule, NMFS listed the Steller sea lion as threatened species on April 5, 1990. This rule prohibited shooting at or near the animals, established three-nautical mile buffer zones around the major sea lion rookeries in the Bering Sea, Aleutian Islands and Gulf of Alaska, and limited to the number of animals that could be taken incidental to fishing in Alaska to 675 animals. On July 20, 1990, NMFS issued a proposed rule to make the listing permanent. Following a public comment period, the final rule was published on November 26, 1990.

In order to protect the Steller sea lion from potential localized depletion of food resources, NMFS has also restricted fishing activities in Alaska waters. On June 13, 1991, NMFS published an emergency rule establishing 10 nautical mile "no trawl" zones around sea lion rookeries in the Gulf of Alaska. This rule also divided the Gulf of Alaska into three longitudinal areas and allocated the catch within these areas to limit spatial depletion of food resources. This rule further limited the total amount of fish that could be taken each quarter. On November 18, 1991, NMFS issued a proposed rule to prohibit groundfish trawling within 10 nautical miles of all sea lion rookeries from the central Gulf of Alaska through the Aleutian Islands and Bering Sea.

Following the listing of the Steller sea lion as threatened, NMFS appointed a Steller sea lion recovery team during April 1990. The recovery team submitted a draft recovery plan to NMFS on February 15, 1991, which NMFS released for public review and comment (March 15, 1991; 56 FR 11204). The recovery team submitted a final draft plan to NMFS on October 3, 1991, for NMFS review and approval. The final draft incorporated, to the maximum extent possible, the comments that were submitted to NMFS during the technical review process. The plan discusses the natural history and current status of the species, as well as the known and potential human impacts on the species. The plan also recommends management and research actions to aid the species' recovery. Final adoption of the recovery plan is anticipated in 1992.



Megaptera novaeangliae (Humpback whale)
Photo by: Scott Benson, NMFS

Humpback Whale Recovery Plan

Severely affected by commercial whaling, the population of the Humpback whale declined from a pre-exploitation estimate of 125,000 animals to between 10,000 and 12,000 animals. The species was listed as endangered on June 2, 1970.

In July 1987, NMFS appointed a recovery team to develop a plan to help the species increase in abundance. The team developed a draft recovery plan which NMFS submitted for public comment in October 1989. The final plan, which was published in November 1991, delineates actions required to support recovery of the species.

Summarizing current information on humpback whales, the plan identifies problems that may interfere with recovery and recommends research or management actions to restore and maintain the humpback whale as a viable member of the ecosystem. The Plan's long-term goal is

to increase the species' population to at least 60 percent of the number that existed prior to commercial exploitation. The interim goal is to double current population within 20 years. To achieve these goals, the plan establishes the following objectives: maintain and enhance habitat; identify sources of and reduce human-related mortality; measure and monitor key population parameters.; and promote coordinated administration of the plan.

Right Whale Recovery Plan

The northern right whale is considered to be the world's most endangered large whale. The best estimate of its North Atlantic population is 300-350 individuals. Threats to viability and recovery include human impacts (e.g., ship strikes, net entanglement), habitat degradation, and inbreeding.

To meet the requirements of the ESA, NMFS appointed a recovery team in July 1987. The draft recovery plan became available for public comment in February 1990. NMFS adopted a final plan in December 1991.

Recognizing that some measures designed to assist the northern right whale are in place, the plan presents an action plan that includes:

- An aggressive education and enforcement program to reduce the risks of ship collisions and entanglement in fishing gear;
- Possible designation of three areas of "critical habitat" in U.S. waters; and
- Restriction of recreational whale watching activities directed at northern right whales.

The plan also calls for additional research on northern right whale ecology and vulnerability.

The plan recommends priority be given to the western North Atlantic population of northern right whales. As more information is obtained on the North Pacific population, the plan recommends that a separate recovery effort be initiated for those animals. The plan also recommends that NMFS take steps to coordinate and, as appropriate, combine efforts benefitting the northern right whale with other species, especially the humpback whale.

Hawaiian Monk Seal Recovery Plan

The Hawaiian monk seal came close to extinction during the 19th Century as a result of harassment and over-exploitation. After a modest comeback during the first half of this century, the population declined again. The species is currently listed as endangered. A recovery plan was adopted by NMFS in 1983, but the plan quickly became outdated.

The team held additional meetings in 1989, 1990 and 1991. At these meetings the team reviewed its work plan for updating the recovery plan and discussed and reviewed critical work on population status, the "mobbing" problem (when multiple males attempt to mate simultaneously with a single female), and the Head Start project (designed to enhance the survival of young seals). In a related management action, NMFS published final rules establishing a moratorium on pelagic longline fishing within a Protected Species Zone extending 50 nautical miles around the northwest Hawaiian Islands and in the corridors between the islands.

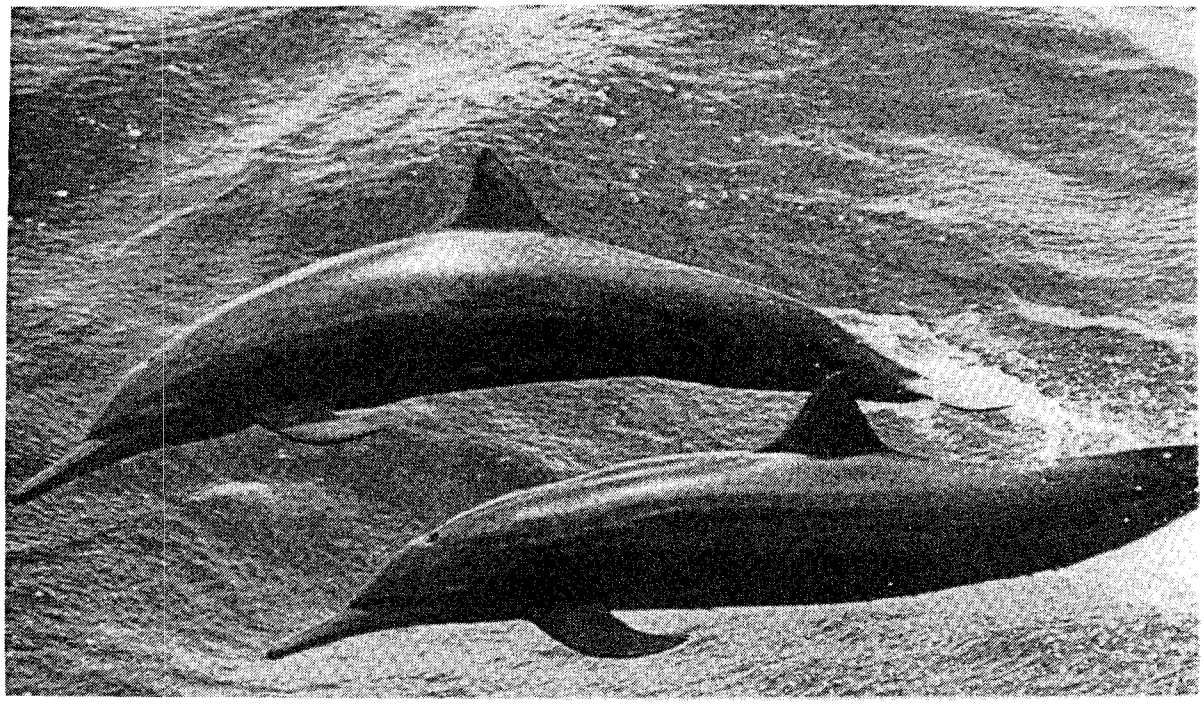
Eastern Spinner Dolphin and Northern Offshore Spotted Dolphin

In August 1991, NMFS received petitions requesting that the eastern spinner dolphin be listed as threatened under the ESA and depleted under the MMPA. NMFS determined that the petition requesting the threatened listing presented substantial information and that listing may be warranted. To ensure a comprehensive review of the petition, the Service solicited information and public comments. Action on both petitions was pending at the end of 1991.

NMFS received petitions on October 29, 1991 to list the northern offshore spotted dolphin as threatened and depleted. Following review of the petitions, the Service determined that the request for depleted listing may be warranted and requested information and comments. As of the end of 1991, no determination was made regarding the request to list the species as threatened.

The final determination for each of these petitions will be based, in part, on estimates of species' abundance provided by research vessel surveys and other studies of offshore dolphin stocks in the ETP. Data presented in these studies suggest possible changes in the structure of offshore

spotted dolphin stocks. Therefore, re-analyses of the abundance estimates and mortality estimates for spotted dolphin stocks is warranted before a final determination can be made.



Stenella longirostris (Eastern spinner)
Photo by: Scott Benson, NMFS

Gulf of Maine Population of Harbor Porpoise

The greatest concentration of the southern Nova Scotia - North Carolina harbor porpoise population occurs during the summer in the Bay of Fundy and the northern Gulf of Maine. This population, known as the Gulf of Maine population, is adversely affected by mortalities incidental to commercial gillnet fishery operations.

The Sierra Club Legal Defense Fund submitted a petition to NMFS on September 18, 1991 requesting that this population of harbor porpoise be listed as threatened under the ESA. On December 13, 1991, the Service determined that listing may be warranted and solicited information and comments regarding the status of the Gulf of Maine harbor porpoise population.

The Harbor Porpoise Working Group was established in December 1990 to investigate harbor porpoise interactions with commercial fisheries. It is composed of researchers, environmentalists, industry representatives and state and Federal managers.

Coastal Bottlenose Dolphin

In 1987-1988, more than 740 Atlantic bottlenose dolphins were found dead, stranded along the U.S. east coast from New Jersey to Florida. As a result of this die-off, NMFS concluded that the mid-Atlantic coastal-migratory stock may have declined by more than 50 percent and that stock abundance is therefore below OSP. In response to these findings and a petition from the Center for Marine Conservation, NMFS proposed that the coastal migratory stock of bottlenose dolphins be designated as depleted under the MMPA on August 15, 1991. At the end of 1991, NMFS had not yet made a final determination.

Gray Whales

On March 7, 1991, NMFS received a petition from the Northwest Indian Fisheries Commission and others to remove the eastern North Pacific stock of gray whales from the List of Endangered and Threatened Wildlife (the List). On November 22, 1991, NMFS published a determination that the eastern North Pacific (California) stock of gray whales should be removed from the List. No change to the status of the western stock was proposed.

NMFS made this proposal based on evidence that stock's population, at 21,113 (± 688) in a 1987/88 survey, exceeded the pre-exploitation estimate of 15,000 to 20,000 individuals. Furthermore, the data indicate that the gray whale population, while below estimated historic carrying capacity of ≈24,000, is within OSP and increasing at an annual rate of 3.2 percent (± 0.5 percent). NMFS also determined that the stock is not in danger of extinction throughout all or a significant portion of its range, nor is it likely to become endangered again. At the end of 1991, the proposed de-listing was pending.

VI. Stock Assessments

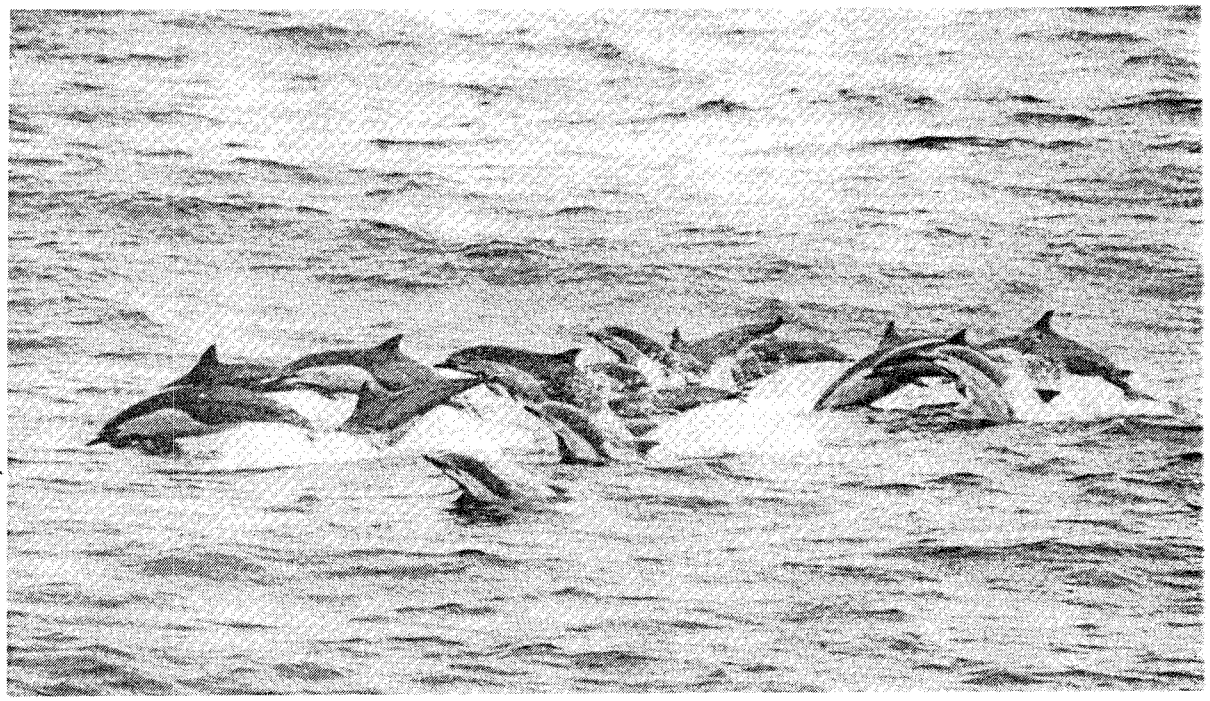
Management decisions regarding marine mammals require the best possible data on the abundance, population trends, distribution, and structure of species and stocks. NMFS, therefore, actively engages in stock assessment research. To improve the techniques used to evaluate population parameters (e.g., abundance, trends, distribution), NMFS also undertakes projects to improve these methods. Stock assessment activities are implemented by staff in the Regional Offices and Fishery Science Centers and through contracts and grants.

Several methods are used to provide data for stock assessments, including aerial surveys, ship surveys, physical tagging, radio and satellite tagging, photo-identification, and tissue and blood sampling. Aerial and ship surveys are used to develop abundance estimates. When counts at haul-outs are taken, aerial surveys are sometimes combined with radio tagging to correct for the proportion of the population that remains in the water. Tagging and photo-identification methods focus on migration, feeding, and other behavioral characteristics. Researchers use tissue and blood samples to analyze migration, feeding behavior, and anthropogenic contaminants that could adversely affect the species.

This chapter summarizes stock assessment activities and findings during 1990 and 1991 for ETP dolphins, coastal stocks, depleted stocks, north Atlantic right whales, and humpback whales.

Assessments of ETP Dolphin Stocks

Since the enactment of the MMPA in 1972, approximately 1.25 million dolphins have been killed incidentally to yellowfin tuna purse seine fishing operations for in the ETP. Three species of pelagic dolphins are primarily involved in this fishery interaction: spotted dolphins, spinner dolphins, and common dolphins. Striped dolphins are also taken but in much smaller numbers. In response to the level of dolphin take, NMFS has launched several assessment programs.



Delphinus delphis (Common Dolphin)
Photo by: Scott Benson, NMFS

Dolphin Stock Assessment Program

In 1986, NOAA commenced a series of research vessel surveys to monitor changes in the relative abundance of spotted, spinner, and common dolphin stocks affected by the yellowfin tuna purse seine fishery in the ETP. The NOAA research vessels *David Starr Jordan* and *McArthur* conducted the fifth survey in 1990. The program was designed to detect a 40 percent change over 6 years (or 5 percent per year) in the abundance of these species. Because the coefficient of variation has been higher than expected, these data are not relevant for trend analysis. The data, however, can be used to determine absolute estimates of abundance, which, in turn, can be used to gauge the impact of mortality on the population. Exhibit 7 presents estimates of dolphin abundance for 1986 to 1990.

Exhibit 7
Relative Abundance Estimates of ETP Dolphins
(N is estimate in thousands, SE is standard error, CV is coefficient of variation)

		1986	1987	1988	1989	1990
N. Offshore Spotted	N	1134.2	1582.6	2205.5	1993.6	658.3
	SE	346.5	402.8	575.1	720.7	195.2
	CV	.305	.255	.261	.362	.297
S. Offshore Spotted	N	236.0	475.8	85.8	451.9	87.7
	SE	175.4	230.0	58.2	346.0	75.6
	CV	.743	.483	.678	.766	.863
Eastern Spinner	N	603.7	444.7	754.2	748.8	391.2
	SE	286.1	146.0	327.9	318.8	163.6
	CV	.474	.328	.435	.426	.418
Whitebelly Spinner	N	706.1	1220.7	1398.4	1280.0	363.3
	SE	371.1	786.7	777.6	486.1	201.0
	CV	.526	.644	.556	.380	.553
N. Common	N	390.0	23.5	1272.4	473.6	177.7
	SE	192.4	18.2	921.7	345.5	128.7
	CV	.493	.773	.724	.730	.724
C. Common	N	306.2	348.1	1487.6	261.0	568.0
	SE	216.1	152.6	775.2	218.4	383.5
	CV	.706	.438	.521	.837	.675
S. Common	N	2217.3	152.0	2896.5	3664.0	1657.5
	SE	1525.3	85.1	1712.0	2601.5	1147.9
	CV	.688	.560	.591	.710	.693
N. Striped	N	201.1	40.7	323.4	185.2	111.6
	SE	108.6	15.2	180.5	76.5	69.2
	CV	.540	.373	.558	.413	.620
S. Striped	N	612.0	1300.8	1927.9	1611.4	1115.6
	SE	174.2	454.2	685.3	485.4	309.7
	CV	.285	.349	.355	.301	.278

Current research methods cannot detect changes in population trends with a high level of precision. Changes on the order of 5 to 10 percent per year would take a minimum of 10 years to detect. Present methods would be unable to detect the current population growth rate (estimated at one to three percent growth accounting for fishery related mortality), even over a 10-year study period. Given this level of uncertainty, NMFS believes that management of the stock requires (1) long time series of sighting data obtained from tuna vessels and (2) limits on mortality based on an international, stock-specific quota system. The quotas would be based on the best estimates of abundance derived from research vessel surveys. One approach which has been proposed for managing fishery-marine mammal interactions in U.S. waters (i.e., NMFS's proposed management regime) could also be applied to the ETP dolphin populations.

School Size Estimates

Abundance estimates are based on estimates of school size. Experience has indicated, however, that observer data was often biased and could generate inaccurate estimates of school size. In response to these survey problems, SWFSC launched an aerial photography program that enabled researchers to make accurate counts of school size. The data yielded by the aerial photographs were than used to calibrate observer data. For 10 out of 23 observers, the calibration improved the observer estimates. Before calibration, most of the estimates tended to be low.

Fishery Dependent Assessment Program

A computer model was used to evaluate two types of dolphin sampling and analysis methods for detecting population trends. It was designed to detect a population decreasing by a constant rate of 10% per year. Although the tuna vessel sampling method overestimated the abundance, and the research vessel method underestimated the abundance, both methods could be used to recognize a 10% annual rate of decrease.

Additional analyses concerning the statistical power of estimating trends in abundance of ETP dolphins were completed. The results of these analyses concluded that despite the apparent great density of sightings data in tuna vessel observer data, trend estimates derived from these data are generally not precise. The only way to improve the power of the tuna vessel observer data estimates and the detectability of trends in abundance would be to reduce the variability in annual abundance, both

within years and between years. It is possible to reduce variability in estimates derived only from tuna vessel observer data by controlling the effort of the tuna fleet, which is not feasible, or by some sort of improved stratification of the data. The precision and accuracy of these analyses using tuna vessel observer data was not appreciably worse than the results to date from the MOPS research vessel data. The MOPS estimates are also characterized by large variance within years and large changes in abundance estimates between years. In this sense, it was found that tuna vessel observer data and research vessel data may be roughly equivalent in terms of usefulness for management, except that the tuna vessel observer data time series is much larger than the research vessel data time series, and is therefore, currently more useful for trend analyses.

Coastal Marine Mammal Program

Harbor Porpoise (U.S. West Coast and Alaska)

The National Marine Mammal Laboratory (NMML) was involved in a number of research efforts to develop minimum population estimates for the harbor porpoise along the Washington and Oregon coasts and in Alaska in 1990 and 1991. Initial estimates suggest that harbor porpoise population size is 3,000 to 11,000 along the Oregon coast and 5,000 to 18,000 along the Washington Coast. In Alaska, initial results from surveys indicate high densities in southeastern Alaska with low numbers in Bristol Bay and Cook Inlet.

Harbor Seal (U.S. West Coast and Alaska)

NMML conducted a census of harbor seals in 1990 and 1991 along the Washington and Oregon coasts using aerial surveys of haul-outs combined with radio tagging. In Washington, the preliminary count was 23,199. Applying a correction factor, which ranges from 1.5 to 1.8, NMML estimates that the Washington population of harbor seals exceeds 30,000. Furthermore, the coefficient of variation was less than 0.2 (lower than the target of 0.3), indicating that the estimate has a high level of precision. For Oregon, the highest counts were obtained during molt season (6,958 individuals). The correction factor, required to estimate the size of the Oregon population, will not be available until 1992.

Aerial surveys were also conducted in Alaska to obtain minimum population estimates for Bristol Bay, Prince William Sound, and the Copper River Delta. The north side of the Alaska peninsula was also surveyed to obtain comparative counts and assess trends. Using a sum of mean counts from all areas, the surveys yielded a total count of 13,708 animals in the southern areas and 8,962 animals along the north side of the peninsula.

Under a cooperative agreement between NMFS and the California Dept. of Fish and Game (CDFG), CDFG biologists conducted annual aerial, radio tagging, and feeding surveys in 1990 and 1991 to assess status of the harbor seal in California. The 1990 and 1991 surveys yielded counts of 11,673 and 23,089 respectively. Analyses indicate that the California population may be near or at OSP levels. Furthermore, the radio tagging surveys showed movement between the mainland and offshore channel islands and movement north to San Francisco Bay.

California Sea Lion (California)

The California sea lion inhabits west coast waters from southern Canada to the southern coast of Mexico. For assessment purposes, researchers divide the population into three stocks: one in the U.S. and two in Mexico. Quantitative methods for estimating the U.S. population are currently unavailable, but increasing births at U.S. rookeries suggest that status of the stock has improved since the last survey was conducted in 1986.

In 1990, surveys counted approximately 26,700 pups in U.S. waters. Researchers believe that this pup count represents over 30,000 births, corresponding to a total population of the U.S. stock of 107,362. The current growth rate is assumed to be over 11 percent but immigration from the Mexico stocks may account for some of this growth. Data are currently unavailable to substantiate this hypothesis. Cooperative tagging studies and surveys to address several stock assessment issues are planned by the U.S. and Mexico.

Northern Elephant Seal (California)

The northern elephant seal, which inhabits the Pacific coast of the U.S., was harvested for oil in the late 19th century. As a result of exploitation, the population declined to fewer than 100 individuals by the turn of the century. Since then, the population has recovered significantly. Population growth is documented by the growth of existing rookeries

and the colonization of new rookeries. Data from 1991 show that 20,900 pups were born at U.S. rookeries corresponding to a total population of 74,000 animals.

Foraging behavior of the northern elephant seal has been studied at San Miguel Island, California to understand the limiting factors associated with rapidly expanding pinniped populations. In 1990, research efforts focused on feeding location and strategy between the breeding season (late winter) and the molt (summer). Females migrated 2000 km out from San Miguel Island and males migrated to several areas including the Aleutian Islands, the eastern Gulf of Alaska, and the deeper waters off Queen Charlotte Island, Canada. The study also suggested that the adults undertake two long migrations each year.

Delphinids, Beaked Whales, Dall's Porpoise and Other Small Cetaceans (California)

Currently, abundance estimates are available only for some of the more common cetacean species in California. Most of these estimates, however, are more than 10 years old and lack statistical confidence limits. In response, NMFS has initiated aerial and ship surveys to obtain minimum population estimates for cetacean species in California waters. A workshop is tentatively scheduled at the Southwest Fishery Science Center (SWFSC) in September 1992 to review information provided on (1) population and stock structure, biological basis, and management recommendations; (2) population estimates; (3) population growth rates and trends; (4) status relative to OSP and carrying capacity; and (5) mortality caused by commercial fishery incidental take, subsistence take, entanglement, and other causes. This information will serve as the scientific basis for species management and NMFS' proposed management regime.

Atlantic Bottlenose Dolphin

The Southeast Fishery Science Center (SEFSC) sponsored and conducted numerous research projects in 1990 and 1991 to obtain better data and an improved understanding of Atlantic bottlenose dolphins. The SEFSC is conducing cooperative aerial surveys with the Northeast Fishery Science Center (NEFSC) from Georges Bank and the Gulf of Maine to Cape Hatteras to determine stock abundance and distribution. In addition, the two centers are performing an interplatform calibration experiment between two aircraft: one accommodating two observers in a clear nose cone and one having viewing ports on the aircraft sides.

In 1990-91, Mote Marine Laboratory and Dolphin Biology Research Associates, Inc. (DBRA) continued their research efforts begun in the late 1980s. The Mote Marine Lab is conducting aerial surveys of the Indian-Banana River complex designed to detect, at a minimum, halving or doubling of inter-annual population abundance. The surveys will be compared with aerial surveys conducted in 1979, and will be used to develop an enhanced data base for future monitoring of population dynamics. DBRA is continuing its small boat and photo-identification surveys to monitor population in Sarasota and Tampa Bays.

Other surveys are being conducted in Biscayne Bay, Mississippi Sound and the Texas and Florida Gulf Coasts. The purpose of these studies include investigation of dolphin behavior in areas of high human population density, examination of population changes and trends, and development of data bases. One notable finding from research following the Megaborg oil spill off the Texas coast suggested that dolphins avoided mousse oil but not slick oil. Bottlenose dolphins, therefore, may be at high risk to hazardous dosages of freshly spilled petroleum hydrocarbons.

North Atlantic Harbor Porpoise

In 1991, the NEFSC continued studies to assess the population size, annual bycatch, and growth rates of the north Atlantic harbor porpoise. Two ship surveys and one aerial survey were conducted to estimate population size. Preliminary analysis suggests that 45,000 to 60,000 animals reside in the northern Gulf of Maine and Bay of Fundy area in the summer. Final analyses should be available in early 1992.

Other North Atlantic Delphinids

NEFSC conducted ship surveys to assess the population size of delphinid stocks along the continental shelf edge from Cape Hatteras to Georges Bank. In addition, some transects were conducted through Gulf Stream warm core rings and across the Gulf Stream north wall. Covering 4032 km of trackline, the survey sighted 56 marine mammals and eight sea turtles. Analysis of the data is currently underway.

Gulf of Mexico Cetaceans

In 1990, the SEFSC conducted monthly aerial surveys from January to June in the offshore waters of the northern-central Gulf of Mexico. The surveys sighted 145 cetacean herds consisting of 4,199 animals from 15 species. Pantropical spotted dolphin and striped dolphins were the most abundant species.

In May 1990, the NOAA research vessel *Oregon II* conducted sighting surveys to assess the feasibility of using ship surveys to examine marine mammal distribution and abundance and determine population trends in offshore waters. Pantropical and bottlenose dolphins were the most common of 36 species identified from 96 marine mammal sightings. When the survey was replicated during May 1991, the pantropical spotted dolphin was the most frequently sighted odontocete and the Bryde's whale was the most frequently sighted mysticete.

Depleted Marine Mammals

Hawaiian Monk Seal

During 1990 and 1991, all five major breeding populations were monitored sufficiently to obtain good estimates of the number of births and representative beach counts.

In 1990, births were much lower than expected based on trends in the late 1980s. Births were down 40 percent and were depressed at each major breeding island. By 1991, births were back in the normal range except at Lisianski Island and at French Frigate Shoals (FFS). The overall beach counts of the monk seal has declined to less than 1,500 individuals.

The continued reduction in births at Lisianski and FFS was attributable to lower birth rates rather than fewer adult females. A lower survival rate of immature seals was also detected in 1991. These findings combined with evidence of lower recruitment in other species suggests that the population may be food stressed.

NMFS is engaged in two efforts designed to support recovery of the species. First, implementation of the Head Start project and reintroduction of rehabilitated females at Kure Atoll have resulted in an increase in both the number of births and the total seal count. Second,

NMFS is engaged in mobbing research and use of the experimental drug Decapeptyl to suppress aggressive socio-sexual behavior.

Bowhead Whale

NMML conducted field research on bowhead whales during the spring of 1991 using photographic techniques to measure body lengths of whales and to identify individual animals for life history studies. As of the end of 1991, the photo-identification collection included 2,500 images that could be used for re-identification purposes. Preliminary analysis of the data shows an age structure dominated by immature animals, a finding that suggests that the population is increasing.

Steller Sea Lion

NMFS conducted aerial and ship-based surveys in Alaska during June and July 1990. Aerial surveys were conducted in 1991. The data from these surveys showed that the count had decreased from 38,860 in 1989 to 37,626 in 1990 and 36,459 in 1991. Data from the 1990 surveys showed that increases in the central and eastern Aleutian Islands was offset by decreases in the eastern and central Gulf of Alaska. Given the statistical power of current survey methods, the changes detected in 1990 and 1991 are considered statistically insignificant.

Research was also conducted on foraging behavior and pup physiology. To analyze foraging behavior, researchers attached satellite transmitters to adult seals. Data showed that duration and distance of winter foraging trips were greater than summer trips. To study the physiological condition of pups, researchers took blood samples and other physical measurements. Results are pending.

Northern Fur Seals

NMFS studied northern fur seals at their breeding rookeries on the Pribilof Islands, Alaska in the southeastern Bering Sea, on Bogoslof Island in the Central Aleutians, and on San Miguel Island in the California Channel Islands. In addition to conventional population counts, researchers also used radio tag surveys to study the migration patterns of adult females.

The results of surveys of adult males on the Pribilof Islands were mixed. Pup production continued to decline at an annual rate of 6.0 to 6.5 percent on St. George Island, but no significant trend was detected on

St. Paul Island. Entanglement rates with fishing gear (0.36 percent) have not changed significantly from 1985. The small herds on Bogoslof and San Miguel Islands continue to grow slowly.

In the summer of 1990, researchers examined dead pups on St. Paul Island. A quarter of the dead pups had a new pathological conduction (called White Muscle Disease) that causes severe muscle lesions. Analysis of dead pups in the fall of 1990 showed that the disease had abated. The source and impact of the disease are unknown.

Radio and satellite tagging surveys were conducted to study migration patterns. In 1990, scientists from the Scripps Institution of Oceanography attached radio transmitters to adult females and pups. Preliminary results suggest that migration is well dispersed across the southern Bering Sea and through most passes of the eastern and central Aleutian Islands. Satellite tagging in autumn 1990 showed migration of females from St. Paul Island through Gulf of Alaska to 54°N before the transmitter batteries lost power. Satellite tagging in 1991 showed females migrating out of the Bering Sea into the North Pacific while males remained in the Bering Sea.

Blue and Humpback Whales

Populations of both blue whales and humpback whales in California are depleted due to earlier whaling activity. Both species are endangered and vulnerable to entanglement in drift gillnets off California. Currently, mortality incidental to commercial fishing is estimated to be less than one animal per year.

Abundance and population structure of both species are poorly understood. To improve estimates of minimum population size, NMFS has used photographic sight/resight methods. Researchers are analyzing the photographic data and will present their findings at a Status of Cetacean Stocks Workshop at SWFSC, tentatively scheduled for September 1992.

North Atlantic Right Whale Program

NEFSC has administered a vigorous research program targeting the north Atlantic right whale since the mid 1980s. Methods include radio/satellite tagging, genetic analysis, and photo-identification. The best data available indicate that the population of the species is 300-350 individuals, recovering at a rate of three to four percent annually. The

population, however, is threatened by human impacts including ship strikes and fishing gear entanglements. Nearly 60 percent of the population is affected by human activities, accounting for a third of the total mortality. Young animals are at greatest risk with 20 to 30 percent of mortality resulting from ship strikes. In light of the small population size, inbreeding is another factor that could adversely affect the viability of the north Atlantic right whale. NMFS is also concerned that a precipitous event (e.g., die-off) could threaten the species with extinction.

The NEFSC-administered research program has also yielded notable findings with respect to stock structure and behavioral characteristics. Researchers have identified five major habitats or congregation areas: southeast U.S. coastal waters, Great South Channel, Cape Cod Bay, Bay of Fundy, and the Scotian Shelf. Genetic analysis suggests that the population is based on three "matrilines", or distinct lineages based on mitochondrial DNA similarities and differences as traced through females. There is uncertainty, however, with respect to the nursery/feeding grounds for one of these lines and the wintering grounds for 70 percent of the population. Based on tagging analyses, researchers have determined that individuals undertake lengthy and somewhat distant excursions. Although this observation casts new light on movement and habitat use, the purpose of these excursions is not understood.

North Atlantic Humpback Whale Program

In conjunction with academic institutions and other organizations, NEFSC has administered an active research program targetting north Atlantic humpback whales since the mid-1970s. Containing photographs of more than 4,000 individuals, a photo-identification data base is the cornerstone of the research program. This data base is located and maintained at the College of the Atlantic in Bar Harbor, Maine.

The population estimate for the north Atlantic population is approximately 5,100 individuals, increasing at an annual rate of nine percent. The precision of these estimates, however, is low. The population in the spring from Cape Hatteras to Nova Scotia was estimated at over 650 individuals. Researchers have identified five distinct summer feeding areas: Gulf of Maine, Gulf of St. Lawrence, Newfoundland and Labrador, western Greenland, and the Iceland-Denmark Strait. Humpback whales migrate to the Caribbean during the winter for courtship, breeding, and calving. The majority of individuals

can be found off the Dominican Republic with the remainder distributed along the coast of Puerto Rico, through the Virgin Islands, along the eastern Antilles, and south to Venezuela.

Other Research Programs and Studies

Marine Mammal Sightings Surveys

In 1990, the SWFSC completed a four month survey counting dolphins and assessing their habitat in the eastern tropical Pacific. The primary objective of the survey was to collect information to estimate the density, size, and species composition of dolphin schools in the ETP in order to assess trends in population sizes. Other objectives included the collection of information with which to investigate the physical and biological environment of dolphins, and to collect data to contribute to ongoing studies of U.S. and foreign flag fishing vessel interactions with dolphins in the ETP.

In 1991, the SWFSC completed the first California Marine Mammal Survey (CAMMS). The survey was conducted north of Mexican waters and south of the Oregon border and out to approximately 200 nautical miles. The overall objectives of the project were to estimate abundance and to understand distribution of dolphins and whales which are commonly found in California waters and incidentally killed in U.S. commercial gillnetting operations. The survey was designed to collect data for estimating the density, size, and species composition of dolphin and whale aggregations in order to make mean and minimum estimates of their population sizes. Results are pending.

VII. Stranding Networks and National Marine Mammal Tissue Bank

During 1990 and 1991, NMFS completed its review of the stranding network program, implemented changes to improve the program, established the marine mammal tissue bank, and created a Task Force on Unusual Mortality. This chapter describes these activities and the highlights of Regional programs.

Program Review

During 1990, NMFS completed its review of stranding network capabilities and actions required to improve data collection. The review found differences between the Regional programs. The review also identified basic data that should be collected at stranding events. In response to these findings, NMFS recommended the standardization of certain elements and developed a common set of program goals. These goals are:

1. To achieve maximum feasible reporting of and response to stranding events;

2. To achieve accurate documentation of data on stranding report forms;

3. To provide for the protection, welfare, and humane treatment (including, when appropriate, euthanasia) of live stranded animals;

4. To provide, when appropriate, for the rehabilitation of sick or injured marine mammals and the care of abandoned or orphaned immature animals. Once rehabilitated, it will be a primary goal that such animals be returned to the wild. As a secondary goal, such animals may serve as a substitute for capturing animals from the wild under public display permits;

5. To gain the maximum amount of scientific information from dead stranded marine mammals and, where consistent with other goals, from live stranded marine mammals;

6. To generate information that will assist in making management decisions on both marine mammals and fisheries;

7. To the extent feasible, tissues from stranded marine mammals should be collected, curated in accordance with professional standards, and provided to legitimate researchers and to institutions that maintain marine mammal collections meeting curatorial and archival standards;

8. To collect and preserve tissues in accordance with standard protocols which can be used to monitor natural mortality and the types and levels of environmental contaminants; and

9. To disseminate accurate information from marine mammal strandings for scientific and public education purposes.

Recent mortality events revealed a lack of baseline data and the need for high quality tissue samples from freshly dead animals. NMFS has responded to these deficiencies by preparing a field guide that provides protocols for information collection and tissue sampling. In addition, the Service has also prepared and pre-positioned tissue sampling kits throughout the Southeast Region. To facilitate research efforts associated with stranded animals, the Assistant Administrator for Fisheries determined that a research permit was not required for tagging stranded animals that have been rehabilitated and released. Tagging or marking allows for identification of animals that re-strand. Radio tagging facilitates monitoring the movements of rehabilitated animals.

Tissue Bank

Following the 1987-1988 unusual mortality event involving bottlenose dolphins on the eastern U.S. coastline, NMFS determined that researchers lacked adequate baseline data on anthropogenic contaminants to determine the significance of levels found in animals associated with this event. This deficiency was particularly acute with respect to the impacts of anthropogenic contaminants. In response, NMFS initiated steps to establish a National Marine Mammal Tissue

Bank. A number of activities have been undertaken associated with the tissue bank, including a rulemaking regarding the disposition of tissues, preliminary studies, and the development of quality assurance (QA) procedures.

Rulemaking

On August 20, 1991, NMFS published regulations that clarified authority to salvage, retain or transfer tissues from stranded marine mammals. The regulations allow salvage of tissues from stranded animals by authorized individuals and requires that tissues be properly curated and registered with the appropriate NMFS Regional office. In addition, the regulation established procedures for transfer of tissues. Transfer of tissues to authorized individuals is allowed without the need for further authorization. Agency authorization is required, however, when tissues are transferred to individuals not already holding authorization.

Preliminary Studies

NWFSC has been conducting analyses to establish baseline concentrations of selected chemical contaminants and biotoxins in marine mammals. Specific contaminants of concern include chlorinated hydrocarbons (e.g. PCBs), chlorinated pesticides, and heavy metals. The studies have used tissues obtained from pilot whales stranded along the Atlantic Coast, bottlenose dolphins stranded in the Gulf of Mexico, and gray whales stranded along the Pacific and Alaska coasts. Results have showed elevated levels of PCBs and several heavy metals in pilot whales. Several mother-fetus pairs were analyzed and results, to date, show maternal transfer of selected metals (e.g., cadmium) to the fetus. Concentrations of chlorinated hydrocarbons and some trace metals in certain bottlenose dolphin tissue samples prompted researchers to expand sampling efforts in September 1991. In contrast, concentrations of anthropogenic contaminants in gray whales were generally less than the levels in pilot whales and bottlenose dolphins, and are considered to be below levels of toxicological concern.

Quality Assurance Procedures

The National Institute of Standards and Technology (NIST) is developing a Quality Assurance (QA) program to ensure accuracy, precision, level of detection, and intercomparability of chemical analyses of tissue samples.

NIST is implementing this program through (1) interlaboratory comparison exercises and the development of Standard Reference Materials (SRMs). Interlaboratory comparisons involve the preparation of tissue control materials using tissues collected from stranded pilot whales. NIST distributed the samples to NWFSC and several other laboratories for trace element and organic contaminant analyses. The results from this exercise will soon be compiled and distributed.

NIST has initiated development of a whale blubber SRM for use in measuring PCBs and chlorinated pesticides in marine mammal tissue. Tissue control material will be distributed to NWFSC and other interested laboratories as a second comparison exercise. Several different approaches will be used to identify a methodology that yields "certified" concentrations. The whale blubber SRM should be available by October 1992. Development of a whale liver SRM for trace element analysis is planned.

Task Group on Unusual Marine Mammal Mortalities

NMFS is concerned about unusual marine mammal mortality events. In response, the Service has established a Task Group with representatives from several scientific specialties. Members of the task group are consulted when an unusual mortality event is suspected. At a meeting on April 10, 1991, the Task Group identified criteria for initiating consultations. These criteria are:

- A marked increase in the magnitude of strandings when compared with prior records. Magnitude by itself may not be an indication of an unusual mortality event and should be weighed against other knowledge;
- Animals are stranding at a time of the year when strandings are unusual;
- An increase in strandings is occurring in a very localized area (possibly suggesting a localized problem), is occurring throughout the geographic range of a species/population, or spreads geographically with time;
- The age or sex composition of the stranded animals is different than that of animals that normally strand in the area at a specific time of the year;

- Stranded animals exhibit a similar or unusual pathology or the general physical condition (e.g., blubber thickness) of stranded animals is different from what is normally seen; and

- Unusual or severely endangered species are stranding. Stranding of three or four right whales, for example, may be cause for concern whereas stranding of a similar number of gray whales would not.

Using these criteria, NMFS staff and researchers contacted the Task Group three times in 1991. In the first case, 38 harbor seals stranded in the Long Island area from mid-February to mid-May. The rate was above normal and many of the animals had a similar pathology: small, dark, raised rhomboidal lesions on the skin. Analyses of some samples tentatively attributed the stranding to an *Erysipelothrix* bacillus which was cultured from some of the seals. These strandings occurred along the Long Island coast, and similar mortalities were not observed in adjacent states. "Ice" seals continue to strand as far south as New Jersey.

The second incident involved a higher than normal stranding rate of California sea lions along the central California coast from late July to the end of October 1991. Nearly 150 animals were diagnosed as having leptospirosis, a disease that is endemic in the population. Based on this finding, the Task Group's recommendation was to monitor the number of animals affected.

From September to December 1991, 35 bottlenose dolphins stranded in the counties surrounding Sarasota, FL, more than three times the historical rate. The majority of the animals were juvenile males. Analyses are being conducted but results are not yet available.

Regional Stranding Networks

The following descriptions of Regional stranding activity presents significant accomplishments and summarizes stranding reports. All strandings are reported in exhibit D-1 in Appendix D.

Northeast

In 1990, the state of Maryland, with the assistance of the National Aquarium in Baltimore, began to take a more active role in the Regional Network. The state of Delaware's involvement also increased.

The Region reported the following stranding data and significant events. In 1990, there were 174 pinniped and 164 cetacean strandings. Reported strandings increased in 1991 to 276 pinnipeds and 225 cetaceans.

The cetacean totals include a number of mass stranded pilot whales. In September 1990, fifty-five pilot whales stranded in Hyannis, Massachusetts. Two juveniles were rehabilitated at the New England Aquarium and released in the spring of 1991. Four separate stranding events involving 96 pilot whales were reported during the fall and winter of 1991. Efforts to return the whales to the wild resulted in only 37 successful releases. Six of 23 whales tagged and released were observed one month later swimming normally near a group of 30 untagged whales.

A Cape Cod stranding response group was formed in December 1991 for the purpose of getting to stranded pilot whales quickly, with experienced personnel, to effect a quick release of the animals.

Southeast

The Southeast Stranding Network is comprised of over 100 participants who are issued Letters of Authorization (LOA) by the Region. The Southeast Region maintains a directory of participants which includes LOA holders and authorized government workers. Following a response to a stranding event, participants complete and submit a standard form. A volunteer compiles data from these forms and produces a quarterly report that is sent to the network participants and to NMFS.

A major initiative in the Region is a cooperative effort between the SEFSC's Miami Laboratory and the Stranding Network to improve both the quantity and quality of data obtained from stranding events. As a result of this effort, SEFSC has developed a multidisciplinary approach that encompasses seven themes. Of these seven themes, four relate to population biology and the remainder are associated with the extent and causes of mortality.

In 1990, there were 729 documented strandings of cetaceans in the Southeast Region. Bottlenose dolphins accounted for nearly 80 percent of the strandings, while the remainder included at least 16 other species. During 1991, there were 632 documented strandings of cetaceans. Once again, bottlenose dolphins accounted for the majority of strandings (nearly 70 percent), and 21 additional species accounted for the remainder of the strandings.

Southwest

The Region reported 1,233 pinniped strandings in 1990 and 1,507 in 1991. Reported cetacean strandings decreased from 88 in 1990 to 67 in 1991.

Northwest

In 1990, the Northwest Marine Mammal Stranding Network responded to 221 reported strandings or unusual events in Oregon and Washington. Pinniped strandings accounted for the majority (86 percent) of these investigations. Network participants investigated 120 reported standings or unusual events in 1991; 81 percent of these involved pinnipeds.

Alaska

The Alaska Region Stranding Network investigated 87 cetacean strandings in 1990. Of these, the most common species were gray whales (27 strandings), harbor porpoise (17), and killer whales (10). In 1991, the network reported 39 cetacean strandings. The most common species again were gray whales (17), harbor porpoise (9), and killer whales (8). Due to limited resources, and the large coastline, the network focuses its efforts primarily on cetacean strandings.

With a few notable exceptions, most stranding reports involve dead animals. In 1990, a humpback whale live-stranded on a sand bar in the Copper River Delta. The whale managed to back off with its flippers and was gone at high tide. Six killer whales live-stranded temporarily in Chignik lagoon in 1990. One of the animals re-stranded a day later and died, and four days later, a second whale was found dead within the area. A pathological investigation was unable to identify a cause of this stranding event. During 1991, six killer whales live stranded in Turnagin Arm. NMFS biologists applied wet blankets to some of the animals until high tide occurred, freeing the animals with no observable significant damage.

VIII. International Programs and Activities

The Department of Commerce furthers the protection and conservation of marine mammals through participation in existing international agreements, and, when necessary, negotiation of new agreements. This chapter describes NMFS involvement in international programs and activities during 1990 and 1991.

Commission for the Conservation of Antarctic Marine Living Resources

The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) and its Scientific Committee were established in 1982. The group meets annually to consider issues related to Antarctic living resources. The Scientific Committee regularly reviews the status of marine mammal populations, and, as necessary, makes recommendations to the Commission. The Commission also reviews annual reports by member nations concerning population assessments and steps taken to avoid the incidental mortality of Antarctic marine living resources.

Marine Mammal Populations

During 1990 and 1991 the Commission sponsored populations surveys of several marine mammals species. The Commission convened a workshop held in Monterey, California, May 22-23, 1991 to assess the current status of southern elephant seals. A review of southern elephant seal stock abundance and trends indicates that populations are declining in the Indian and Pacific Ocean sectors of the Antarctic. In addition, simulations suggest that the South Georgian stock may also be declining, but no direct evidence is available. The workshop concluded that it was not possible to identify factor(s) that are causing the population decline. The workshop did, however, identify several areas of priority research.

In light of evidence that crabeater seal abundance may have declined dramatically during the 1970s, the Scientific Committee and the Scientific Committee on Antarctic Research (SCAR) urged that additional surveys of pack ice seals be conducted. The Commission, in 1990, recommended that members conduct censuses of seals in pack ice areas whenever possible during icebreaker operations. At the 1991 meeting, several members indicated their intent to initiate surveys of crabeater and other pack ice seals.

Working Group on the CCAMLR Ecosystem Monitoring Program (WG-CEMP)

The primary focus of this Working Group has been the study of krill and predator/prey relationships. Krill is the primary prey species for large numbers of marine mammals in the Convention area. In response to concerns expressed by WG-CEMP about the impact of krill fishing on foraging by land-based predators, the Commission and the Scientific Committee requested that the Working Group calculate prey requirements of krill predators in certain priority areas.

The Working Group has made good progress in synthesizing data and it is anticipated that these efforts will culminate in a 1993 workshop. The Subgroup on survey design has made substantial progress on prey monitoring research methods. Survey designs for assessing the abundance and distribution of krill are available to members and members are encouraged to implement such studies.

At its 1990 meeting, the Commission adopted a conservation measure that specified a procedure for providing CCAMLR protection to CEMP sites. In 1991, the United States prepared a draft management plan for protection of the Seal Islands CEMP site. Following review of the plan by the Working Group and the Scientific Committee, the Commission adopted a resolution asking members to voluntarily comply with the management plan pending conclusion of consultations with SCAR, the Antarctic Treaty Consultative Parties, and Contracting Parties to other components of the Antarctic Treaty System. The Commission also agreed to advertise the plan to States that are not parties to the CCAMLR but whose nationals are present in the Convention area.

Assessment and Avoidance of Mortality Incidental to Fishery Operations

Members' reports on observation of lost or discarded fishing gear were submitted at the Commission's 1990 and 1991 meetings. During the 1990 meeting, the Commission noted that the United Kingdom intended to continue with beach surveys at South Georgia. The Commission encouraged members to use methods applied at South Georgia.

The United States tabled a proposal at the 1990 meeting calling for a ban on driftnet fishing in the Convention area. The proposal was adopted as a Commission resolution that noted member agreement not to expand large-scale pelagic driftnet fishing in the Convention area and endorsing the goals of the United Nations General Assembly Resolution 44/225.

High Seas Driftnet Fishing

Large-scale pelagic driftnet fisheries rapidly expanded in the North and South Pacific Oceans during the 1980s. Vessels from Taiwan, Japan and the Republic of Korea set 20-50km long driftnets to catch flying squid. The vessels from Taiwan and Japan also fish for albacore and billfish. In addition, Japan operates a high-seas driftnet fishery for salmonids.

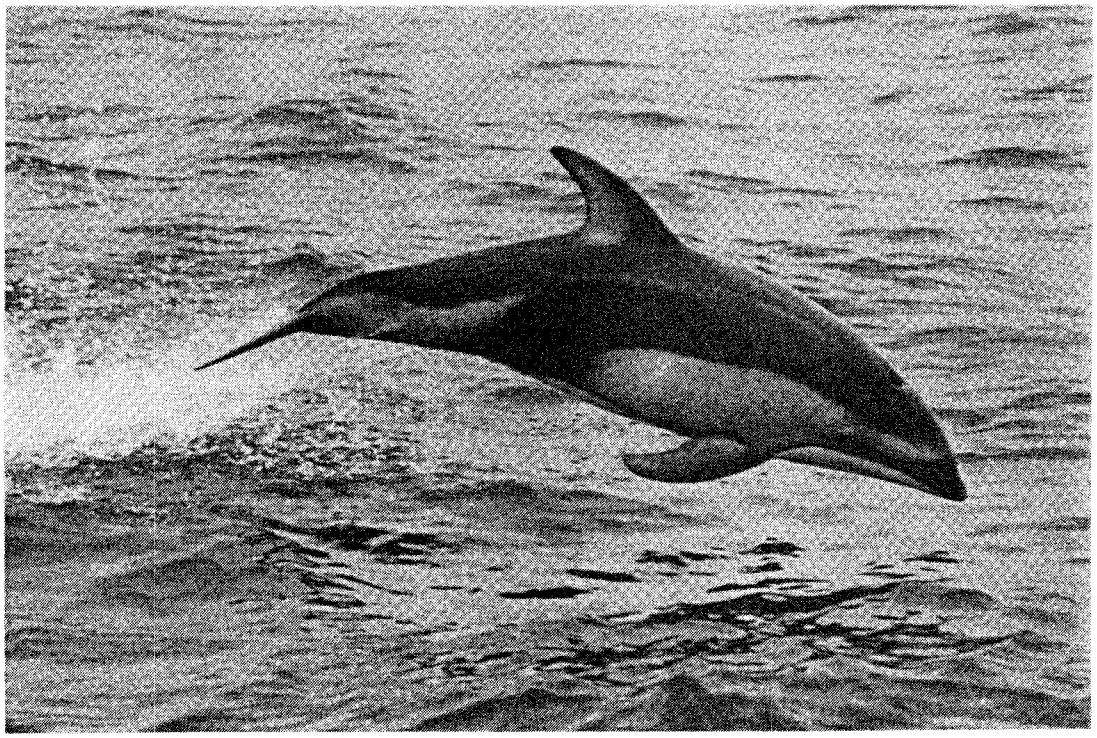
U.S. Response

The United States is concerned about the impacts of these fisheries on marine life and their ecosystems. Substantial evidence exists documenting the incidental take of marine mammals, seabirds, marine turtles, and other non-target species. Of particular concern is the impact of large-scale driftnet fisheries on the threatened northern fur seal population. The U.S. also believes that high seas driftnet fishing for immature salmonids is inefficient and indiscriminate. Concern about the status of high seas salmonid stocks has heightened because some flying squid vessels have targeted these stocks in violation of international law.

In response to concern over the high-seas salmon fishery, the illegal take of salmon on the high seas, and incidental mortality of marine mammals, the Congress enacted the Driftnet Impact Monitoring, Assessment, and Control Act. This legislation requires the Secretary of

Commerce through the Secretary of State, and in cooperation with the Secretary of the Interior, to negotiate cooperative agreements with countries whose nationals operate in the North Pacific high-seas driftnet fisheries. The agreements should provide for monitoring and assessment programs involving on-board scientific observers and enforcement programs focusing on squid fishing in seasons and areas where salmon might be taken.

As of 1990, the U.S. had successfully negotiated agreements with Japan, South Korea, and Taiwan. In 1991, results were released from observer programs in each of the five driftnet fisheries operating during the period between May 1990 and May 1991 covered by these agreements.



Lagenorhynchus obliquidens (Pacific white-sided dolphin)
Photo by: Scott Benson, NMFS

The observer programs monitored 5,300 operations on 143 vessels. The observed bycatch of marine mammals totaled 3,541 cetaceans and 581 pinnipeds. These totals are broken down by fishery and species in Exhibit 8. Northern right whale dolphin, Pacific white-sided dolphin, Dall's porpoise and northern fur seal were the most common incidentally caught marine mammal species in the squid fisheries. In the albacore

Exhibit 8
Incidental Take of Marine Mammals in the North Pacific Ocean High Seas Driftnet Fisheries, 1990 (Includes Lethal Takes, Animals Released Alive, and Takes where Condition of Animal is Unknown)

Species		Squid			Large-Mesh	
		Japan	Korea	Taiwan	Japan[1]	Taiwan
Pinnipeds	N. fur seal	545	4			12
	Elephant seal	1				
	Unidentified	19				
	Total pinnipeds	565	4			12
Dolphins	Unidentified		2	4	152	201
	N. right whale	840	54	7		41
	Pacific white-sided	459	29	5	6	6
	Common	69	6		479	47
	Striped	6	1		500	21
	Spotted				37	
	Bottlenose	1			15	2
	Rough-toothed				18	
	Risso's	2			29	1
	Pygmy killer whale				17	
	False killer whale	2			7	
	Short-finned pilot	3				
	Unid. black whale	1			5	3
	Unid. small	41				
Porpoise	Dall's	318	23	2		1
Whales	Cuvier's beaked	2			2	
	Pygmy sperm	1			20	3
	Dwarf sperm					1
	Sperm				4	
	Minke				1	
	Unidentified Whales	12	1	1	26	4
TOTAL cetaceans		1757	116	19	1318	331
# of operations monitored		2879	911	356	826	358
Amount of net monitored(tans[2])		2281895	669662	170415	511589	194953

[1] Excludes bycatch in Japanese coastal waters.
[2] Tan is standardized to 50 m of net.

fisheries, striped dolphin, common dolphin and northern right whale dolphin were the most common marine mammal bycatch species.

Multilateral Controls

In 1989, the U.N. General Assembly adopted a driftnet resolution co-sponsored by the United States. The resolution prohibited expansion of high-seas driftnet fishing, and called for review of all driftnet data by June 30, 1991, a cessation of South Pacific driftnet fishing by July 1, 1991, and a worldwide cessation of driftnet fishing by July 1, 1992, unless effective conservation and management measures are taken.

Following actions taken by the United Nations, member nations, and international fishing organizations to support the 1989 resolution, the General Assembly reconsidered the matter in its 1991 session. On December 20, 1991, the General Assembly, by consensus adopted a resolution co-sponsored by the United States, Japan, and 28 other nations. This resolution calls on members of the international community to:

- Reduce large-scale high-seas driftnet fishing effort by 50 percent by June 1992;
- Continue to ensure that driftnet fisheries do not expand into new areas; and
- Implement fully a global moratorium on all large-scale driftnet fishing on the high seas in all areas by December 31, 1992.

Although the Resolution does not address large-scale driftnet fishing in the EEZ of individual nations or the use of small driftnets on the high seas, sponsors believe that the moratorium will substantially eliminate the risks to target and non-target species and to pelagic ecosystems.

International Whaling Commission

In 1991, at the 43rd Annual Meeting of the International Whaling Commission (IWC), the parties agreed to:

- Continue to support implementation of the IWC's 1982 moratorium decision;
- Continue to monitor research proposed and conducted under special permits;

- Broaden discussion of the conservation needs of small cetaceans; and
- Secure an aboriginal quota of bowhead whales for U.S. Eskimos.

The Commission also discussed issues related to humane killing, the comprehensive assessment, and small-type whaling proposals. The following sections summarize the activities of the 1991 meeting.

Commercial Whaling Moratorium

Currently, all IWC members are observing the moratorium on commercial whaling. The Commission took three major actions with respect to the moratorium at the 1991 Annual Meeting. First, it took steps to initiate a thorough review of the Schedule to the Convention. Terms of reference for a working group were adopted and member governments were asked to submit papers by October 31, 1991 for consideration by the working group. Second, the Commission denied Iceland's request to allow catch limits of 170 minke whales and 92 fin whales off Iceland. Third, the Commission denied Norway's request to take minke whales from the northeastern Atlantic stock.

The IWC also made significant progress towards development of a revised management procedure (RMP) for baleen whales. Eventually, the RMP will replace the New Management Procedure which is seriously flawed and led to the over-harvesting of some stocks. It is the U.S. position that changes in the moratorium should not be considered until a scientifically acceptable, fully developed RMP, with adequate surveillance and enforcement provisions, is adopted.

Special Permits

At the IWC's 1991 meeting, the Commission rejected research proposals submitted by Japan and the Soviet Union. The Japanese proposal, which called for the take of, at most, 330 minke whales from the southern hemisphere stock to study age-specific natural mortality, was rejected because the research program did not fully satisfy the IWC's criteria. A resolution inviting Japan to reconsider its program was passed by consensus for the second consecutive year.

The Soviet proposal, which involved the take of 90 minke whales from the Sea of Okhotsk stock, was designed to support research on the

morphological and physiological characteristics of the populations and to obtain samples for determining age, sexual and physical maturity, and reproductive conditions. Accepting the Scientific Committee's conclusion that the proposal was seriously flawed, the Commission adopted a resolution stating that the research program did not contribute information essential for management or support other important research needs. The proposal further requested the Soviet Union to refrain from proceeding until the program is revised.

Aboriginal Subsistence Whaling

The Commission made no changes to existing aboriginal subsistence catch limits for central Atlantic minke whales and north Atlantic humpback whales. For the years 1990 through 1992, the limit for central Atlantic minke whales taken by East Greenlanders is 12 per year. The limit for north Atlantic humpback whales taken by Bequians of St. Vincent and the Grenadines is 3 whales each for the 1990/91, 1991/92 and 1992/93 winter seasons.

The IWC established the following aboriginal subsistence catch limits:

- Bering-Chukchi-Beaufort Seas bowhead whales taken by Alaskan Eskimos -- 141 strikes for the years 1992-94 with up to 13 carryover strikes. This limit is subject to the constraints that no more than 54 whales may be struck to land 41 whales in a single year and that the limit will be reviewed annually in light of advice given by the Scientific Committee;

- Eastern north Pacific gray whales, taken on behalf of Soviet Eskimos -- 169 for each year 1992-94;

- West Greenland fin whales taken by West Greenlanders -- 21 for each year 1990-91; and

- West Greenland minke whales taken by West Greenlanders -- a maximum of 115 whales struck in any one year 1992-94 and maximum total of 315 whales struck for the three year period 1992-94.

Comprehensive Assessment

After four years of reviewing proposals, the Scientific Committee recommended, in the form of a resolution, a revised management procedure (RMP) to be used when a single stock of a species resides on a

whaling ground. The Commission accepted this recommendation and provided additional instructions to the Scientific Committee for completing development of an RMP for multi-stock species of whales. The resolution accorded highest priority to the objective that the risk of extinction should not be increased by exploitation. At an inter-sessional meeting scheduled for March 1992, the Scientific Committee will focus on its current agenda of work.

Humane Killing

The Commission considered a number of issues related to the humane killing of whales. The United States, Denmark, and New Zealand delivered presentations or submitted documents on weapons and methods. The United States delivered a presentation on the bowhead whale weapons improvement program. The program includes the use of an improved projectile, a new emphasis on education and training, and continued monitoring of the need to develop a penthrite projectile for the shoulder gun. On behalf of Greenland, Denmark submitted documentation concerning the detonating grenade harpoon required for hunting fin and minke whales and information on the rifle hunt of minke whales. New Zealand presented a document that discussed the use of firearms to dispatch stranded whales.

In other actions, Brazil stated that it is withdrawing its objection to the ban of the cold harpoon. Japan refused to present its laws regulating the killing of Dall's porpoise, stating that the matter is outside the competence of the Commission. Japan did agree, however, to discuss the issue on a bilateral basis. The United Kingdom, supported by the United States and other member nations, proposed that a workshop of experts be convened to evaluate the penthrite grenade harpoon. The Commission agreed to hold the workshop prior to next year's meeting.

Socio-Economic Implications and Small-Type Whaling

The Technical Committee's working group met to consider the social and economic impacts of the commercial whaling moratorium and to examine small-type whaling issues. Presenting a report on the moratorium's impact on two whaling communities, Japan argued that small-type coastal whaling is similar to aboriginal subsistence whaling. Japan also contended that the moratorium had serious cultural and socio-economic impacts on some small Japanese minke whaling communities. Focusing on these arguments, the working group

concluded its deliberations with the same recommendations as the preceding year:

- Continue the working group;
- Request abstracts of documents by December 1, 1991;
- Convene a meeting if abstracts are submitted; and
- Request that completed documents be submitted by April 15, 1992.

Japan requested an interim quota of 50 minke whales for its small-type coastal whalers. Japan argued that this take level would not harm the stock and the whale meat and by-products would be consumed primarily by the local communities. Noting that the Scientific Committee could not determine the effect that this level of take would have on the stock and that any quota would violate the moratorium, the Commission did not approve the Japanese proposal.

Small Cetacean Resolutions

The IWC adopted a resolution, proposed by New Zealand, requesting the Scientific Committee to continue its data collection and reporting efforts on the take of small cetaceans. The resolution also requested that the IWC Secretariat forward the Committee report to appropriate governments, intergovernmental organizations, the Secretariat of the United Nations Conference on Environment and Development, and other entities.

The United States introduced a second resolution that recounted the Scientific Committee's five major recommendations on small cetaceans. This resolution was withdrawn after Commission members raised questions about the IWC's legal competence to debate the issue of small cetaceans. The objective of the U.S. resolution, forwarding the Scientific Committee's recommendations to concerned governments, however, was accomplished by the New Zealand resolution.

U.S.-U.S.S.R. Marine Mammal Project

The primary goal of this cooperative research program is (1) to study the biology, ecology, and population dynamics of marine mammal species of interest to both nations and to (2) foster effective management of these

animals. During 1990 and 1991, U.S. and U.S.S.R. scientists participated in two joint research efforts: a study of Steller sea lions in the Kuril Islands, U.S.S.R. and a study of adult female northern fur seals in the Commander Islands, U.S.S.R.

The purpose of the Steller sea lion research was to assess population levels and movement patterns in the U.S. and U.S.S.R. In the summer of 1991, scientists from the two countries returned to the Kuril Islands to follow-up on Steller sea lion research conducted in 1989. Methods included satellite tagging, counts, and flipper tagging. Although not all sites surveyed in 1989 were revisited, the study indicated that the number of animals did not change significantly.

The purpose of the northern fur seal study was to examine foraging behavior and to explain the difference observed in rates of decline between the U.S. and the U.S.S.R. populations. Foraging trips were shorter for Commander Island seals as compared to Pribilof Island seals. Diet also differed: Commander Island seals eat predominately squid while Pribilof Island seals eat a mix of squid and fish. Other physiological data is currently being analyzed to compare the two herds. In addition, scientists are analyzing blood samples to identify the island of origin for fur seals incidentally taken in the foreign high-seas squid driftnet fishery. Results of this analysis will help researchers determine if the fishery-related mortality is affecting one herd more than the other.

IX. Enforcement

NMFS Special Agents and Enforcement Officers (EOs) enforce the provisions of the MMPA. NMFS employs about 113 Special Agents and 18 uniformed Eos. Assisting these officials are enforcement officers from several states who act under agreements authorized by the MMPA.

During 1990, NMFS and state enforcement personnel investigated 1,016 alleged violations of the MMPA. Of these alleged violations, 737 involved infractions by commercial fishermen regarding Certificate of Exemption and/or marine mammal observer requirements. There were 128 investigations of unlawful taking (including harassment), 92 cases of illegal importation (primarily of marine mammal parts and products), 28 involving improper fishing practices in the yellowfin tuna purse seine fishery, and 31 miscellaneous violations. In 1991, the total number of investigations was 509. These included 311 cases dealing with commercial fishing Certificates of Exemption, 122 illegal takings, 60 illegal importations, and 16 miscellaneous violations.

Regional Issues

A major focus of Regional enforcement efforts has been interactions between commercial fisheries and marine mammals. Potential interactions between commercial fishermen and Steller sea lions continued to be the most contentious marine mammal problem in the Alaska Region. Ten-mile buffer zones were established around some sea lion rookeries in the Gulf of Alaska and Aleutian Islands during 1991 in an attempt to control such interactions.

In the Northwest Region, interactions between humans and marine mammals are increasing as the populations of marine mammals continue to grow primarily due to their protection under the MMPA. The taking by harassment of marine mammals such as gray and humpback whales remained the main focus of marine mammal enforcement activities in the Southwest Region. Other continuing problems include random shootings of marine mammals by fishermen.

Enforcement actions in the Southeast Region addressed lethal takes of marine mammals and non-lethal forms of taking such as the feeding of dolphins in the wild. In contrast, the majority of enforcement actions in the Northeast Region focused on the illegal importation of marine mammal parts or products. Most of these cases involved the casual importation of items by tourists. Northeast Region enforcement personnel conducted additional investigations relating to unlawful takes by harassment.

Marine Mammal Interim Exemption Program Enforcement

A major enforcement issue of concern involves compliance with exemption certificate and observer requirements under the Marine Mammal Exemption Program. While these requirements affect thousands of fisherman, NMFS has lacked adequate resources to enforce these provisions.

The Regions have responded to this problem by implementing a range of innovative and low cost approaches to enforcement. In the Northwest Region, enforcement officers compared state fish landing records against a list of certificate holders to identify fishing vessels that had not obtained a Certificate of Exemption. This effort yielded the names of 656 violators. The Office of Enforcement continues to work with the NOAA Office of General Counsel to process these cases. As the 1990 backlog is eliminated, NMFS will attempt to identify and prosecute those who fished in violation of the MMPA during 1991.

In July 1991, nine Yakutat, Alaska setnet operators were cited for failure to obtain or possess marine mammal Certificates of Exemption. NMFS decided to focus enforcement resources on this problem when it was determined that the exemption program compliance rate for this fishery was less than 50 percent. NMFS issued a press announcement to notify fisherman of impending enforcement actions. Although compliance improved somewhat after the press release, noncompliance was still widespread.

The Southwest Region identified several vessels in Categories I and II fisheries that did not register/renew their Certificates of Exemption for 1991. In response, enforcement personnel conducted an extensive investigation to ascertain the status of the fishing vessels and verify their 1991 commercial sales. Violators received penalties ranging from written

warnings to summary settlements up to $750. These investigations continue as enforcement officers have identified several other vessel owners that did not renew their certificates of exemption.

NMFS enforcement officials have also addressed non-compliance with observer requirements. Three cases initiated by the Southwest Region in 1991 involved direct refusals by vessel owner/operators to carry observers, resulting in penalties of $1,000 to $2,000 each. In one of these cases, the vessel owner/operator declined to take an observer on board solely because the observer was female. In addition to the fine, the vessel owner/operator also had to take a female observer on board when requested by NMFS.

In the Alaska Region, a salmon gillnet vessel operator was cited for failure to embark a marine mammal observer in July 1990. The operator was issued a Notice of Violation that assessed a $5,000 penalty, a fine that is currently being appealed.

Other Noteworthy Enforcement Cases

In Alaska, a factory trawl vessel was seized for fishing within one mile of a Steller sea lion rookery buffer zone. The vessel was seized and released on a $550,000 bond.

In November 1990, the owner/operator of a salmon gillnet vessel was arraigned in U.S. District Court in Anchorage, Alaska for the unlawful taking of a Steller sea lion in June 1990. A jury convicted him of intentionally shooting at a sea lion and discharging a firearm within 100 yards of a sea lion. A crew member aboard the vessel was also found guilty of discharging a firearm within 100 yards of a sea lion. The vessel owner was sentenced to serve 30 days in a halfway house, placed on probation for one year, and fined $1,000. The crew member was sentenced to serve 15 days in a halfway house, placed on probation for six months, and fined $500.

The owner/operator of an Alaska salmon purse seine vessel and one of his crew members were arraigned in U.S. District Court in Anchorage on charges of unlawfully taking a humpback whale by rifle fire in July 1988. Both defendants were found guilty in a March 1991 jury trial and sentenced to two months in jail and supervised probation for one year. Witnesses testified that the crew member, acting under the direction of the captain, shot a humpback whale four to five times at close range.

In November 1990, the operator of a Seattle-based longline vessel was arraigned in U.S. District Court in Anchorage on a charge of unlawfully taking killer whales by gunfire during 1987 and 1988. The individual pled guilty to one count of shooting at a killer whale and was sentenced to 60 days in jail, one year of supervised probation, and 120 hours of community service. The defendant also received a $3,500 fine.

Acting on a tip that a crewman had shot a California sea lion from a fishing vessel docked in Astoria, Oregon, a NMFS special agent and an Oregon state police officer contacted the vessel owner/operator. The officials informed the owner that he was subject to a $25,000 fine because the vessel was used in the taking of a marine mammal. The owner identified the crewman, and, after a brief discussion between the owner and the crewman, the crewman admitted his guilt. The Agent obtained the crewman's statement and seized his shotgun. This case is currently pending.

NMFS enforcement agents in the Southeast Region investigated the killing of an Atlantic bottlenose dolphin in Titusville, Florida in 1991. The dolphin, which was discovered near a major highway by a passing tourist, was killed by an arrow that punctured its lung. Investigative efforts to find the guilty party continue.

In November 1990, a shipment of 37,389 pounds of seal meat originating in Africa, Chile and bound for Taiwan arrived at the port of San Francisco aboard the M/V *San Juan*. U.S. Customs agents seized the shipment upon arrival, assessed a $2,500 fine against the shipper, and destroyed the seal meat. This case involved the largest known amount of seal product ever seized in the United States.

In 1991, a man shot a recovering elephant seal at the Humboldt Wildlife Care Center in California. Despite the man's claim that he shot the animal as an act of mercy, the NOAA Office of General Counsel assessed a $1,500 penalty.

At Cypress Point Beach, California, a designated Monterey County Harbor Seal Sanctuary, reports claimed that a German shepherd dog mauled and killed a newborn seal pup in May 1991. Although the dog was alone during the incident, witnesses saw it return to a nearby beach home. Working with local officials, NMFS agents located the dog and its owner who was charged with violating a county ordinance and the MMPA. The NOAA Office of General Counsel assessed a $2,000 fine against the owner.

In August 1991, NMFS enforcement agents responded to an incident in which a yacht harassed a pod of feeding humpback whales off the coast of Monterey, California. After determining the name of the vessel and its projected course, agents queried harbor masters along the coast and located the yacht. The case was presented to the NOAA Office of General Counsel which issued a Notice of Violation assessing a $10,000 penalty.

An individual was cited in December 1990 for running a swim-with-the dolphins program at Kealakekua Bay, Hawaii. Litigation in the case is pending. The same individual was cited again in October 1991 for violating the same provision of the MMPA.

In July 1991, an individual was convicted in the U.S. District Court in Hawaii of unlawfully taking a marine mammal by rifle fire. The defendant, who had to forfeit the rifle, was sentenced to one year of probation and fined $1,000. The U.S. District Court upheld this conviction on appeal. An appeal to the Ninth Circuit Court of Appeals is expected.

During the reporting period, NMFS Special Agents conducted several investigations of gray whale harassment in California. The Agents conducted undercover investigations from commercial whale watching vessels. To date, the investigation has yielded one case for referral to the NOAA General Counsel.

X. Litigation

At the end of 1991, NMFS was involved in eight MMPA-related legal actions. Five of these cases were ongoing from the 1989 report and three were new. This chapter presents summaries of these actions, describing motions, rulings and other important events.

Ongoing Legal Actions

- *Federation of Japan Salmon Fisheries Cooperative Association et al.* v. *Baldridge* (D.C. Cir. 1988): As reported in the 1989 Marine Mammal Protection Act Annual Report, the plaintiffs in this case (commonly known as the "*Kokechik*" case) filed a motion for attorneys' fees pursuant to the Equal Access to Justice Act in the amount of $81,600.12 (the amount of $81,240.12 reported in the 1989 Annual Report was revised upward in a second amended motion filed by the plaintiffs on August 15, 1989). As of the end of 1991, this motion for attorneys' fees was still pending before the court.

- *Earth Island Institute* v. *Verity* (N.D. Cal. 1988): This case, as reported in earlier Marine Mammal Protection Act Annual Reports, challenged NOAA's implementation of the MMPA provisions that relate to tuna-dolphin interactions. In 1990 and 1991, the plaintiffs' efforts focused mainly on NOAA's procedures for making affirmative findings that foreign nations involved in the yellowfin tuna purse seine fishery in the ETP meet U.S. dolphin mortality, observer coverage and regulatory requirements. The plaintiffs also challenged NOAA's implementation of the MMPA's primary and secondary embargo provisions. Exhibit 9 presents a chronology of case-related events that occurred during 1990 and 1991. The case was still active at the end of 1991.

Exhibit 9
Earth Island Institute* v. *Verity
Chronology of 1990-1991 Decisions and Actions

August 28, 1990:	The U.S. District Court for the Northern District of California ordered the Secretaries of Commerce and Treasury to embargo yellowfin tuna and tuna products from all countries fishing in the ETP until affirmative findings had been made that the countries met the standards of the MMPA.
September 7, 1990:	Pursuant to the Court's order, tuna from Mexico, Venezuela, Vanuatu, Ecuador and Panama was embargoed. Affirmative findings were made for Mexico, Venezuela and Vanuatu, allowing the embargoes to be removed from those countries on the same day.
September 11, 1990:	The embargo against Ecuador was lifted after a finding was made that Ecuador met the comparability standards of the MMPA.
October 4, 1990:	The Court issued a temporary restraining order reinstating the embargo against Mexico because its kill rate for eastern spinner dolphins had not been calculated with a full year's data as required by the MMPA.
October 19, 1990:	The temporary restraining order was converted to a preliminary injunction when the court narrowed the scope of the embargo to prohibit only yellowfin tuna caught with purse seine nets in the ETP.
November 14, 1990:	In response to the government's appeal of the August 28, 1990 decision, the Ninth Circuit Court of Appeals stayed the District Court's order pending the outcome of the appeal, resulting in a lifting of the embargo from Mexico.
November 16, 1990:	NMFS published a regulation that allowed NOAA to make affirmative findings for countries that make sets of purse seines on dolphins illegal and require 100 percent observer coverage on their vessels.
November 23, 1990:	NOAA lifted the embargo against Panama after the Administration made an affirmative finding pursuant to the November 16, 1990, regulation.
February 19, 1991:	The Ninth Circuit Court of Appeals vacated its November 14, 1990 stay of the District Court order thereby imposing the embargo on Mexican tuna.

Exhibit 9 (cont'd)
Earth Island Institute* v. *Verity
Chronology of 1990-1991 Decisions and Actions

March 16, 1991:	Pursuant to the November 16, 1990 regulation, NOAA made an affirmative finding for Ecuador that allowed the importation of Ecuadorian tuna into the United States during 1991.
March 26, 1991:	The District Court ordered another embargo to be imposed against Venezuela and Vanuatu because their 1990 fishing data showed that they did not meet the MMPA's requirement that their mortality rate be no more than 1.25 greater than the 1990 U.S. fleet rate. The Court's order was implemented on April 7, 1991. This order did not affect Mexico because it was already embargoed.
April 11, 1991:	The Ninth Circuit Court of Appeals upheld the District Court's August 28, 1990, and October 19, 1990, orders. As a result, the embargoes of Mexican, Venezuelan and Vanuatuan tuna remained in place.
May 24, 1991:	The secondary embargoes required by §101(a)(2)(C) of the MMPA to be imposed against intermediary nations were imposed against nations that import tuna from Mexico, including Japan, Panama, France, Italy and Costa Rica. The products embargoed from these nations were the same as those embargoed from Mexico (i.e., yellowfin tuna or tuna products caught with purse seines in the ETP).
June 25, 1991:	Secondary embargoes were imposed against nations that import tuna from Venezuela and Vanuatu, affecting France, Italy and Costa Rica.
August 23, 1991:	Mexico was automatically certified under the Pelly Amendment (for having been embargoed for six months) pursuant to §101(a)(2)(D) of the MMPA. No sanctions were imposed against Mexico due to Pelly Amendment certification.
September 26, 1991:	Venezuela and Vanuatu were certified under the Pelly Amendment. No sanctions were imposed against any of these nations due to Pelly Amendment certification.
November 25, 1991:	The Mexican intermediary nations were certified under the Pelly Amendment. No sanctions were imposed against these intermediary nations due to Pelly Amendment certification.
December 25, 1991:	The Venezuelan and Vanuatuan intermediary nations were certified under the Pelly Amendment. No sanctions were imposed against these intermediary nations due to Pelly Amendment certification.

- *Progressive Animal Welfare Society, et al.* v. *Navy* (W.D. Wash. 1989): This action challenged three permits and a "concurrence letter" issued to the Navy by the Secretary of Commerce pursuant to 10 U.S.C. §7524 to authorize the deployment of bottlenose dolphins at Naval Submarine Base Bangor, Washington.

After the court denied the government's motion to dismiss the complaint, the parties filed a joint stipulation with the court on May 3, 1990. The Navy agreed not to take, collect, or deploy dolphins in western Washington until an Environmental Impact Statement (EIS) or Environmental Assessment (EA) was completed, reviewed, and finalized. The Navy also agreed not to appeal the court's November 3, 1989 order denying the defendants' motion to dismiss. The plaintiffs agreed to move to dismiss all defendants except the Navy and to not bring any other actions against the original defendants concerning the issues of this case. The parties also asked the court to stay the proceedings until the Navy completed its EIS or EA.

The court dismissed the Department of Commerce defendants and stayed the proceedings on June 11, 1990. The Navy held a public meeting in Silverdale, Washington, on September 5, 1990, to discuss the scope of the environmental documentation to be prepared as required by the joint stipulation. In January 1991, the Navy announced that it was canceling its program to deploy dolphins at Naval Submarine Base Bangor due to budget reductions and reallocations of funds within the Navy. The Navy, however, pledged to complete the environmental documentation as agreed to in the joint stipulation.

- *Animal Protection Institute* v. *Mosbacher and Shedd Aquarium* (D.D.C. 1989): This action, discussed in detail in the 1989 Marine Mammal Protection Act Annual Report, was brought to challenge a permit issued to the Shedd Aquarium in Chicago to import two false killer whales from Japan.

Animal Protection Institute (API), Shedd, federal defendants and defendant American Association of Zoological Parks and Aquariums (AAZPA) filed cross motions for summary judgment on January 17, 1990. On February 7, 1990, API filed a memorandum in opposition to the defendants' motions for summary judgment, and the defendants filed memoranda in opposition to API's motion for summary judgment the same day. On February 28, 1990, the federal defendants and Shedd filed memoranda in reply to API's opposition to defendants' motions for summary judgment. On the same day, API filed a reply memorandum in

support of its motion for summary judgment. As of the end of 1991, these cross motions were still pending and no oral argument had been scheduled by the Court.

- *Progressive Animal Welfare Society (PAWS)* v. *Department of Commerce, et al.* (W.D. Wash. 1989): As summarized in the 1989 Marine Mammal Protection Act Annual Report, this action challenged a permit issued by NOAA to the Shedd Aquarium to import three beluga whales from Canada. The suit sought to invalidate the permit, force the return of two beluga whales that had already been imported, and block the importation of the third whale on the grounds that the issuance of the permit was a major federal action for which no Environmental Assessment had been prepared.

On January 4, 1990, the Court entered a pre-trial order setting filing deadlines and scheduling the trial for September 17, 1990. Federal defendants and Shedd both filed answers to PAWS's complaint on February 2, 1990. On August 31, 1990, the Court dismissed the action with prejudice in light of an anticipated settlement being negotiated by the parties. On October 29, 1990, the parties entered into a settlement agreement wherein Shedd agreed not to capture or import the third beluga whale authorized by its permit, but received the two whales already imported. The Court did not address the merits of the legal issues.

New Legal Actions

- *Cease, Inc. and RAINBOW, a dolphin* v. *New England Aquarium et al.* (D. Mass. 1990): In this action brought on September 10, 1990, an animal rights group sought a temporary restraining order to prohibit the New England Aquarium (NEA) from transferring a dolphin named "Rainbow" to the Navy. The transfer had been authorized by NOAA at the request of NEA because Rainbow was socially incompatible with other dolphins at NEA. Plaintiffs opposed the transfer because the parties had not obtained a formal MMPA permit for the transfer and because "Rainbow" would be transferred from a public display facility to a Naval research facility. On November 6, 1990, the case was settled with the parties agreeing that the dolphin would not be transferred to the Navy. The merits of the legal issues were not addressed by the Court.

- *Kama, et al.* v. *New England Aquarium, et al.* (D. Mass 1991): This action, which was brought in June 1991 by the plaintiffs from the "Rainbow" case, challenged the 1987 transfer of a captive-born male dolphin named "Kama" from the New England Aquarium to the Navy. The plaintiffs raised MMPA, Administrative Procedures Act, and National Environmental Policy Act challenges to (1) the use of letters of agreement to effect transfers of marine mammals between permit holders, (2) the use of letters of agreement to implement the beached and stranded marine mammal rescue and rehabilitation program, and (3) extending the valid time period of permits, compensating permit holders that voluntarily postponed the capture of dolphins from the Gulf of Mexico after a mass die-off. A status conference was held in December, 1991, where the parties agreed to file cross motions for summary judgment by early January 1992.

- *Strong d/b/a The Dolphin Connection* v. *Mosbacher* (S.D. Tex. 1991): The plaintiffs filed a complaint on April 18, 1991, challenging NOAA's regulation that defined feeding marine mammals in the wild as a prohibited take under the MMPA. The plaintiffs based their challenge on the grounds that there was no concrete evidence that such activities harm marine mammals and that NOAA's action was arbitrary and capricious. On April 19, 1991, the Court issued a temporary restraining order enjoining NOAA from enforcing the new rule against the plaintiffs' commercial feeding cruises. The Court, however, did not enjoin NOAA from enforcing the rule against other persons. The parties agreed that the issues could be disposed of by cross motions for summary judgment, and oral argument on the cross motions was heard by the Court on December 19, 1991. As of the end of 1991, the Court had not issued a ruling on the cross motions for summary judgment.

XI. Publications

Southwest Region

Akin, P. A., R. B. Miller and Peltier. 1992. Techniques for the preparation and examination of reproductive material collected from dolphin species in the eastern tropical Pacific. In Prep.

Anonymous. 1991. The First Annual Report on the Status of U.S. Living Marine Resources - Our Living Oceans. NOAA TM NMFS F/SPO 1.

Ballance, L. T. 1990. Residence patterns, group organization, and surfacing associations of bottlenose dolphins in Kino Bay, Gulf of California, Mexico. pp. 267-283 *In:* S. Leatherwood & R.R. Reeves (Eds.). The Bottlenose Dolphin. Academic Press, San Diego, CA.

Barlow, J. 1991. A birth-interval model for estimating cetacean reproductive rates from re-sighting data. *In:* P. S. Hammond, S. A. Mizroch and G. P. Donovan. (Eds.). Individual ecognition of Cetaceans: Use of Photo-Identification and Other Techniques To Estimate Population Parameters. Rep. Int. Whal. Commn Special Issue 12:155-160.

Barlow, J. 1991. Non-linear density dependence in experimental guppy populations. (In Press) Ecology.

Barlow, J. 1991. The utility of demographic models in marine mammal management. Rep. Int. Whal. Commn 41

Barlow, J., R. Baird, J. Heyning, K. Wynne, A. M. Manville, L. Lowry, D. Hanan, and J. Sease. 1991. A review of cetacean mortality in coastal fisheries along the west coast of the U. S. and Canada and the east coast of the USSR. (In Press) Rep. Int. Whal. Commn, Special Issue 14.

Barlow, J. and P. Boveng. 1991. Modelling age-specific mortality for marine mammal populations. Marine Mammal Science 7(1):84-119.

Barlow, J. and D. Hanan. 1990. An assessment of the status of harbor porpoise populations in California. Document SC/42/SM 6 presented to the Int. Whal. Commn. Scientific Committee, June 1990.

Bright, A. M. and S. J. Chivers. 1991. Post-natal growth rates: a comparison of northern and southern stocks of the offshore spotted dolphin. NMFS SWFSC Administrative Report LJ-91-30.

Calambokidis, J. and J. Barlow. 1991. Chlorinated hydrocarbons in harbor porpoise from Washington, Oregon, and California and their use for describing population discreetness. NOAA Tech. Rept. 98:101-110.

Calambokidis, J., G. H. Steiger, J. C. Cubbage, C. Ewald, K. C. Kruse, and R. Wells. 1990. Sightings and movements of blue whales off central California 1986-1988 from photo-identification of individuals. *In*: P. S. Hammond, S. A. Mizroch and G. P. Donovan (Eds.). Individual recognition of cetaceans: use of photo-identification and other techniques to estimate population parameters. Int. Whale. Commn, Special Issue 12:343-348.

Cassano, E. R., A. C. Myrick, Jr., C. B. Glick, R. C. Holland and C. E. Lennert. 1990. The use of seal bombs on dolphin in the yellowfin tuna purse-seine fishery. SWFSC Admin. Rept. LJ-90-09. 31 p.

Chivers, S. J. and D. P. DeMaster. 1991. Potential biological indices evaluated for four species of eastern tropical Pacific dolphin. NMFS SWFSC Administrative Report LJ-91-29.

Chivers, S. J., A. A. Hohn and A. C. Myrick. 1990. Population regulation in exploited eastern tropical Pacific pelagic dolphins: a research plan to study trends in population condition simultaneously with trends in population abundance and carrying capacity. SWFSC Admin. Rept. No. LJ-90-03 also submitted as a working document to the IWC SC/42/SM 44.

Chivers, S. J., R. B. Miller, and A. A. Hohn. 1990. Composition of the 1988 incidental kill of six cetaceans in the US purse-seine fishing for tuna in the eastern tropical Pacific. Rep. Int. Whal. Commn: 40:455-458.

Chivers, S. J. and A. C. Myrick, Jr. 1991. Comparison of age at sexual maturity for two stocks of offshore spotted dolphins subjected to different rates of exploitation. NMFS SWFSC Administrative Report LJ-91-31.

Coe, J. M. and C. W. Oliver. 1991. An assessment of a federal regulation to curtail "sundown" sets involving marine mammals by the U.S. tuna purse-seine fleet. NMFS SWFSC Admin. Rept No. LJ-91-20.

DeMaster, D. P. 1990. Workshop to assess the effects of using seal-control devices to herd schools of dolphins in the eastern tropical Pacific. Held at the Southwest Fisheries Science Center on 29 November 1989. SWFSC Admin Rept. No. LJ-90-01.

DeMaster, D. P. and S. B. Reilly. 1990. Monitoring the status of ETP dolphins. Rep. Int. Whal. Commn. 40:127.

Dizon, A.E., C. Lockyer, D.P. DeMaster, W.F. Perrin, and J.E. Sisson. 1991. Rethinking the stock concept: A phylogeographic approach. Conservation Biology 6:24-36.

Dizon, A. E., W. F. Perrin and P. Akin. 1991. Stocks of dolphins in the (*Stenella* spp. and *Delphinus delphis*) eastern tropical Pacific: a phylogeographic classification. NMFS SWFSC Adminsitrative Report LJ-91-33.

Dizon, A. E., P. E. Rosel, and J. E. Heyning. 1991. Molecular phylogeny of two forms of common dolphin. NMFS SWFSC Administrative Report LJ-91-32.

Dizon, A. E., S. O. Southern, W. F. Perrin. 1991. Molecular analysis of mtDNA types in exploited populations of spinner dolphins. *In:* A. R. Hoelzel and G. P. Donovan (Eds.). Rep. Int. Whal. Commn Special Issue 13:183-202.

Dizon, A. E., and J. E. Rosenberg. 1990. We don't care, professor Einstein, the instructions to the authors specifically said *double*-spaced. *In:* Writing for fishery journals: pet peeves of editors and how to avoid them. J. R. Hunter (ed.), American Fisheries Society Symposium Proceedings. 65-74.

Edwards, E. F. and D. P. DeMaster. 1991. Workshop report: Survey design review panel: ETP Dolphin Monitoring Program. SWFSC Admin Rept. No. LJ-91-15.

Edwards, E. F. and P. Kleiber. 1990. Effects of non-randomness on line transect estimates of dolphin school abundance. Fish. Bull. 87(4):859-876.

Edwards, E. F., P. M. Kleiber, and C. Glick. 1990. MOPS in TOPS: Effects of trackline length, environment, and non-random school distributions on line transect estimates of dolphin school abundance derived from research surveys. SWFSC Admin. Rept LJ-90-14.

Edwards, E. F. and P. K. Kleiber. 1991. CHARTOPS: simulating short-term use of the tuna purse-seine fleet to survey dolphin schools in the eastern tropical Pacific Ocean. NOAA-TM-NMFS-SWFC-163.

Edwards, E. F. and P. Perkins. 1991. Power to detect trends in dolphin abundance: estimates from tuna-vessel observer data 1975-1989. NMFS SWFSC Administrative Report LJ-91-34.

Eliason, J. J., T. C. Johanos, and M. A. Webber. 1990. Parturition in the Hawaiian monk seal (*Monachus schauinslandi*). Mar. Mamm. Sci. 6(2):146-151.

Fiedler, P. C. 1990. Seasonal variability of eastern tropical Pacific surface waters. EOS, Trans. Amer. Geophys. Union 71(43):1401 (abstract).

Fiedler, P.C. and R. M. Laurs. 1990. Variability of the Columbia River plume observed in invisible and infrared satellite imagery. Int. Journal Remote Sensing, 11(6):999-1010.

Fiedler, P. C., L. J. Lierheimer, S. B. Reilly, S. N. Sexton, R. S. Holt and D. P. DeMaster. 1990. Atlas of eastern tropical Pacific oceanographic variability and cetacean sightings, 1986-1989. NOAA Tech. Memo. NMFS-SWFC-144. 142pp.

Fiedler, P. C., V. Philbrick, and F. P. Chavez. 1991. Oceanic upwelling and productivity in the eastern tropical Pacific. Limnology and Oceanography 36 (8): 1834-1850.

Fiedler, P. C. and S. B. Reilly. 1991. Interannual variability in dolphin habitats and abundances estimated from tuna vessel sightings in the eastern tropical pacific, 1975-1989. SWFSC Admin. Rep. No. LJ-91-35.

Forney, K., D. A. Hanan, and J. Barlow. 1991. Detecting trends in harbor porpoise abundance from aerial surveys using analysis of covariance. Fish. Bull. 89(3):367-377.

Forney, K., A. J. Leete, and D. L. Lindburg. 1991. A bar code scoring system for behavioral research. American Journal of Primatology, 23:127-135.

Gerrodette, T. 1991. Models for power of detecting trends -- a reply to Link and Hatfield. Ecology. 72: 1889-1892.

Gerrodette, T. 1991. Calibration of shipboard estimates of dolphin school size from aerial photographs. NMFS SWFSC Administrative Report LJ-91-36.

Gerrodette, T., B. K. Choy, and L. M. Hiruki. 1991. An experimental study of derelict gill-net fragments in the central Pacific Ocean. *In:* Proceedings of Second International Conference on Marine Debris. NOAA Tech. Memo. NMFS-SWFSC-1543 p. 600-614.

Gerrodette, T., and D. P. DeMaster. 1990. Quantitative determination of optimum sustainable population level. Marine Mammal Science 6:1-16.

Gerrodette, T., P. C. Fiedler and S. B. Reilly. 1991. Including habitat variability in line transect estimation of abundance and trends. NMFS SWFSC Administrative Report LJ-91-37.

Gerrodette, T. and W. G. Gilmartin. 1990. Demographic consequences of changed pupping and hauling sites of the Hawaiian monk seal. Conservation Biology 4(4):423-430.

Gilpatrick, J. W. Jr., M. S. Lynn and R. L. Westlake. 1991. Image interpretation and reader variability in dolphin school size estimates made from aerial photographs. Background document SOPS BD5 submitted to the 1991 Status of Porpoise Stocks Workshop, NMFS SWFSC, La Jolla, CA.

Gilpatrick, J. W. Jr., M. S. Lynn, A. E. Dizon, R. L. Westlake and W. L. Perryman. 1990. Ship based aerial photography: A tool for assessing the population biology of dolphins in the eastern tropical Pacific Ocean. Abstracts of the Fourth Biennial Conference of the American Cetacean Society. 9-11 November 1990. Monterey, CA.

Gilmartin, W. G. 1990. Hawaiian monk seal work plan, fiscal years 1991-93. Southwest Fish. Cent. Honolulu Lab., NMFS, NOAA, Honolulu, HI. Admin. Rept. H-90-14, 43 pp.

Henderson, J. R. 1990. Recent entanglements of Hawaiian monk seals in marine debris. *In*: R. S. Shomura and M. L. Godfrey (eds.), Proceedings of the Second International Conference on Marine Debris, April 2-7, 1989, Honolulu, HI. NOAA Tech. Memo. SWFSC-154.

Henderson, J. R., and M. R. Finnegan. 1990. Population monitoring of the Hawaiian monk seal, *Monachus schauinslandi*, and captive maintenance project at Kure Atoll, 1988. NOAA Tech. Memo. SWRSC-150.

Heyning, J. E. and W. F. Perrin. 1991. Re-examination of two forms of common dolphins (genus *Delphinus*) from the eastern North Pacific; evidence for two species. NMFS SWFSC Administrative Report LJ-91-28.

Hill, P. S., A. Jackson, and T. Gerrodette. 1990. Report of a marine mammal survey of the eastern tropical Pacific aboard the research vessel *DAVID STARR JORDAN* July 29-December 7, 1989. NOAA Tech. Memo. NMFS-SWFC-142.

Hill, P. S., A. Jackson, and T. Gerrodette. 1990. Report of a marine mammal survey of the eastern tropical Pacific aboard the research vessel *McARTHUR* July 29-December 7, 1989. NOAA Tech. Memo. NMFS-SWFC-143.

Hill, P. S., A. Jackson, and T. Gerrodette. 1991. Report of a marine mammal survey of the eastern tropical Pacific aboard the research vessel *McARTHUR* July 28-December 6, 1990. NOAA Tech. Memo. NMFS-SWFSC-159.

Hill, P. S., R. C. Rasmussen, and T. Gerrodette. 1991. Report of a marine mammal survey of the eastern tropical Pacific aboard the research vessel *DAVID STARR JORDAN* July 28-December 6, 1990. NOAA-Tech. Memo. NMFS-SWFSC-158.

Hohn, A. A. 1990. Reading between the lines: an analysis of age estimation in dolphins. *In*: S. Leatherwood and Reeves, R., (Eds.). The Bottlenose Dolphin. Academic Press, San Diego, CA. 575-586.

Hohn, A. A. and S. R. Benson. 1990. Bioacoustics of odontocetes in the ETP: Project description, preliminary results, and recommendations for future work. SWFSC Admin. Rep. LJ-90-23.

Hohn, A. A., R. B. Miller, K.M. Peltier and S.J. Chivers. 1991. Composition of the incidental kill of small cetaceans in the U.S. purse-seine fishery for tuna in the eastern tropical Pacific during 1989. Rep. Int. Whal. Commn 42.

Holland R. C. 1991. A personal computer based system for analog-to-digital and serial communication data acquisition. NOAA Tech. Memo. NMFS-SWFSC-152.

Holt, R. S. and S. N. Sexton. 1990. Monitoring trends in dolphin abundance in the eastern tropical Pacific using research vessels over a long sampling period: analyses of 1988 data. Rep. Int. Whal. Commn 40.

Johanos, T. C., B. L. Becker, M. A. Brown, B. K. Choy, L. M. Hiruki, R. E. Brainard, R. L. Westlake. 1990. The Hawaiian monk seal on Laysan Island, 1988. NOAA Tech. Memo. SWFSC-151.

Kruse, S. 1991. Theodolite studies of killer whale/boat interactions in Johnstone Strait, British Columbia. *In:* K. Pryor and K. S. Norris (Eds.). School Structure and Social Behavior of Wild Delphinids: A Methodological Survey of Current Studies. UC Press.

Kruse, S., S. Leatherwood, W. P. Prematunga, C. Mendes, and A. Gamage. 1991. Records of Risso's dolphins *Grampus griseus* in the Indian Ocean, 1891-1986. *In:* S. H. Ridgway (Ed.). Handbook of Marine Mammals, Volume 5: The Delphinids. Academic Press, London, San Diego.

Lavigne, D., S. Innis, G. Worthy, and E. F. Edwards. 1990. Lower critical temperatures of blue whales, *Balaenoptera musculus*. J. Theor. Biology. 144:249-257.

Lennert, C., S. Kruse, and M. Beeson. 1991. Preliminary report on incidental marine mammal bycatch in California gillnet fisheries. Document SC/43/03 Rept. Int. Whal. Commn.

Lierheimer, L. J., P. C. Fiedler, S. B. Reilly, R. L. Pitman, L. T. Ballance, S. C. Beavers, and D. W. Behringer. 1990. Report of ecosystem studies conducted during the 1989 eastern tropical Pacific dolphin survey on the research vessel *McARTHUR*. NOAA TM-NMFS-SWFC-140:123pp.

Lierheimer, L. J., P. C. Fiedler, S. B. Reilly, R. L. Pitman, L. T. Ballance, S. C. Beavers, G. G. Thomas and D. W. Behringer. 1990. Report of ecosystem studies conducted during the 1989 eastern tropical Pacific dolphin survey on the research vessel *DAVID STARR JORDAN*. NOAA TM-NMFS-SWFC-139:118pp.

Lowry, M. S. and R. L. Folk. 1990. Sex determination of the California sea lion (*Zalophus californianus californianus*) from canine teeth. Marine Mammal Science 6(1):25-31.

Lowry, M. S., C. W. Oliver, C. Macky, and J. B. Wexler. 1990. Food habits of California sea lions *Zalophus californianus* at San Clemente Island, California, 1981-1986. Fish. Bull. 88(3):509-521.

Lowry, M. S., B. S. Stewart, C. B. Heath, P. K. Yochem, and J. M. Francis. 1991. Seasonal and annual variability in the diet of California sea lions, *Zalophus californianus*, at San Nicolas Island, California, from 1981 through 1986. Fish. Bull. 89(2):331-336.

Majors, A. P., and A. C. Myrick, Jr. 1990. Effects of noise on animals: implications for dolphins exposed to seal bombs in the eastern tropical Pacific purse-seine fishery, an annotated bibliography. SWFSC Admin. Rept. No. LJ-90-06.

Myrick. A. C. Jr. 1991. Some new and potential uses of dental layers in studying delphinid populations. *In*: K. Pryor and K. Norris (Eds.). Dolphin Societies. UC Press, Berkeley.

Myrick, A. C. Jr., E. R. Cassano, and C. W. Oliver. 1990. Potential for physical injury, other than hearing damage, to dolphins from seal bombs used in the yellowfin tuna purse-seine fishery: results from open-water tests. SWFSC Admin. Rept. No. LJ-90-07.

Myrick, A. C. Jr,. and L. H. Cornell. 1990. Calibrating dental layers in captive bottlenose dolphins from serial tetracycline labels and tooth extractions. *In*: S. Leatherwood and R. R. Reeves (Eds.), The Bottlenose Dolphin. Academic Press Inc., San Diego.

Myrick, A. C. Jr., M. Fink, and C. B. Glick. 1990. Identification, chemistry, and behavior of seal bombs used to control dolphins in the yellowfin tuna purse-seine fishery in the eastern tropical Pacific: potential hazards. SWFSC Admin. Rept. No. LJ-90-08.

Myrick, A. C. Jr., J. Taylor, C. W. Oliver, E. R. Cassano, L. L. Robertson and A. P. Majors. 1990. Results of underwater tests of double-base smokeless-powder pipebombs on targets to determine physical hazards to dolphins. NOAA NMFS SWFSC Admin. Rep. LJ-90-26.

Oliver. C. W. 1991. 1988-1991 field studies on pinnipeds at San Clemente Island. SWFSC Admin. Rept. No. LJ-91-27.

Oliver, C. W. 1991. 1986-1987 field studies on pinnipeds at San Clemente Island. SWFSC Admin. Rep. No. LJ-91-25.

Oliver, C. W. 1991. Trip report for a marine mammal Aerial Survey ober the southern California Bight (April 13-15, 1982). SWFSC Admin. Rep. No. LJ-91-23.

Oliver, C. W. 1991. Documentation of the 1959-1988 editing criteria for porpoise life-history data: porpoise data management system. SWFSC Admin. Rept. No. LJ-91-07.

Oliver, C. W. 1991. Tuna/porpoise data editing criteria for range, blankness, and logical error statements: porpoise data management system. SWFSC Admin. Rept. No. LJ-91-06.

Oliver, C. W. 1991. Documentation of the 1975-1984 marine mammal bridge log record data: porpoise data management system. SWFSC Admin. Rept. No. LJ-91-04.

Oliver, C. W. and R. L. Butler. 1991. Documentation of the 1980 data verification programs and common subroutines for fixed-format data: porpoise data management system. NOAA Tech. Memo. NMFS SWFSC 157.

Oliver, C. W. and E. F. Edwards. 1990. Effects of including in mortality estimates, dolphins categorized as either injured or of undetermined status. NOAA-TM-NMFS-SWFC-138. 51 p.

Oliver, C. W. and J. B. Wexler. 1991. 1985 field studies on pinnipeds at San Clemente Island. SWFSC Admin. Rep. No. LJ-91-24.

Palka, D. 1991. Accounting for school size using a bivariate hazard rate detection function in line transect surveys of dolphins from the eastern tropical Pacific Ocean. NMFS SWFSC Administrative Report LJ-91-38.

Perrin, W. F., P. A. Akin and J. V. Kashiwada. 1991. Geographic variation in external morphology of the spinner dolphin, *Stenella longirostris*, in the eastern Pacific and implications for conservation. Fishery Bulletin, USA, 89(3):411-428.

Perrin, W. F. and J. W. Gilpatrick, Jr. 1991. Spinner dolphin, *Stenella longirostris*, In: R. Harrison and S. Ridgway (Eds.). Handbook of Marine Mammals. (In Press).

Perrin, W. F., G. D. Schnell, D. J. Hough, J. W. Gilpatrick and J. V. Kashiwada. 1991. Re-examiniation of geographical cranial variation in the pantropical spotted dolphin, *Stenella attenuata*, in the eastern Pacific. NMFS SWFSC LJ-91-39.

Perryman, W. L. and M. S. Lynn. 1991. Length distributions of striped dolphins from aerial photographs: are stocks identifiable? NMFS SWFSC Administrative Report LJ-91-41.

Perryman, W. L., A. E. Dizon and M. S. Lynn. 1991. Identification of common dolphin (*Delphinus delphis*) stocks from aerial photographs. NMFS SWFSC Administrative Report LJ-91-40.

Philbrick, V. A., P. C. Fiedler, S. B. Reilly, R. L. Pitman, L. T. Ballance, G. G. Thomas, and D. W. Behringer. 1991. Report of ecosystem studies conducted during the 1990 eastern tropical Pacific dolphin survey on the research vessel *DAVID STARR JORDAN*. NOAA Tech. Memo. NMFS-SWFSC-160.

Philbrick, V. A., P. C. Fiedler, S. B. Reilly, R. L. Pitman, L. T. Ballance, and D. W. Behringer. 1991. Report of ecosystem studies conducted during the 1990 eastern tropical Pacific dolphin survey on the research vessel *McARTHUR*. NOAA Tech. Memo. NMFS-SWFSC-161.

Pitman, R. L. 1991. Distribution and biology of sea turtles in the eastern tropical Pacific. Pages 143-148 in Proceedings of the 10th Annual Workshop on Sea Turtle Biology and Conservation. NOAA TM NMFS SEFC 278.

Pitman, R. L. and L. T. Ballance. 1990. Daytime feeding by Leach's storm petrel on a midwater fish in the eastern tropical Pacific. Condor 92:524-527.

Reilly, S. B. 1990. Seasonal changes in distribution and habitat differences among dolphins in the eastern tropical Pacific. Mar. Ecol. Prog. Ser. 66(1-2):1-11.

Reilly, S. B. 1991. We've got the blues in the eastern tropical Pacific. Whalewatcher 25(1):7-8.

Reilly, S. B. and P. C. Fiedler. 1991. Interannual variability in dolphin habitats in the eastern tropical Pacific. 1986-1990. NMFS SWFSC Administrative Report LJ-91-42.

Reilly, S. B. and P. C. Fiedler. 1990. Interannual variability in dolphin habitats in the eastern tropical Pacific, 1986-1989. SWFSC Admin. Rep. No. LJ-90-29.

Reilly, S. B. and V. G. Thayer. 1990. Blue whale (*Balaenoptera musculus*) distribution in the eastern tropical Pacific. Marine Mammal Science 6(4):265-277.

Salvadó, C. A. M., P. Kleiber, and A. E. Dizon. 1991. Optimal course by dolphins for detection avoidance. (Submitted to Fish. Bull., USA).

Sexton, S. N., R. S. Holt, and D. P. DeMaster. 1991. Investigating parameters affecting relative estimates in dolphin abundance in the eastern tropical Pacific from research vessel surveys in 1986, 1987, and 1988. Rep. Int. Whal. Commn 41.

Scott M. S. and W. L. Perryman. 1991. Using aerial photogrammetry to study dolphin school structure. In: *Dolphin Societies: Discoveries and Puzzles.* (eds.) Pryor, K. and Norris, K.S. University of California Press, Berkeley, pp 226-241.

Staff SWFSC. 1991. Status of Pacific Oceanic Living Marine Resources of Interest to the USA for 1991. NOAA TM NMFS SWFSC 165.

Vomend, I. 1991. Report of a census of California sea lions, *Zalophus californianus*, on Guadalupe Island and adjacent islets. SWFSC Admin. Rept. No. LJ-91-17.

Wade, P. R. 1991. Estimation of historical population size of eastern spinner dolphins. NMFS SWFSC Admin. Rep. LJ-91-12.

Wade, P. R. and T. Gerrodette. 1991. Monitoring trends in dolphin abundance in the eastern tropical Pacific: analysis of five years of data. Reports of the International Whaling Commission SC/43/SM13.

Westlake, R. L. and W. G. Gilmartin. 1990. Hawaiian monk seal pupping locations in the Northwestern Hawaiian Islands. Pacific Science 44(4) : 366-383.

Winchell, J. M. 1990. Field manual for phocid necropsies (specifically *Monachus schauinslandi*). NOAA Tech. Memo. SWFC-146.

Southeast Fishery Science Center

Anon. 1991. U.S. Western North Atlantic cetacean aerial survey design, August - October 1991. SEFSC Contribution MIA-90/91-76. 24 pp.

Anon. 1991. Southeast cetacean aerial survey design. SEFSC Contribution MIA-91/92-23. 22 pp.

Blaylock, R. A. 1991. Relationship between bottlenose dolphin, *Tursiops truncatus*, stranding and environment in Texas coastal waters. SEFSC Contribution MIA-90/91-36. 14 pp.

Hansen, L. H. 1990. California coastal bottlenose dolphins. *In*: S. Leatherwood and R. R. Reeves (eds.), The bottlenose dolphin, p. 403-420.

Hansen, L. J. and R. H. Defran. 1990. A comparison of photo-identification studies of California coastal bottlenose dolphins. Rep. Int. Whal. Commn. (Special Issue 12): 101-104.

Mullin, K., W. Hoggard, C. Roden, R. Lohoefener, C. Rogers, and B. Taggart. 1991. Cetaceans on the upper continental slope in the north-central Gulf of Mexico. OCS Study/MMS 91-0027. U.S. Dept. of the Interior, Minerals Mgmt. Service, Gulf of Mexico OCS Regional Office, New Orleans, La. 108 pp.

Mullin, K. D., R. R. Lohoefener, W. Hoggard, C. L. Roden, and C. M. Rogers. 1990. Abundance of bottlenose dolphins, Tursiops truncatus, in coastal Gulf of Mexico. Northeast Gulf Science 11(2): 113-122.

Scott, G. P. 1990. Management-oriented research on bottlenose dolphins by the Southeast Fisheries Center. *In*: S. Leatherwood and R. R. Reeves (eds.), The bottlenose dolphin, p. 623-640.

Scott, G. P. 1991. (ed.) Proximity of marine mammals and turtles to spilled oil. SEFSC Contribution MIA-90/91-73. 36 pp.

Wells, R. S., L. J. Hansen, A. Baldridge, T. P. Dohl, D. L. Kelly, and R. H. Defran. 1990. Northward extension of the range of bottlenose dolphins along the California coast. *In*: S. Leatherwood and R. R. Reeves (eds.), The bottlenose dolphin., p. 421-434.

National Marine Mammal Laboratory

Antonelis, G. A, C. W. Fowler, E. Sinclair, and A. E. York. 1990. Population assessment, Pribilof Islands, Alaska, p. 8-21. *In*: Kajimura, H. (editor), Fur Seal Investigations, 1989. NOAA Technical Memorandum, NMFS F/NWC-190.

Au, W. W. L. and L. Jones. 1991. Acoustic reflectivity of nets: implications concerning incidental take of dolphins. Marine Mammal Science 7(3):258-273.

Baba, N., M. Kiyota, K. Yoshida, T. R. Loughlin, and G. A. Antonelis. 1991. Satellite tracking of northern fur seal, Callorhinus ursinus, p. 103-108. *In*: Uchida, A. and C. J. Amlaner (editors), BIOTELEMETRY XI, Proceedings of the Eleventh International Symposium on Biotelemetry.

Baker, J. D. and C. W. Fowler. 1990. Tooth weights of juvenile male northern fur seals, *Callorhinus ursinus*. Marine Mammal Science 6(1):32-47.

Baker, J. 1991. Trends in northern fur seal, *Callorhinus ursinus*, feeding cycles indicated by nursing lines in juvenile male teeth. Master of Science Thesis, University of Washington, Seattle, WA

Barlow, J. and P. Boveng. 1991. Modeling age-specific mortality for marine mammal populations. Marine Mammal Science 7(1): 50-65.

Bengtson, J. L. 1990. Seal Island logistics and operations during 1989/90, p. 55-57. *In*: AMLR 1989/90 field season report: objectives, accomplishments and tentative conclusions. NOAA NMFS SWFC Administrative Report LJ-90-11.

Bengtson, J. L. and P. Boveng. 1990. Crabeater seal research inpack ice areas near the Antarctic Peninsula, p. 80-82. *In*: AMLR 1989/90 field season report: objectives, accomplishments and tentative conclusions. NOAA NMFS SWFC Administrative Report LJ-90-11.

Bengtson, J. L., Boveng, P. and Hewitt, R. 1990. Fur seal and penguin foraging areas near Seal Island. US Department of Commerce, NOAA, Southwest Fisheries Science Center Administrative Report LJ-90-11: 75-79.

Bengtson, J. L., Ferm, L. M., Harkönen, T. J. and Stewart, B. S. 1990. Abundance of Antarctic fur seals in the South Shetland Islands, Antarctica, during the 1986/87 austral summer, p. 265-270. In Kerry, K. and Hempel, G. (editors), Antarctic ecosystems, Würzburg, Germany, Springer-Verlag.

Bengtson, J. L. 1991. Seal Island logistics and operations during 1990/91, p. 4-6. AMLR 1990/91 Field Season Report. NOAA NMFS SWFC Administrative Report LJ-91-18.

Bengtson, J. L., P. Boveng, T. Ichii, A. Mujica, J. K. Jansen, and J. Alvarado. 1991. Fur seal and penguin foraging areas near Seal Island during 1990/91, p. 20-23. AMLR 1990/91 Field Season Report. NOAA NMFS SWFC Administrative Report LJ-91-18.

Bengtson, J. L., P. Boveng, U. Franzen, P. Have, M. P. Heide-Jörgensen and T. J. Härkönen. 1991. Antibodies to canine distemper virus in antarctic seals. Marine Mammal Science 7(1):85-87.

Boekelheide, R. J., D. G. Ainley, H. R. Huber and T. J. Lewis. 1990. Pelagic cormorant and double-crested cormorant, p. 195-218. *In*: Ainley, D. G. and R. J. Boekelheide (editors), Seabirds of the Farallon Islands. Palo Alto, CA, Stanford University Press.

Boekelheide, R. J., D. G. Ainley, S. H. Morrell, H. R. Huber and T. J. Lewis. 1990. Common murre, p. 245-275. *In*: Ainley, D. G. and R. J. Boekelheide (editors), Seabirds of the Farallon Islands. Palo Alto, CA, Stanford University Press.

Boveng, P., M. Goebel and J. L. Bengtson. 1990. Pinniped research at Seal Island, p. 58-62. *In*: AMLR 1989/90 field season report: objectives, accomplishments and tentative conclusions. NOAA NMFS SWFC Administrative Report LJ-90-11.

Boveng, P., M. E. Goebel, and J. L. Bengtson. 1991. Pinniped research at Seal Island during 1990/91, p. 7-10. AMLR 1990/91 Field Season Report. NOAA NMFS SWFC Administrative Report LJ-91-18.

Braham, H. W. 1990. Scientific investigations of the National Marine Mammal Laboratory, 1988. Polar Record 26(157): 119-121.

Braham, H. W. 1990. Scientific investigations of the National Marine Mammal Laboratory, 1989. Polar Record 26(159): 319-322.

Braham, H. W. 1991. Marine mammal resources off Alaska. *In*: Status of Living Marine Resources off Alaska, as assessed in 1991, p. 77-95. NOAA Technical Memorandum NMFS-F/NWC-211.

Braham, H. W. and J. Barlow. 1991. Marine mammal resources off Washington, Oregon, and California. *In*: Status of Living Marine Resources off the Pacific Coast of the United States as assessed in 1991, p. 54-60. NOAA Technical Memorandum NMFS-F/NWC-210.

Breiwick, J. and H. Braham. 1990. Historical population estimates of bowhead whales: sensitivity to current population size. Report of the International Whaling Commission 40:423-426.

Briggs, L. 1990. Distribution of adult territorial males and pups born on St. Paul and St. George Islands, p. 66-84. *In*: H. Kajimura (editor), Fur seal investigations, 1987 and 1988. NOAA Technical Memorandum NMFS F/NWC-180.

Burke, R. A., D. Withrow, J. Alcala-Herrera and J. M. Brooks. 1990. Carbon isotope ratio variations in bowhead whale baleen plates. EOS 71(2):92.

Costa, D., G. Antonelis and R. DeLong. 1991. Effects of El Niño on foraging energetics of California sea lion, p. 156-165. *In:* Trillmich, F. and K. Ono (editors), Pinnipeds and the 1982-83 El Niño in the North Pacific. Berkeley, CA, University of California Press.

Croll, D. A. 1990. Physical and biological determinants of the abundance, distribution, and diet of the common murre in Monterey Bay, California. *In:* Spencer G. Sealy (editor), Studies in avian biology No. 4, p. 139-148. Allen Press, Lawrence, KS.

Croll, D. A., S. Osmek and J. L. Bengtson. 1990. Seabird research at Seal Island, p. 62-71. In AMLR 1989/90 field season report: objectives, accomplishments and tentative conclusions. NOAA NMFS SWFC Administrative Report LJ-90-11.

Croll, D. A., S. D. Osmek, and J. L. Bengtson. 1990. Seabird research at Seal Island. US Department of Commerce, NOAA, Southwest Fisheries Science Center Administrative Report LJ-90-11:62-71.

Croll, D. A., J. K. Jansen, and J. L. Bengtson. 1991. Seabird research at Seal Island, Antarctica, during 1990/91, p. 11-19. AMLR 1990/91 Field Season Report. NOAA NMFS SWFC Administrative Report LJ-91-18.

Croll, D. A., S. D. Osmek, and J. L. Bengtson. 1991. An effect of instrument attachment on foraging trip duration in chinstrap penguins. The Condor 93:777-779.

Dahlheim, M. E. 1990. North Atlantic Killer Whales. By J. Sigurjonsson and S. Leatherwood (editors), Rit Fiskideildar. Journal of the Marine Research Institute, Reykjavik. Volume XI, 316 pp. 1988. [book review] Marine Mammal Science 6(2):161-163.

Dahlheim, M. E. and J. Heyning. 1991. The killer whale. *In:* Ridgway, S. and R. Harrison (editors), Handbook of marine mammals. New York, NY, Academic Press. (in press)

Dahlheim, M. E. and D. K. Ljungblad. 1991. Preliminary hearing study on gray whales *Eschrichtius robustus* in the field. *In:* Jeanette A. Thomas and Ronald A. Kastelein (editors),Sensory abilities of cetaceans, p. 335-346. Plenum Press. New York. 710 p.

DeLong, R. L. 1990. Population and behavioral studies, San Miguel Island, California, 1987 and 1988 (Adams Cove and Castle Rock), p. 64-65. *In*: Kajimura, H. (editor), Fur seal investigations, 1987 and 1988. NOAA Technical Memorandum NMFS F/NWC-180.

DeLong, R. L. and G. Antonelis. 1991. Impacts of the 1982-83 El Niño on the northern fur seal population on San Miguel Island, p. 75-83. *In*: Trillmich, F. and K. Ono (editors), Pinnipeds and the 1982-83 El Niño in the North Pacific. Berkeley, CA, University of California Press.

DeLong, R. L. and B. S. Stewart. 1991. Diving patterns of northern elephant bulls. Marine Mammal Science 7(4):369-384.

DeLong, R. L., G. Antonelis, C. Oliver, B. Stewart, M. Lowry and P. Yochem. 1991. Effects of the 1982-83 El Niño on several population parameters and diet of California sea lions on the California Channel Islands, p. 166-172. *In*: Trillmich, F. and K. Ono (editors), Pinnipeds and the 1982-83 El Niño in the North Pacific. Berkeley, CA, University of California Press.

Fay, F. H., J. L. Sease and R. L. Merrick. 1990. Predation on a ringed seal, *Phoca hispida*, and a black guillemot, *Cepphus grylle*, by a Pacific walrus, *Odobenus rosmarus*. Marine Mammal Science 6(4):348-350.

Feldkamp, S., G. Antonelis, and R. DeLong. 1991. Effect of El Niño 1983 on the foraging patterns of California sea lion (*Zalophus californianus*) at San Miguel Island, California, p. 146-155. *In*: Trillmich, F. and K. Ono (editors), Pinnipeds and the 1982-83 El Niño in the North Pacific. Berkeley, CA, University of California Press.

Fowler, C. W. 1990. Density dependence in northern fur seals (*Callorhinus ursinus*). Marine Mammal Science 6(3):171-195.

Fowler, C. W. and T. Ragen. 1990. Entanglement Studies, juvenile male roundups, St. Paul Island, Alaska, p. 43-54. *In*: Kajimura, H. (editor), Fur Seal Investigations, 1989. NOAA Technical Memorandum, NMFS F/NWC-190.

Fowler, C. W., R. Merrick and N. Baba. 1990. Entanglement studies, St. Paul Island, 1988 juvenile male roundups, p. 85-89. *In:* Kajimura, H. (editor), Fur seal investigations, 1987 and 1988. NOAA Technical Memorandum NMFS F/NWC-180.

Fowler, C. W., R. Merrick and J. D. Baker. 1990. Studies of the population level effects of entanglement on northern fur seals. *In:* R. S. Shomura and M. L. Godfrey (editors), Proceedings of the Second International Conference on Marine Debris, 2-7 April 1989, p. 453-474. NOAA Technical Memorandum NMFS SWFSC 154.

Fowler, C. W. and Baba, N. 1991. Entanglement studies, St. Paul Island, 1990 juvenile male northern fur seals. Processed Report 91-01, Alaska Fisheries Science Center, NMFS, NOAA, 7600 Sand Point Way NE, Seattle, WA 98115. 63 p.

Fowler, C. W. and J. D. Baker. 1991. A review of animal population dynamics at extremely reduced population levels, p. 545-554. Report of the International Whaling Commission 41.

Fowler, C. W. and D. DeMaster (editors). 1991. Priorities for assessing marine mammals incidentally taken in commercial fisheries of the United States. Processed Report 91-19. Northwest and Alaska Fisheries Science Centers, National Marine Fisheries Service, NOAA, Seattle, WA. 62 p.

Fowler, C. W. and T. Ragen. 1991. Entanglement studies, St. Paul Island, 1989 juvenile male roundups. Processed report 90-06, Northwest and Alaska Fisheries Science Center, NMFS, NOAA, 7600 Seattle, WA 98115, 39 p.

Gentry, R. L. and C. A. Goebel-Diaz. 1990. Behavior and biology of northern fur seals, Pribilof Islands, Alaska, 1987 and 1988, p. 56-63. *In:* Kajimura, H. (editor), Fur seal investigations, 1987 and 1988. NOAA Technical Memorandum NMFS F/NWC-180.

Gentry, R. L., E. C. Gentry and J. F. Gilman. 1990. Responses of northern fur seals to quarrying operations. Marine Mammal Science 6(2):151-155.

Gentry, R. L. 1991. El Niño effects on adult northern fur seals at the Pribilof Islands, p. 84-93. *In:* Trillmich, F. and K. Ono (editors), Pinnipeds and the 1982-83 El Niño in the North Pacific. Berkeley, CA, Univ. California Press.

Goebel, M. E., J. L. Bengtson, R. L. DeLong, R. L. Gentry and T. R. Loughlin. 1991. Diving patterns and foraging locationsof female northern fur seals. Fish. Bull. 89(92):171-179.

Hammond, P. S., S. A. Mizroch and G. P. Donovan (editors). 1990. Individual recognition of cetaceans: Use of photo- identification and other techniques to estimate population parameters. Cambridge, International Whaling Commission (Special Issue 12).

Hammond, P. S., S. A. Mizroch and G. P. Donovan (editors). 1990. Use of natural marks to assess cetacean populations. Cambridge, U.K., International Whaling Commission (Special Issue 12), 600 p.

Hempel, G., J. L. Bengtson, R. Horner, G. Hubold, and D. W. H. Walton. 1990. Antarctic ecosystems: change and conservation. P. 407-414. *In*: Antarctic Ecosystems, Ecological Change and Conservation, K. Kerry and G. Hempel (eds.). Springer-Verlag: Berlin.

Huber, H. R. 1991. Changes in the distribution of California sea lions north of the breeding rookeries during the 1982-83 El Niño, p.129-137. *In*: Trillmich, F. and K. Ono (editors), Pinnipeds and the 1982-83 El Niño in the North Pacific. Berkeley, CA, University of California Press.

Huber, H. R., C. Beckam and J. S. Nisbet. 1991. Effects of the 1982-83 El Niño on elephant seals at the South Farallon Islands, California, p. 219-233. *In*: Trillmich, F. and K. Ono (editors), Pinnipeds and the 1982-83 El Niño in the North Pacific. Berkeley, CA, University of California Press.

Huber, H. R., A. C. Rovetta, L. A. Fay and S. Johnston. 1991. Age-specific natality of northern elephant seals at the South Farallon Islands, California. J. Mammal. 72(3):525-534.

Kajimura, H. (editor). 1990. Fur seal investigations, 1987 and 1988. U. S. Dep. Commer., NOAA Technical Memorandum NMFS F/NWC-180, 148 p.

Kajimura, H. (editor). 1990. Fur seal investigations, 1989. U. S. Dep. Commer., NOAA Technical Memorandum NMFSF/NWC-190, 99 p.

Kajimura, H., A. E. York, G. A. Antonelis and C. W. Fowler. 1990. Population assessment, Pribilof Islands, Alaska, p. 9-15. *In*: Kajimura, H. (editor), Fur seal investigations, 1987 and 1988. NOAA Technical Memorandum NMFS F/NWC-180.

Loughlin, T. R. 1990. Growth of the Bogoslof Island northern fur seal colony, p. 53-55. *In*: Kajimura, H. (editor), Fur seal investigations, 1987 and 1988. NOAA Technical Memorandum NMFS F/NWC-180.

Loughlin, T. R., A. S. Perlov and V. A. Vladimirov. 1990. Survey of northern sea lions (*Eumetopias jubatus*) in the Gulf of Alaska and Aleutian Islands during June 1989. NOAA Technical Memorandum NMFS F/NWC-176, 26 p.

Lowry, L. F. and T. R. Loughlin. 1990. New conservation efforts begin for Alaska's Steller sea lions. Alaska's Wildl. 22(4):6-9, 45.

Merrick, R. L., M. K. Maminov, J. D. Baker and A. G. Makhnyr. 1990. Results of U.S.-U.S.S.R. joint marine mammal research cruise in the Kuril and Aleutian Islands 6 June-24 July 1989. NOAA Technical Memorandum NMFS F/NWC-177, 63 p.

Merrick, R. L., Ferm, L. M., Everitt, R. D., Ream, R. R. and Lessard, L. A. 1991. Aerial and ship-based surveys of northern sea lions (*Eumetopias jubatus*) in the Gulf of Alaska and Aleutian Islands during June and July 1990. U.S. Department of Commerce, NOAA Technical Memorandum, NMFS F/NWC 196, 34 p.

Miller, E. J. 1990. Photo-identification techniques applied to Dall's porpoise (*Phocoenoides dalli*) in Puget Sound, Washington, p. 429-437. *In*: P. Hammond, S. Mizroch and G. Donovan (editors), Use of natural marks to assess cetacean populations. Cambridge, U.K., International Whaling Commission (Special Issue 12).

Miller, R. V. 1990. The Bering Sea connection: The US/USSR Marine Mammal Project. Alaska's Wildlife 22(5):7-10.

Mizroch, S. A. and M. A. Bigg. 1990. Shooting whales (photographically) from small boats: An introductory guide. *In*: Philip S. Hammond, Sally A. Mizroch, and Gregory O. Donovan (editors), Individual recognition of cetaceans: Use of photo-identification and other techniques to estimate population parameters. Special Issue 12, International Whaling Commission Annex K, p. 39-40. Cambridge, United Kingdom. 440 p.

Mizroch, S. A., J. A. Beard and M. Lynde. 1990. Computer assisted photo-identification of humpback whales, p. 63-70. *In*: P. Hammond, S. Mizroch and G. Donovan (editors), Use of natural marks to assess cetacean populations. Cambridge, U.K., International Whaling Commission (Special Issue 12).

Perez, M. A. 1990. Review of marine mammal population and prey information for Bering Sea ecosystem studies. NOAA Technical Memorandum NMFS F/NWC-186, 81 p.

Perez, M. A., W. B. McAlister and E. E. Mooney. 1990. Estimated feeding rate relationship for marine mammals based on captive animal data. NOAA Technical Memorandum NMFS F/NWC-184, 30 p.

Perez, M. A. and T. R. Loughlin. 1991. Incidental catch of marine mammals by foreign and joint venture trawl vessels in the U.S. EEZ of the North Pacific, 1973-88. NOAA Technical Report 104, 57 p.

Ponganis, P. J., Ponganis, E. P., Ponganis, K. V., Kooyman, G. L., Gentry, R. L. and Trillmich, F. 1990. Swimming velocities in otariids. Can. J. Zool. 68:2105-2112.

Rice, D. W. 1990. The scientific name of the pilot whale--a rejoinder to Schevill. Mar. Mammal Sci. 6(4):359-360.

Rice, D. and A. Wolman. 1990. The stomach of *Kogia breviceps*. Journal of Mammalogy 71(2):237-242.

Rugh, D. J. 1990. Bowhead whales reidentified through aerial photography near Point Barrow, Alaska, p. 289-294. *In*: Hammond, P. S., Mizroch, S. A. and Donovan, G. P. (editors). 1990. Individual recognition of cetaceans: use of photo-identification and other techniques to estimate population parameters. Cambridge, International Whaling Commission (Special Issue 12).

Rugh, D. J., R. Ferrero and M. Dahlheim. 1990. Interobserver count discrepancies in a shore-based census of gray whales. *Marine Mammal Science* 6(2):109-120.

Stewart, B. S. and R. L. DeLong. 1991. Diving patterns of northern elephant seal bulls. *Marine Mammal Science* 7(4): 369-384.

Testa, J. W., G. Oehlert, D. G. Ainley, J. L. Bengtson, D. B. Siniff, R. M. Laws and D. Rounsevell. 1991. Temporal variability in Antarctic marine ecosystems: periodic fluctuations in the Phocid seals. Can. J. Fish. Aquat. Sci. 48(4):631-639.

Trillmich, F., K. A. Ono D. P. Costa, R. L. DeLong, S. D. Feldkamp, J. M. Francis, R. L. Gentry, C. B. Heath, B. J. LeBoeuf, P. Majluf and A. E. York. 1991. The effect of El Niño on pinniped populations in the eastern Pacific, p. 247-270. *In:* Trillmich, F. and L. Ono (editors), Pinnipeds and the 1982-83 El Niño in the North Pacific. Berkeley, CA, University of California Press.

Williams, T. M., G. L. Kooyman and D. A. Croll. 1991. The effect of submergence on heart rate and oxygen consumption of swimming seals and sea lions. J. Comp. Physiol. B 169(6):637-644.

York, A. E. 1990. Trends in numbers of pups born on St. Paul and St. George Islands 1973-88, p. 31-37. *In:* Kajimura, H. (editor), Fur seal investigations, 1987 and 1988. NOAA Technical Memorandum NMFS F/NWC-180.

York, A. E. and G. A. Antonelis. 1990. Northern fur seal pups born on St. Paul Island 1987-88, p. 16-30. *In:* Kajimura, H. (editor), Fur seal investigations, 1987 and 1988. NOAA Technical Memorandum NMFS F/NWC-180.

York, A. E. and G. A. Antonelis. 1990. Pup weights and sex-ratios, 1987-88, p. 38-52. *In:* Kajimura, H. (editor), Fur seal investigations, 1987 and 1988. NOAA Technical Memorandum NMFS F/NWC-180.

York, A. E. 1991. Sea surface temperature and survival of juvenile male fur seals from the Pribilof Islands, p. 94-108. *In:* Trillmich, F. and K. Ono (editors), Pinnipeds and the 1982-83 El Niño in the North Pacific. Berkeley,CA, University of California Press.

Zeh, J. E., A. E. Radftery, Q. Yang, D. E. Withrow, J. M. Breiwick, H. W. Braham, T. F. Albert, J. C. George, L. M. Philo and C. W. Clark. 1991. Assessment of bowhead whales: A progress report, abstract only, p. 590. Report of the International Whaling Commission 41.

Northeast Fisheries Science Center

Carlson, C.A., C.A. Mayo. 1990. Changes in the ventral fluke pattern of the humpback whale (*Megaptra novaeangliae*) and its effect on matching; evaluation of its significance to photo-identification research. Rep. Int. Whal. Commn. Special Issue 12:105-111.

Clapham, P.J., C.A. Mayo. 1990. Reproduction of humpback whales (*Megaptera novaeangliae*) observed in the Gulf of Maine. Rep. Int. Whal. Commn. Special Issue 12: 171-175.

Clapham, P.J., I.E. Seipt. 1991. Resightings of independent fin whales (*Balaenoptera physalus*), on maternal summer ranges. J. Mamm. 72:788-790.

Hamilton, P.K., C.A. Mayo. 1990. Population characteristics of right whales (*Eubalaena glacialis*) observed in Cape Cod and Massachusetts Bays, 1978-1986. Rep. Int. Wahl. Commn Special Issue 12:203-298.

Hammond, P.S. 1990. Heterogeneity in the Gulf of Maine? Estimating humpback whale population size when capture probabilities are not equal. Rep. Int. Whal. Commn. Special Issue 12:135-139.

Katona, S.K., J.A. Beard. 1990. Population size, migrations and feeding aggregations of the humpback whale (*Megaptera novaeangliae*) in the Western North Atlantic Ocean. Rep. Int. Whal. Commn. Special Issue 12:295-304.

Kraus, S.D. 1990. Rates and potential causes of mortality in north Atlantic right whales *Eubalaena glacialis*). Marine Mammal Science. 6:278-291.

Mayo, C.A., M.K. Marx. 1990. Surface and foraging behavior of the North Atlantic right whale (*Eubalaena glacialis*) and associated zooplankton characteristics. Can. J. Zool. 68:2214-2220.

Nelson, G, M.R. Ross. 1991. Biology and population changes of northern sand lance (*Ammodytes dubius*) from the Gulf of Maine to the Middle Atlantic Bight. J. Northw. Atl. Fish. Sci. 11:11-27.

Overholtz, W.S., G.T. Waring. 1991. Diet and composition of pilot whales (*Globicephala ssp.*) and common dolphin (*Delphinus delphis*) in the mid-Atlantic Bight during Spring 1989. Fish. Bull. U.S. 89:723-728.

Overholtz, W.J., S.A. Murawski, K.L. Foster. 1991. Impact of predatroy fish, marine mammals, and seabirds on the pelagic ecosystem of the Northeastern USA. *In*: Daan, N., and M. Sissenwine (eds.), Symposium on multispecies modals relevant to management of living resources, The Hague, Netherlands, October 1989. ICES Mar. Sci. Symp., 193:198-208.

Payne, P.M., D.W. Heinemann, T.D. Smith. 1990. Seasonal distribution of minke whales in the shelf and shelf-edge waters of the northeastern U.S. Rep. Int. Whal. Commn. SC/42/NHMi32 (2).

Smith, T.D., P.M. Payne, D. Heinemann, G.T. Waring, A. Lange. 1990. Simultaneous fishery resource and seabird and cetacean sighting surveys: advantages and disadvantages. ICES N. Atl. Studies 2(1-2):90-101.

Waring, G.T., P. Gerrior, P.M. Payne, B.L. Parry, J.R. Nicolas. 1990. Incidental take of marine mammals in foreign fishery activities off the northeast United States, 1977-1988. Fish. Bull. 88(2): 347-360.

Appendix A

Exhibit A-1
1991 List of Category I and Category II Fisheries

FISHERY	CATEGORY
AK Prince William Sound - drift gillnet	I
WA marine set gillnet in Areas 4, 4A, and 4B	I
WA, OR Lower Columbia River Region, Willapa Bay, Grays Harbor (includes rivers, estuaries, etc.) drift gillnet	I
WA, OR, CA thresher shark and swordfish drift gillnet	I
CA California halibut - set gillnet	I
CA angel shark - set gillnet	I
SNE, MDA Foreign mackerel	I
Atlantic Ocean, CB, GMX swordfish, tuna, shark	I
GME groundfish/mackerel	I
AK Prince William Sound - set gillnet	II
AK South Unimak (False Pass and Unimak Pass) drift gillnet	II
AK Peninsula (other than South Unimak) drift gillnet	II
AK Southeast Alaska - drift gillnet	II
AK Yakutat - set gillnet	II
AK Cook Inlet - drift gillnet	II
AK Cook Inlet - set gillnet	II
AK Kodiak - set gillnet	II
AK Peninsula - set gillnet	II
AK Bristol Bay - drift gillnet	II
AK Bristol Bay - set gillnet	II
WA Puget Sound Region, including Hood Canal, Strait of Juan de Fuca (estuaries and lower river areas subject to tidal action) set and drift gillnet	II
WA coastal river - gillnet	II
CA Klamath River - gillnet	II

Exhibit A-1 (cont'd)
1991 List of Category I and Category II Fisheries

FISHERY	CATEGORY
AK - gillnets (except salmon and herring)	II
CA - gillnets for white sea bass, yellow tail, soupfin shark, white croaker, bonito/flying fish	II
AK South Unimak (False Pass and Unimak Pass)	II
WA, OR, CA salmon	II
CA herring - purse seine	II
CA anchovy, mackerel, tuna - purse seine	II
CA sardine - purse seine	II
CA squid - purse seine	II
AK Prince William Sound	II
AK Southern Bering Sea, Aleutian Islands, and Gulf of Alaska (Unimak Pass and westward)	II
AK Metlakatla fish trap	II
CA squid	II
WA, OR salmon - net pens	II
OR salmon - ranch	II
FL east coast shark	II
SNE, MDA squid	II
SNE, MDA Atlantic mackerel	II
Atlantic Ocean, CB, GMX, tuna, shark, swordfish	II

Appendix B

Exhibit B-1
National Marine Fisheries Service Marine Mammal Exemption Program
Archive Year 1990 Fishery Registration and Logbook Interaction Information
Data current as of January 25, 1993

Table I - Atlantic Ocean Fisheries:

Fishery (Number)	Estimated Number of Vessels	Vessels Registered	Vessels Reporting	Gear Interactions			Deterrence Actions			Total Hours Fished	Mean Effort (/day)	Take Rate[1] (/day)	Take Rate (/20 days)
				Involved	Injured	Killed	Harassed	Injured	Killed				
Category I													
Mid-Atlantic Foreign Mackerel Trawl Fishery (01)	15	19	12	41	0	40	0	0	0	1,282	6.0	0.187	3.74
Gulf of Maine Groundfish/ Mackerel Sink Gillnet Fishery (02)	140	314	241	280	4	247	1	0	7	363,953	23.4	0.016	0.33
Category II													
Mid-Atlantic Squid Trawl Fishery (03)	20	300	161	1	0	0	0	0	0	67,404	11.8	N.A.	N.A.
Mid-Atlantic Mackerel Trawl Fishery (04)	200	317	124	2	0	2	0	0	0	17,613	8.0	.00091	0.018
Atlantic, Caribbean, and Gulf of Mexico Tuna, Shark, and Swordfish Longline Fishery (05)	820	595	335	305	26	50	28	2	0	218,430	15.2	.0035	0.070

1: Daily take rate is calculated according to the following equation:

$$\frac{\text{N(Gear Interaction Kills)} + \text{N(Deterrence Action Kills)}}{\text{Total Hours Fished}} \times \text{Mean Effort (/day)}$$

Exhibit B-1 (cont'd)
National Marine Fisheries Service Marine Mammal Exemption Program
Archive Year 1990 Fishery Registration and Logbook Interaction Information
Data current as of January 25, 1993

Table II - Pacific Ocean Fisheries:

Fishery (Number)	Estimated Number of Vessels	Vessels Registered	Vessels Reporting	Gear interactions			Deterrence Actions			Total Hours Fished	Mean Effort (/day)	Take Rate[1] (/day)	Take Rate (/20 days)
				Involved	Injured	Killed	Harassed	Injured	Killed				
Category I													
Alaska Prince William Sound Drift Gillnet Fishery (06)	525	618	550	19,869	26	19	7,512	9	11	317,881	18.6	.0018	0.035
Alaska Prince William Sound Set Gillnet Fishery (07)	17	36	29	857	0	0	180	0	0	22,605	20.2	N.A.	N.A.
Alaska Peninsula Drift Gillnet Fishery (08)	164	150	134	3,849	5	11	1,458	6	7	83,865	18.1	.0039	0.078
Washington Marine (Areas 4, 4A, and 4B) Set Gillnet Fishery (09)	66	16	6	9	0	4	0	0	0	2,234	21.5	0.038	0.770
WA, OR Lower Columbia River Salmon Drift Gillnet Fishery (10)	914	838	653	53,990	75	70	15,473	24	21	111,095	8.4	0.0069	0.138
WA, OR, CA Thresher Shark and Swordfish Drift Gillnet Fishery (11)	309	224	134	342	11	58	100	7	12	48,850	12.7	0.018	0.364
California Halibut Set Gillnet Fishery (12)	788	274	131	2,700	45	925	829	24	78	138,592	26.6	0.193	3.85
California Angel Shark Set Gillnet Fishery (13)	788	179	25	83	5	67	90	0	12	7,439	17.8	0.189	3.78

Exhibit B-1 (cont'd)
National Marine Fisheries Service Marine Mammal Exemption Program
Archive Year 1990 Fishery Registration and Logbook Interaction Information
Data current as of January 25, 1993

Fishery (Number)	Estimated Number of Vessels	Vessels Registered	Vessels Reporting	Gear Interactions			Deterrence Actions			Total Hours Fished	Mean Effort (/day)	Take Rate[1] (/day)	Take Rate (/20 days)
				Involved	Injured	Killed	Harassed	Injured	Killed				
Alaska Bering Sea/ Gulf of Alaska Groundfish Trawl Fishery (14)	70	483	255	2,373	3	27	26	0	1	276,611	10.9	0.0011	0.022
Category II													
Southeast Alaska Salmon Drift Gillnet Fishery (15)	460	496	402	10,789	3	14	1,589	4	3	215,561	18.0	0.0014	0.028
Alaska Yakutat Salmon Set Gillnet Fishery (16)	154	38	28	354	0	0	20	0	0	14,139	17.2	N.A.	N.A.
Alaska Cook Inlet Salmon Set and Drift Gillnet Fishery (17)	1,213	790	692	924	4	3	301	1	0	136,582	12.7	0.0003	.0056
Alaska Kodiak Salmon Set Gillnet Fishery (18)	174	115	103	1,029	0	10	374	0	0	86,100	23.6	0.0027	0.055
Alaska Peninsula Set Gillnet Fishery (19)	100	99	75	1,773	0	0	884	0	0	33,801	19.7	N.A.	N.A.
Alaska Bristol Bay Salmon Set and Drift Gillnet Fishery (20)	2,692	2,349	1,936	35,085	30	25	9,139	28	28	493,820	16.0	0.0017	0.034
Washington Puget Sound Region and Inland Waters S. of the Canadian Border Salmon Set and Drift Gillnet Fishery (21)	3,900	2,536	1,128	17,296	66	26	7,627	43	66	179,950	12.7	0.0065	0.130

Exhibit B-1 (cont'd)
National Marine Fisheries Service Marine Mammal Exemption Program
Archive Year 1990 Fishery Registration and Logbook Interaction Information
Data current as of January 25, 1993

Fishery (Number)	Estimated Number of Vessels	Vessels Registered	Vessels Reporting	Gear Interactions			Deterrence Actions			Total Hours Fished	Mean Effort (/day)	Take Rate[1] (/day)	Take Rate (/20 days)
				Involved	Injured	Killed	Harassed	Injured	Killed				
Washington Coastal River Salmon Set Gillnet Fishery (22)	255	322	13	504	0	1	73	0	0	2,091	10.2	0.0048	0.098
California Klamath River Salmon Gillnet Fishery (23)	600	7	8	33	0	0	0	0	0	764	8.3	N.A.	N.A.
Alaska Gillnet Fishery (except salmon and herring) (24)	6	234	73	939	5	0	39	0	0	8,203	14.9	N.A.	N.A.
California White Sea Bass, Yellow Tail, Soupfin Shark, White Croaker, Bonito/Flying Fish Gillnet Fishery (25)	144	276	83	1,813	6	33	823	8	8	26,585	15.2	0.023	0.469
Alaska South Unimak (False Pass and Unimak Pass) Salmon Purse Seine Fishery (26)	102	115	81	361	0	0	15	0	0	14,169	14.3	N.A.	N.A.
Alaska Salmon Troll Fishery (27)	1,607	1,410	962	10,004	102	1	449	9	5	431,425	12.9	0.0002	.0036
WA, OR, CA Salmon Troll Fishery (28)	4,727	4,526	3,354	77,796	502	146	14,894	275	182	647,843	9.9	0.0050	0.10
California Herring Purse Seine Fishery (29)	43	97	30	10,884	5	0	9,978	0	0	3,806	7.0	N.A.	N.A.

Exhibit B-1 (cont'd)
National Marine Fisheries Service Marine Mammal Exemption Program
Archive Year 1990 Fishery Registration and Logbook Interaction Information
Data current as of January 25, 1993

Fishery (Number)	Estimated Number of Vessels	Vessels Registered	Vessels Reporting	Gear Interactions			Deterrence Actions			Total Hours Fished	Mean Effort (/day)	Take Rate[1] (/day)	Take Rate (/20 days)
				Involved	Injured	Killed	Harassed	Injured	Killed				
California Anchovy, Mackerel, and Tuna Purse Seine Fishery (30)	330	160	59	2,546	4	3	543	10	5	12,943	5.7	0.0035	0.070
California Sardine Purse Seine Fishery (31)	345	113	15	17	0	0	6	0	0	282	4.0	N.A.	N.A.
California Squid Purse Seine Fishery (32)	40	145	36	6,077	0	1	3,577	17	1	4,835	8.0	0.0033	0.066
Alaska Prince William Sound (Area 649) Sablefish Longline/ Setline Fishery (33)	25	271	76	120	0	0	30	0	0	6,435	13.4	N.A.	N.A.
Alaska Southern Bering Sea and Aleutian Islands (Areas 610 W of 165 W) Sablefish Longline/ Setline Fishery (34)	66	226	76	3,012	0	1	80	0	0	36,852	19.1	0.0005	0.010
Alaska Metlakatla Fish Trap Fishery (35)	4	54	7	0	0	0	0	0	0	1,313	19.1	N.A.	N.A.
California Squid Dip Net Fishery (36)	10	113	12	0	0	0	0	0	0	71	23.7	N.A.	N.A.
WA and OR Salmon Net Pen Fishery (37)	21	14	9	120	1	6	97	0	4	19,512	15.6	0.0080	0.160
OR Salmon Ranch Fishery (38)	5	8	7	48	0	0	35	0	0	788	13.3	N.A.	N.A.

1: Daily take rate is calculated according to the following equation:

$$\frac{N(\text{Gear Interaction Kills}) + N(\text{Deterrence Action Kills})}{\text{Total Hours Fished}} \times \text{Mean Effort (/day)}$$

Exhibit B-2
National Marine Fisheries Service Marine Mammal Exemption Program
Archive Year 1991 Fishery Registration and Logbook Interaction Information
Data current as of January 25, 1993

Table I - Atlantic Ocean Fisheries:

Fishery (Number)	Estimated Number of Vessels	Vessels Registered	Vessels Reporting	Gear Interactions			Deterrence Actions			Total Hours Fished	Mean Effort (/day)	Take Rate[1] (/day)	Take Rate (/20 days)
				Involved	Injured	Killed	Harassed	Injured	Killed				
Category I													
Mid-Atlantic Foreign Mackerel Trawl Fishery (01)	19	20	3	0	0	0	0	0	0	181	6.7	N.A.	N.A.
Gulf of Maine Groundfish/ Mackerel Sink Gillnet Fishery (02)	345	297	203	195	1	191	0	0	13	353,435	27.4	0.016	0.316
Atlantic, Caribbean, Gulf of Mexico Swordfish, Tuna, and Shark Gillnet Fishery (39)	75	35	30	80	0	77	0	0	0	1,879	10.7	0.438	8.76
Category II													
Mid-Atlantic Squid Trawl Fishery (03)	370	231	122	39	0	1	0	0	0	55,910	13.2	0.0002	0.005
Mid-Atlantic Mackerel Trawl Fishery (04)	340	226	113	15	0	11	4	0	0	7,788	9.6	0.014	0.27
Atlantic, Caribbean, and Gulf of Mexico Tuna, Shark, and Swordfish Longline Fishery (05)	820	358	235	316	6	5	209	0	0	155,763	15.3	0.0001	.0006
Florida East Coast Shark Gillnet Fishery (40)	40	1	0	-	-	-	-	-	-	-	-	-	-

1: Daily take rate is calculated according to the following equation:

$$\frac{N(\text{Gear Interaction Kills}) + N(\text{Deterrence Action Kills})}{\text{Total Hours Fished}} \times \text{Mean Effort (/day)}$$

Exhibit B-2 (cont'd)
National Marine Fisheries Service Marine Mammal Exemption Program
Archive Year 1991 Fishery Registration and Logbook Interaction Information
Data current as of January 25, 1993

Table II - Pacific Ocean Fisheries:

Fishery (Number)	Estimated Number of Vessels	Vessels Registered	Vessels Reporting	Gear Interactions			Deterrence Actions			Total Hours Fished	Mean Effort (/day)	Take Rate[1] (/day)	Take Rate (/20-day)
				Involved	Injured	Killed	Harassed	Injured	Killed				
Category I													
Alaska Prince William Sound Drift Gillnet Fishery (06)	536	590	494	15,415	8	13	4,503	5	2	244,890	15.5	0.0009	0.019
Alaska Prince William Sound Set Gillnet Fishery (07)	30	28	27	659	0	0	258	0	0	21,913	21.7	N.A.	N.A.
Washington Marine (Areas 4, 4A, and 4B) Set Gillnet Fishery (09)	19	6	2	43	0	34	0	0	0	2,412	23.9	0.337	6.74
WA, OR Lower Columbia River Salmon Drift Gillnet Fishery (10)	850	773	615	35,437	91	54	10,146	36	21	128,899	8.2	0.0047	0.095
WA, OR, CA Thresher Shark and Swordfish Drift Gillnet Fishery (11)	224	165	136	307	10	117	15	0	2	55,085	11.7	0.025	0.506
California Halibut Set Gillnet Fishery (12)	273	172	151	3,548	15	423	361	2	11	155,454	26.0	0.073	1.452
California Angel Shark Set Gillnet Fishery (13)	178	90	71	434	0	4	0	0	0	12,038	22.6	0.0075	0.150
Alaska Bering Sea/ Gulf of Alaska Groundfish Trawl Fishery (1990:14, 1991:43/44)	490	287	240	354	0	15	11	0	1	261,552	11.8	0.0007	0.014

Exhibit B-2 (cont'd)
National Marine Fisheries Service Marine Mammal Exemption Program
Archive Year 1992 Fishery Registration and Logbook Interaction Information
Data current as of January 25, 1993

Fishery (Number)	Estimated Number of Vessels	Vessels Registered	Vessels Reporting	Gear Interactions			Deterrence Actions			Total Hours Fished	Mean Effort (/day)	Take Rate[1] (/day)	Take Rate (/20-day)
				Involved	Injured	Killed	Harassed	Injured	Killed				
Category II													
Alaska Peninsula Drift Gillnet Fishery (1990:08, 1991:41/42)	158	162	143	3,468	2	1	1,559	0	2	73,113	17.6	0.0007	0.014
Southeast Alaska Salmon Drift Gillnet Fishery (15)	468	431	362	5,503	7	8	1,450	9	3	224,608	14.5	0.0007	0.014
Alaska Yakutat Salmon Set Gillnet Fishery (16)	164	158	115	3,270	12	3	1,048	6	0	56,578	15.0	0.0008	0.016
Alaska Cook Inlet Salmon Set and Drift Gillnet Fishery (1990:17, 1991:45/46)	1,303	768	639	1,308	1	0	349	0	1	81,432	12.9	0.0002	.0032
Alaska Kodiak Salmon Set Gillnet Fishery (18)	187	117	96	1,115	3	6	256	0	0	102,842	21.0	0.0012	0.025
Alaska Peninsula Set Gillnet Fishery (19)	113	90	66	1,504	0	1	973	0	0	31,497	17.0	0.0005	0.011
Alaska Bristol Bay Salmon Set and Drift Gillnet Fishery (1990:20, 1991:47/48)	2,689	2,051	1,645	26,633	59	25	5,983	58	35	396,101	15.6	0.0024	0.047

Exhibit B-2 (cont'd)
National Marine Fisheries Service Marine Mammal Exemption Program
Archive Year 1991 Fishery Registration and Logbook Interaction Information
Data current as of January 25, 1993

Fishery (Number)	Estimated Number of Vessels	Vessels Registered	Vessels Reporting	Gear Interactions			Deterrence Actions			Total Hours Fished	Mean Effort (/day)	Take Rate[1] (/day)	Take Rate (/20-day)
				Involved	Injured	Killed	Harassed	Injured	Killed				
Washington Puget Sound Region and Inland Waters S. of the Canadian Border Salmon Set and Drift Gillnet Fishery (21)	3,900	1,690	957	14,775	59	38	6,554	103	43	110,365	11.4	0.0084	0.167
Washington Coastal River Salmon Set Gillnet Fishery (22)	325	12	4	0	0	0	0	0	0	82	9.1	N.A.	N.A.
California Klamath River Salmon Gillnet Fishery (23)	504	2	2	0	0	0	0	0	0	12	12.0	N.A.	N.A.
Alaska Gillnet Fishery (except salmon and herring) (24)	235	91	40	46	0	1	23	0	0	3,596	14.7	0.0041	0.082
California White Sea Bass, Yellow Tail, Soupfin Shark, White Croaker, Bonito/Flying Fish Gillnet Fishery (25)	275	149	134	1,612	6	40	272	2	9	36,124	16.7	0.023	0.453
Alaska South Unimak (False Pass and Unimak Pass) Salmon Purse Seine Fishery (26)	115	102	85	201	0	0	20	0	0	8,429	12.0	N.A.	N.A.
Alaska Salmon Troll Fishery (27)	1,607 (Cat.III)	95	2	0	0	0	0	0	0	18	18.0	N.A.	N.A.

Exhibit B-2 (cont'd)
National Marine Fisheries Service Marine Mammal Exemption Program
Archive Year 1992 Fishery Registration and Logbook Interaction Information
Data current as of January 25, 1993

Fishery (Number)	Estimated Number of Vessels	Vessels Registered	Vessels Reporting	Gear Interactions			Deterrence Actions			Total Hours Fished	Mean Effort (/day)	Take Rate[1] (/day)	Take Rate (/20-day)
				Involved	Injured	Killed	Harassed	Injured	Killed				
WA, OR, CA Salmon Troll Fishery (28)	4,727	3,829	2,911	35,576	45	39	9,034	73	83	456,991	9.1	0.0024	0.049
California Herring Purse Seine Fishery (29)	100	44	37	2,245	1	0	842	1	0	1,830	6.6	N.A.	N.A.
California Anchovy, Mackerel, and Tuna Purse Seine Fishery (30)	160	101	83	33,025	1	1	621	1	0	11,398	4.8	0.0004	0.0084
California Sardine Purse Seine Fishery (31)	120	72	58	577	0	0	312	0	0	1,440	5.9	N.A.	N.A.
California Squid Purse Seine Fishery (32)	145	82	65	4,851	0	0	3,922	0	0	6,769	6.1	N.A.	N.A.
Alaska Prince William Sound (Area 649) Sablefish Longline/ Setline Fishery (33)	270	220	106	154	0	0	2	0	0	6,345	15.7	N.A.	N.A.
Alaska Southern Bering Sea and Aleutian Islands (Areas 610 W of 165 W) Sablefish Longline/ Setline Fishery (34)	226	194	131	4,680	0	0	0	0	0	36,598	18.3	N.A.	N.A.
Alaska Metlakatla Fish Trap Fishery (35)	4	9	3	0	0	0	0	0	0	720	24.0	N.A.	N.A.
California Squid Dip Net Fishery (36)	115	53	39	51	0	0	51	0	0	177	11.1	N.A.	N.A.
WA and OR Salmon Net Pen Fishery (37)	21	10	10	1,918	0	6	1,898	0	0	60,544	24.0	0.0024	0.048

Exhibit B-2 (cont'd)
National Marine Fisheries Service Marine Mammal Exemption Program
Archive Year 1991 Fishery Registration and Logbook Interaction Information
Data current as of January 25, 1993

Fishery (Number)	Estimated Number of Vessels	Vessels Registered	Vessels Reporting	Gear Interactions			Deterrence Actions			Total Hours Fished	Mean Effort (/day)	Take Rate[1] (/day)	Take Rate (/20-day)
				Involved	Injured	Killed	Harassed	Injured	Killed				
OR Salmon Ranch Fishery (38)	8	4	1	0	0	0	0	0	0	0	N.A.	N.A.	N.A.

1: Daily take rate is calculated according to the following equation:

$$\frac{N(\text{Gear Interaction Kills}) + N(\text{Deterrence Action Kills})}{\text{Total Hours Fished}} \times \text{Mean Effort (/day)}$$

Appendix C

Exhibit C-1
Summary of Permit Applications
January 1, 1990 to December 31, 1991

	Scientific Research	Public Display	Scientific Research & Public Display	Totals
NUMBER OF APPLICATIONS SUBMITTED	**72**	**22**	**1**	95
No. of Animals Requested (Total)	952,041	121	50	952,212
OF THESE:				
Taken by Killing	241	0	0	241
Taken and Kept Alive	2	9	0	11
Killed in Captivity	0	0	0	0
Taken and Released	13,665	0	0	13,665
Found Dead	13	0	0	13
Stranded/Exchanged	25	101	0	126
Imports	0	11	0	11
Harass	938,095	0	50	938,145
ACTION TAKEN ON APPLICATIONS:				
No. Forwarded to Marine Mammal Commission	51	17	0	68
No. Reviewed by Marine Mammal Commission	47	17	0	64
No. Withdrawn	7	2	0	9
No. Referred to Fish and Wildlife Service	0	0	0	0
No. Referred to States	0	0	0	0
No. Referred to Regions	0	0	0	0
No. Resolved through Agreement	0	0	0	0
No. Returned Due to Insufficient or	17	1	1	19
No. Denied	1	0	0	1
No. Approved	44	17	0	61
No. Pending	3	2	0	5

Exhibit C-1 (cont'd)
Summary of Permit Applications
January 1, 1990 to December 31, 1991

	Scientific Research	Public Display	Scientific Research & Public Display	Totals
NO. OF ANIMALS APPROVED	**1,181,354**	**83**	**0**	**1,181,437**
OF THESE:				
Taken by Killing	211	0	0	211
Taken and Kept Alive	2	0	0	2
Killed in Captivity	0	0	0	0
Taken and Released	12,376	0	0	12,376
Found Dead	0	0	0	0
Stranded/Exchanged	25	73	0	98
Imports	0	10	0	10
Harass	1,168,740	0	0	1,168,740

Exhibit C-2
Number of Cetaceans in Scientific Research/Public Display Permit Requests
January 1, 1990 to December 31, 1991

	Taken / Imported and Kept Alive	Tagged or Taken and Released	Found Dead / Stranded	Total Requested
Atlantic Bottlenose Dolphin	9	1,050	2	1,061
Atlantic Hump-Backed Dolphin	0	0	0	0
Atlantic Spotted Dolphin	0	50	0	50
Baird's Beaked Whale	0	20	0	20
Black Right Whale, Northern Right Whale	0	20	0	20
Blue Whales	0	20	0	20
Bottlenose Dolphins	0	160	0	160
Common Dolphin	0	80	0	80
Dall's Porpoise	0	80	6	86
Dwarf Sperm Whale	0	250	0	250
Fin Whale, Finback	0	20	0	20
Gray Whale	0	20	0	20
Harbor Porpoise	0	80	1	81
Humpback Whale	0	20	0	20
Killer Whale	7	0	0	7
Melon-Headed Whale, Electra	0	250	0	250
Minke Whale	0	70	0	70
Northern Right Whale Dolphin	0	80	1	81
Pacific White-Sided Dolphin	0	80	1	81
Pygmy Sperm Whale	0*	250	0	250
Risso's Dolphin, Grampus	0	80	0	80
Short-Finned Pilot Whale	0	80	0	80
Sperm Whale	0	20	0	20
Unspecified Cetaceans	0	10	0	10
White Whale, Beluga	4	0	0	4
TOTAL	20	2,790	11	2,821

Exhibit C-3
Number of Pinnipeds in Scientific Research/Public Display Permit Requests
January 1, 1990 to December 31, 1991

	Taken By Killing	Taken / Imported and Kept Alive	Tagged or Taken and Released	Found Dead/ Stranded	Total Requested
Bearded Seal	200	0	0	0	200
California Sea Lion	20	0	3945	5	3970
Crabeater Seal	0	0	1000	0	1000
Harbor Seal	0	0	200	10	210
Hawaiian Monk Seal	1	2	776	0	779
Kerguelen Fur Seal	0	0	4500	0	4500
Largha Seal, Spotted Seal	0	0	100	0	100
Leopard Seal	0	0	1010	0	1010
Lorthern Fur Seal	0	0	0	1	1
Ringed Seal	0	0	0	1	1
Ross Seal	0	0	500	0	500
Southern Elephant seal	0	0	1000	0	1000
Weddell Seal	20	0	1050	0	1070
TOTAL	241	2	14081	17	14341

Exhibit C-4
Number of Cetaceans Authorized in Scientific Research/Public Display Permits
January 1, 1990 to December 31, 1991

	Taken/Imported and Kept Alive	Tagged or Taken and Released	Found Dead/ Stranded	Total Requested
Atlantic Bottlenose Dolphin	0	1,000	0	1,000
Dwarf Sperm Whale	0	250	0	250
Killer Whale	6	0	0	6
Melon-Headed Whale, Electra	0	250	0	250
Minke Whale	0	50	0	50
Pygmy Sperm Whale	0	250	0	250
White Whale, Beluga	4	0	0	4
TOTAL	**10**	**1,800**	**0**	**1,810**

Exhibit C-5
Number of Pinnipeds Authorized in Scientific Research/Public Display Permits
January 1, 1990 to December 31, 1991

	Taken By Killing	Taken / Imported and Kept Alive	Tagged or Taken and Released	Found Dead/ Stranded	Total Requested
Bearded Seal	200	0	0	0	200
California Sea Lion	0	0	2,676	0	2,676
Crabeater Seal	0	0	1,000	0	1,000
Harbor Seal	0	0	200	4	204
Hawaiian Monk Seal	1	2	776	0	779
Kerguelen Fur Seal	0	0	4,500	0	4,500
Largha Seal, Spotted Seal	0	0	100	0	100
Leopard Seal	0	0	1,010	0	1,010
Ross Seal	0	0	500	0	500
Southern Elephant Seal	0	0	1,000	0	1,000
Weddell Seal	10	0	1,030	0	1,040
TOTAL	211	2	12,792	4	13,009

Appendix D

Exhibit D-1
Marine Mammal Strandings in 1990 and 1991

Species	1990					1991				
	NE	SE	SW	NW	AK	NE	SE	SW	NW	AK
Beaked Whale		2	1	2			4			
Blainville Beaked Whale		1					2			
Cuvier's Beaked Whale			1					1		
Dense Beaked Whale						1				
Gervais' Beaked Whale		3					4			
Stejneger's Beaked Whale			1		2					2
True's Beaked Whale						1				
Beluga Whale					3					1
Bowhead whale					1					
Bryde's whale		1					3			
Dwarf Sperm Whale	1	8				1	5			
Pygmy Sperm Whale	2	17		1		3	25			
Pygmy or Dwarf Sperm Whale							2			
Fin Whale	1	1				4	1	1		
Gray Whale			11	14	27			16	14	17
Humpback Whale	5	5	1		2	6	7		1	2
Killer Whale					10		1			8
Melon Headed Whale		1					1			
Minke Whale	9	1	4	3	1	11	1			
Northern Right Whale							1			
Pilot Whale							1			
Longfin Pilot Whale	61					99				
Short-finned Pilot Whale			1			1	42			
Pygmy Killer Whale							3			
Sperm Whale		7	1	1	1		3	1		
Other Whale		2	4		20					
Bottlenose Dolphin	23	578	9			19	448	5		
Common Dolphin	7		23			9		15		
Northern Right Whale Dolphin			2					5		
Pacific White-sided Dolphin			6	1				5	3	

Exhibit D-1 (cont'd)
Marine Mammal Strandings in 1990 and 1991

Species	1990					1991				
	NE	SE	SW	NW	AK	NE	SE	SW	NW	AK
Atlantic White-sided Dolphin	30					18				
Risso's Dolphin	1	1	1			2	5	5		
Rough Toothed Dolphin		1					14			
Spinner Dolphin		1					1			
Spotted Dolphin		13					13			
Striped Dolphin	1		1			3	10	1	1	
Other Dolphin	1	86	1			1	40	7		
Dall's Porpoise			3		3				1	
Harbor Porpoise	21		17	9	17	46		11	3	9
Other Cetacean	1									
TOTAL CETACEAN	**164**	**729**	**88**	**31**	**87**	**225**	**632**	**67**	**23**	**39**
California Sea Lion			560	23				936	24	
Northern (Steller) Sea Lion			6	10				7	2	
Gray Seal	24					11				
Guadalupe Fur Seal			1					1		
Harbor Seal	129	3	148	134		237	5	184	61	
Harp Seal	7					13				
Hooded Seal	10		1			11				
Northern Elephant Seal			201	19				229	6	
Northern Fur Seal			19	4				14	4	
Ringed Seal	4					3				
Other Pinniped		5	297			1	3	136		
TOTAL PINNIPED	**174**	**8**	**1233**	**190**	**0**	**276**	**8**	**1507**	**97**	**0**
TOTAL MARINE MAMMALS	**338**	**737**	**1321**	**221**	**87**	**502**	**640**	**1575**	**120**	**39**