MARINE MAMMAL COMMISSION

Annual Report to Congress

1991

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1992

Marine Mammal Commission
1825 Connecticut Avenue, N.W.
Washington, D.C. 20009

31 January 1992

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United States. Marine Mammal Commission.

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Executive Summary

This, the nineteenth Annual Report of the Marine Mammal Commission, describes the activities of the Marine Mammal Commission and its Committee of Scientific Advisors on Marine Mammals during calendar year 1991. The Commission was established under Title II of the Marine Mammal Protection Act to provide guidance on Federal activities and policies, be they domestic or international, that bear on the protection and conservation of marine mammals. The Report is an in-depth summary of Commission activities in this regard. Its purpose is to provide timely information to Congress, government agencies, public interest groups, the academic community, private citizens, and the international community on important issues and events concerning marine mammal protection and conservation. To ensure factual accuracy, the Report was provided in draft form to concerned Federal and State agencies and other involved parties for review and comment prior to publication.

As described in Chapter II, the Commission and its Committee of Scientific Advisors pay special attention to certain marine mammal species and populations each year. Among the species and populations facing the most urgent conservation problems in 1991 were West Indian manatees, Hawaiian monk seals, Steller sea lions, the California population of sea otters, and northern right whales.

The West Indian manatee is one of the most endangered marine mammals in the United States. It occurs in coastal waters and rivers of Florida and Georgia and is the largest known group in the species' North, Central, and South American range. Numbering something more than 1,800 animals, its long-term survival is in doubt. Known deaths in the past three years have exceeded 550, more than 150 of which were caused by water craft. In 1991, for the sixth time in eight years, vessel-related deaths reached a new record high. However, habitat degradation from development may pose an even more serious long-term threat than boats. As noted in Chapter II, the Commission continued to work closely with the Fish and Wildlife Service, the State of Florida, and other groups in 1991 to strengthen manatee recovery efforts. Encouraging progress was made. Boat speed regulatory systems were expanded, additional manatee habitat was added to Federal and State protected area systems, and shoreline development plans received greater scrutiny. Efforts now appear sufficiently comprehensive to have a chance of succeeding if vigorously sustained, but it will take several years before the effectiveness of this expanded program can be judged.

The most endangered seal in United States waters is the Hawaiian monk seal. This species, which may number fewer than 1,500 animals, inhabits the remote, largely uninhabited Northwestern Hawaiian Islands. Over the past two years, significant declines in births and beach counts have been recorded. Over the same period, there has been an increase in reports of seal injuries and deaths due to interactions with the Hawaiian

swordfish longline fishery that has expanded from about 15 to 150 vessels. In 1991, the National Marine Fisheries Service, the Fish and Wildlife Service, the Western Pacific Regional Fishery Management Council, the United States Coast Guard, and the Commission cooperated in efforts to prevent these harmful interactions. The National Marine Fisheries Service also continued to rebuild some seal colonies through headstart and pup rehabilitation programs and to address problems caused by groups of aggressive male seals killing adult females and young seals of both sexes. Substantial progress was made with respect to starting restoration efforts at Tern Island, and planning began in earnest for the repair of the disintegrating seawall, something critical to both the welfare of the seals and the integrity of the Island. Particularly noteworthy were the progress made by the National Marine Fisheries Service's program staff over the past two years and the substantially improved levels of cooperation amongst all agencies involved in monk seal recovery efforts. In addition to the groups already mentioned, the Hawaiian Monk Seal Recovery Team, the Corps of Engineers, the Navy, and the Hawaii Department of Land and Natural Resources were important contributors.

Because of alarming declines in the number of Steller sea lions throughout their range, particularly in Alaska, the species was listed as threatened under the Endangered Species Act in 1990. In 1991, the Steller Sea Lion Recovery Team constituted by the National Marine Fisheries Service completed and provided a recovery plan to the Service for adoption. At the same time, the Marine Mammal Commission began work to update its 1988 Steller sea lion species account with research and management recommendations. Among the things affecting Steller sea lions were the commercial fisheries for pollock and other groundfish. In these fisheries, sea lions have been caught in nets or shot by fishermen to protect gear and catch, and the fisheries themselves may have depleted sea lion food supplies. In this regard, the Service promulgated emergency rules to close areas within 10 miles of major rookeries to groundfish fishing and adjusted proposed catch limits for pollock downward. Recommendations also were made by the Recovery Team to designate critical habitat under the Endangered Species Act.

The remnant population of sea otters along the central California coast numbers about 1,900 animals and remains at risk. A decline in numbers in the 1980s due to incidental take in gillnets has been stopped by State actions to prohibit the use of gillnets in sea otter habitat and otter numbers again appear to be increasing. The major threat to the population has been and continues to be the possibility of a large oil spill. To address this threat, the Fish and Wildlife Service began efforts in 1987 to establish a separate reserve colony of otters at San Nicolas Island, an island some distance from the mainland colony. To date, however, only a few animals have remained at the Island and efforts to translocate additional animals have ended. In addition, the *Exxon Valdez* oil spill indicates that one massive spill could affect both the mainland and San Nicolas

Island colonies. Therefore, future recovery objectives and activities were re-examined in 1991.

The northern right whale, the most endangered marine mammal in U.S. waters, is also the world's most endangered species of large whale. The largest known population, perhaps 350 animals, occurs seasonally in coastal waters off the east coasts of Canada and the United States. Entanglement in fishing gear and collisions with ships are the principal human causes of mortality and injury for this population. The Marine Mammal Commission has urged development of a recovery plan and the Right Whale Recovery Team has recommended designating critical habitat pursuant to the Endangered Species Act. Although the Commission has provided extensive advice on both matters over the past two years, it is not clear what the National Marine Fisheries Service intends to do.

Activities relative to harbor seals, North Pacific fur seals, Pacific walruses, sea otters in Alaska, polar bears, humpback whales, bowhead whales, gray whales, killer whales, Gulf of California harbor porpoises, bottlenose dolphins, and harbor porpoises also are discussed in Chapter II.

Marine mammals affect and are affected by certain commercial and recreational fisheries. Currently, the taking of marine mammals incidental to most commercial fisheries is authorized under a five-year exemption, enacted in 1988, from the moratorium on taking marine mammals. Before the interim exemption expires, Congress will re-examine the issue in light of information gathered under the exemption program, and enact a more permanent system for regulating the take of marine mammals by fishermen. Efforts to implement the interim exemption and to develop a new regime to govern the take of marine mammals incidental to commercial fishing operations after 1 October 1993 are discussed in Chapter III. One fishery not included under the interim exemption is the eastern tropical Pacific purse seine fishery for yellowfin tuna. Actions taken to reduce the mortality of dolphins incidental to that fishery also are discussed in Chapter III.

The Marine Mammal Protection Act directs the Commission to review and provide advice to the Secretary of State and other Federal officials on international arrangements affecting marine mammals and their habitat. As discussed in Chapter IV, the Commission devoted particular attention in 1991 to issues regarding the International Whaling Commission, high seas driftnet fisheries, conservation of marine mammals and their habitat in the seas surrounding Antarctica, and formation of the North Pacific Marine Science Organization (PICES).

Ineffective regulation of commercial whaling by the International Whaling Commission has allowed most exploited whale stocks to be reduced to dangerously low

levels. To permit time for the stocks to recover and to review its management practices, the International Whaling Commission initiated a worldwide moratorium on commercial whaling that went into effect in 1986. Several countries are now advocating an end to the moratorium and the resumption of commercial whaling. On 5 December 1991, the Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, sent a comprehensive review of issues related to commercial whaling and operation of the International Whaling Commission to the U.S. Commissioner to the International Whaling Commission. The Marine Mammal Commission noted, among other things, that both the 1946 International Convention for the Regulation of Whaling and the International Whaling Commission's conservation program were in need of fundamental revision and concluded that the United States should initiate efforts to update both.

At present, the incidental take of marine mammals in commercial fisheries, particularly high seas driftnet fisheries, poses a greater threat to many marine mammals than does commercial exploitation. As noted in previous Annual Reports, the Commission has advocated banning large-scale high seas driftnet fisheries. In 1991, the Commission continued to work with the Departments of State and Commerce to seek an international ban on these fisheries. Largely thanks to efforts by the Department of State, the United Nations General Assembly adopted a consensus resolution in December 1991 that calls for a 50 percent reduction in large-scale high seas driftnet fishing effort by 30 June 1992 and a global moratorium on all such fishing to begin on 31 December 1992.

Another subject discussed in Chapter IV is the Commission's continued work with the Department of State and other Federal agencies to develop and implement international agreements for conserving whales, seals, and their habitats in Antarctica. An action of particular significance in this regard was the conclusion of the Antarctic Treaty Protocol on Environmental Protection on 4 October 1991. At present, the issue of greatest concern to the Commission continues to be the potential for unregulated growth of the Antarctic krill fishery.

Many of the issues of concern in the Southern Ocean have parallels in the North Pacific Ocean. To provide a mechanism for cooperatively identifying and assessing key research issues in the North Pacific, the Governments of Canada, Japan, the People's Republic of China, the Soviet Union, and the United States concluded the Convention for a North Pacific Marine Science Organization (PICES) in December 1990. In 1991, the Commission provided partial support for and participated in a workshop to initiate discussions on four key topic areas: climate change, the Bering Sea, environmental quality, and fisheries oceanography. The workshop report, expected to be completed early in 1992, will be provided to the member states to assist in preparing for the first meeting of the Organization.

As indicated in past Annual Reports, there appears to have been a worldwide increase in unusual marine mammal mortality events since the late 1970s. More occurred in 1991. While the reasons for the apparent increase are not clear, the increase may be due, at least in part, to environmental pollution or other factors that suppress the immune systems and weaken the ability of marine mammals to ward off natural disease. This issue, of great concern to the Commission, is discussed in Chapter V.

Marine mammals and other species, including some that are endangered, are killed or injured as a result of becoming entangled in or ingesting lost or discarded nets, line, and other debris. Such debris is now recognized as a major form of marine pollution and a serious threat to many species. As discussed in Chapter VI, the Commission continued in 1991 to help the National Marine Fisheries Service in its efforts to carry out education, mitigation, and research activities through the Marine Entanglement Research Program. In cooperation with the Coast Guard and the National Marine Fisheries Service, the Commission also helped focus attention on implementing the provisions of Annex V of the International Convention for the Prevention of Pollution from Ships, which regulates disposal of ship-generated garbage.

As noted in Chapter VII, marine mammal management in Alaska is particularly challenging. This is due, in part, to the large numbers of marine mammals in Alaska, their use for subsistence purposes by Alaska Natives, and interactions with commercial fisheries and offshore oil and gas development. In 1991, the Commission took steps to help the Fish and Wildlife Service and the National Marine Fisheries Service strengthen their marine mammal programs in Alaska. Among other things, the Commission started preparation of draft conservation plans for walruses, polar bears, and sea otters, and the preparation of species accounts with research and management recommendations for Steller sea lions, killer whales, and harbor seals. For reasons that are not known, populations of a number of Alaska marine mammals and seabirds have declined significantly in recent years. In December 1990, the Commission and the National Marine Fisheries Service conducted a workshop to assess possible causes and implications of these declines and related research and management needs. The workshop report, completed and widely distributed in 1991, is among the matters discussed in Chapter VII.

The Minerals Management Service, the National Marine Fisheries Service, and the Fish and Wildlife Service share responsibility for ensuring that activities and events, like oil spills, associated with offshore oil, gas, and mineral exploration and development do not have significant adverse effects on marine mammals or the ecosystems of which they are a part. In 1991, these agencies, in consultation with the Commission, promulgated regulations and took other actions, as described in Chapter VIII, to give effect to section 101(a)(5) of the Marine Mammal Protection Act. This section of the Act directs the

Secretaries of Commerce and the Interior to authorize the taking of small numbers of marine mammals incidental to activities other than commercial fishing, when the taking would have negligible impacts and certain other conditions are met.

The Marine Mammal Protection Act directs that the Marine Mammal Commission undertake, or cause to be undertaken, such studies as it considers necessary or desirable to effect the protection and conservation of marine mammals. Actions taken by the Commission in 1991 in response to this directive are described in Chapter IX. Reports and other publications resulting from research and studies supported by the Commission in previous years are listed in Appendices B and C.

Chapter X discusses the process for issuing permits to take marine mammals for scientific research, public display, and species enhancement. Chapter XI discusses regulations governing the care and maintenance of marine mammals in captivity. During 1991, the National Marine Fisheries Service continued to review its permitting system and expects to publish proposed revisions to its existing permit regulations in 1992. In 1991, the Commission called upon the Animal and Plant Health Inspection Service, the National Marine Fisheries Service, and the Fish and Wildlife Service to review and, as necessary, revise the Standards and Regulations for the Humane Handling, Care, Treatment, and Transportation of Marine Mammals. To begin the process, the Commission provided the Services with a detailed discussion paper to serve as a base document for the review.

Three Appendices follow the body of this Report. Appendix A summarizes recommendations made by the Commission in 1991; Appendix B lists reports published by the National Technical Information Service on Commission-supported studies and activities; and Appendix C lists other reports and papers based upon Commission-supported studies and activities that have been published elsewhere.

Chapter I

INTRODUCTION

This nineteenth Annual Report of the Marine Mammal Commission covers the period 1 January through 31 December 1991. It is being submitted to Congress pursuant to section 204 of the Marine Mammal Protection Act of 1972.

Established under Title II of the Act, the Marine Mammal Commission is an independent agency of the Executive Branch. It is charged with developing, reviewing, and making recommendations on the actions and policies of all Federal agencies with respect to marine mammal protection and conservation and with carrying out a research program.

Personnel

The Commission consists of three part-time Commissioners appointed by the President. The Marine Mammal Protection Act requires that the Commissioners be knowledgeable in marine ecology and resource management. At the end of 1991, the Commissioners were: John E. Reynolds, III, Ph.D., (Chairman), Eckerd College, St. Petersburg, Florida; Paul K. Dayton, Ph.D., Scripps Institution of Oceanography, La Jolla, California; and Jack W. Lentfer, Homer, Alaska. During 1991, Robert Elsner, Ph.D., and Francis H. Fay, Ph.D., both with the University of Alaska, Fairbanks, completed their terms of service on the Commission.

The Commission's full-time staff members are: John R. Twiss, Jr., Executive Director; Robert J. Hofman, Ph.D., Scientific Program Director; David W. Laist, Policy and Program Analyst; Michael L. Gosliner, General Counsel; Steven L. Swartz, Ph.D., Deputy Scientific Program Director; Richard L. Wallace, Special Assistant to the Executive Director; Anne K. Kiley, Administrative Officer; Alison G. Kirk, Permit Officer; Eileen C. Shoemaker, Staff Assistant in charge of publications; and Darel E. Jordan and Susan E. Holcombe, Staff Assistants.

The Commission Chairman, with the concurrence of the other Commissioners, appoints persons to the nine-member Committee of Scientific Advisors on Marine Mammals. Committee members are required by statute to be scientists who are knowledgeable in marine ecology and marine mammal affairs. At the end of 1991, its members were: William F. Perrin, Ph.D., (Chairman), National Marine Fisheries Service, La Jolla, California; Douglas G. Chapman, Ph.D., Seattle, Washington; Murray L. Johnson, M.D., Burke Museum, University of Washington, Seattle; Burney J. LeBoeuf, Ph.D., University of California, Santa Cruz; Lloyd F. Lowry, Alaska Department of Fish and Game, Fairbanks; Marc Mangel, Ph.D., University of California, Davis; William Medway, D.V.M., Ph.D., University of Pennsylvania, Philadelphia; Thomas J. O'Shea, Ph.D., U.S. Fish and Wildlife Service, Gainesville, Florida; and Tim D. Smith, Ph.D., National Marine Fisheries Service, Woods Hole, Massachusetts. During 1991, Jack W. Lentfer and John E. Reynolds, III, Ph.D., completed their terms of service on the Committee. In recognition of the importance of marine mammals in the lives of many Eskimos, Indians, and Aleuts, Matthew Iya of Nome, Alaska, serves as Special Advisor to the Marine Mammal Commission on Native Affairs.

Funding

Appropriations to the Marine Mammal Commission in the past five fiscal years have been: FY 1988, $953,000; FY 1989, $953,000; FY 1990, $960,000; FY 1991, $1,153,000; and FY 1992, $1,250,000.

Chapter II

SPECIES OF SPECIAL CONCERN

Section 202 of the Marine Mammal Protection Act directs the Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, to make recommendations to the Departments of Commerce and the Interior and other agencies on actions needed to protect and conserve marine mammals. In 1991, the Commission continued to devote special attention to marine mammals listed as endangered or threatened under the Endangered Species Act (Table 1).

Because of their occurrence in U.S. waters and/or an exceedingly high risk of extinction, greatest effort in 1991 was devoted to West Indian manatees, Hawaiian monk seals, Steller sea lions, California sea otters, northern right whales, humpback whales, bowhead whales, gray whales, and Gulf of California harbor porpoises. Given the serious threats facing certain other species in U.S. waters, special attention also was given to North Pacific fur seals, Pacific walruses, sea otters and harbor seals in Alaska, polar bears, killer whales, harbor porpoises, and bottlenose dolphins. Efforts to protect these species are described in this Chapter.

West Indian Manatee (*Trichechus manatus*)

One of the most endangered marine mammals in U.S. waters is the West Indian manatee. The species' U.S. range is limited primarily to rivers and coastal waters of peninsular Florida and southern Georgia. The southeastern U.S. population, also called the Florida manatee population, is geographically isolated from other manatee populations and is recognized as a separate sub-species (*T. manatus latirostris*). Collisions with boats and habitat destruction are by far the leading human threats to these animals.

Early in 1991, the Florida Department of Natural Resources organized two state-wide aerial surveys to count manatees in Florida. They yielded preliminary counts of 1,268 and 1,465 animals. Although the counts closely match the previous minimum population estimate (1,200 animals), which was based primarily on counts at warm-water refuges, weather conditions in all areas were not optimal. Because comparable aerial surveys were not conducted before 1991 and because the previous estimate was intended only as a conservative best guess of minimum population size, the surveys are not comparable to any earlier estimates. The recent counts are, however, the largest ever recorded anywhere in the species' range.

Outside of the United States, West Indian manatees are found in the Greater Antilles (including Puerto Rico), along the Atlantic coast of Central America and northern South America, and in Trinidad and Tobago. In these areas, manatees are considered members of a second subspecies, the Antillean manatee (*T. manatus manatus*). These populations are thought to be small, numbering perhaps 100 or fewer in most countries, and generally declining. Major threats include poaching, incidental take in gillnets, and habitat degradation. Since effective conservation programs do not exist in most other countries, the species' long-term survival may well depend on the success of efforts to protect remaining animals in Florida and Georgia.

Mortality in the southeastern United States, however, has increased steadily since 1980 (Table 2). Recent levels are especially alarming given what is known about the species' abundance and low reproductive rate. The high 1990 mortality was caused, in part, by the death of at least 47 animals following an intense cold spell the last week of 1989. However, most of the steady increase over the past 13 years is attributable to increasing numbers of vessel-related deaths and perinatal calf mortality.

Table 1. Marine Mammal Species and Populations Listed as Endangered (E) or Threatened (T) under the U.S. Endangered Species Act as of 31 December 1991[1]

Common Name	Scientific Name	Status	Range
Manatees and Dugongs			
West Indian manatee	*Trichechus manatus*	E	Eastern North, Central and South America coast and rivers from southeast United States to Brazil, including Puerto Rico and other Greater Antilles Islands
Amazonian manatee	*Trichechus inunguis*	E	Amazon River basin of South America
West African manatee	*Trichechus senegalensis*	T	West Africa coast and rivers; Senegal to Angola
Dugong	*Dugong dugon*	E	Northern rim of Indian Ocean; Indonesia; Philippines; Malagasy; Australia; southern China; Palau
Otters			
Marine otter	*Lutra felina*	E	Western South America; Peru to southern Chile
Southern sea otter	*Enhydra lutris nereis*	T	Central California coast
Seals and Sea Lions			
Hawaiian monk seal	*Monachus schauinslandi*	E	Hawaiian Archipelago
Caribbean monk seal	*Monachus tropicalis*	E	Caribbean Sea and Bahamas
Mediterranean monk seal	*Monachus monachus*	E	Mediterranean Sea; Atlantic coast of northwest Africa
Guadalupe fur seal	*Arctocephalus townsendi*	T	West coast of Baja California, Mexico, to southern California
Steller sea lion	*Eumetopias jubatus*	T	North Pacific Rim from northern Japan to southern California
Whales and Porpoises			
Gulf of California harbor porpoise	*Phocoena sinus*	E	Northern and central Gulf of California, Mexico
Northern right whale	*Eubalaena glacialis*	E	North Atlantic Ocean; North Pacific Ocean; Bering Sea
Southern right whale	*Eubalaena australis*	E	South Atlantic, South Pacific, Indian, and Southern Oceans
Bowhead whale	*Balaena mysticetus*	E	Arctic Ocean and adjacent seas
Humpback whale	*Megaptera novaeangliae*	E	Oceanic, all oceans
Gray whale	*Eschrichtius robustus*	E	Eastern and western North Pacific; Bering Sea
Blue whale	*Balaenoptera musculus*	E	Oceanic, all oceans
Finback or fin whale	*Balaenoptera physalus*	E	Oceanic, all oceans
Sei whale	*Balaenoptera borealis*	E	Oceanic, all oceans
Sperm whale	*Physeter catodon*	E	Oceanic, all oceans

[1] From Fish and Wildlife Service Regulations at 50 *C.F.R.* § 17.11

Table 2. Known Manatee Mortality in the Southeastern United States (excluding Puerto Rico) Reported through the Manatee Salvage and Necropsy Program from 1978 - 1991[1]

Year	Vessel-Related Deaths No. (%)	Perinatal Deaths No. (%)	All Other Deaths No. (%)	Deaths Inside Florida	Deaths Outside Florida	Total No. of Deaths in U.S.
1978	21 (24)	10 (12)	55 (64)	86	0	86
1979	24 (28)	9 (12)	45 (58)	77	1	78
1980	16 (23)	13 (19)	38 (56)	63	4	67
1981	25 (21)	13 (11)	81 (72)	116	3	119
1982	20 (17)	14 (12)	86 (68)	114	6	120
1983	15 (19)	18 (22)	48 (59)	81	0	81
1984	34 (26)	26 (20)	71 (54)	128	3	131
1985	35 (27)	25 (20)	69 (53)	120	9	129
1986	33 (26)	27 (22)	65 (52)	122	3	125
1987	39 (33)	30 (25)	49 (42)	114	4	118
1988	43 (32)	30 (22)	61 (46)	133	1	134
1989	51 (29)	37 (21)	86 (49)	166	8	174
1990	49 (23)	45 (21)	120 (56)	206	8	214
1991	53 (30)	53 (30)	69 (39)	174	1	175

[1] Totals provided by the Florida Department of Natural Resources for 1991 are preliminary.

As noted above, death from interactions with boats is one of two principal threats to Florida manatees. Vessel-related deaths have reached record levels in five of the past seven years and appear to be the result of dramatic increases in vessel traffic. In 1960, the number of registered vessels in Florida was about 100,000; in 1990, the number exceeded 700,000. Whereas known vessel-related manatee deaths averaged 22 percent of total known mortality from 1978 to 1983, they accounted for 27 percent from 1984 through 1986. Since 1987, vessel-related deaths have been responsible for 29 percent of the total mortality (31 percent if the unusual cold-related death of 47 animals early in 1990 is excluded).

Increases in perinatal deaths (*i.e.*, stillborn and newborn calves) parallel those of vessel deaths. Previous records have been equaled or exceeded in six of the past seven years. Perinatal deaths averaged 14 percent of the total known mortality from 1978 to 1983, 20 percent from 1984 through 1986, and 24 percent since 1987.

The cause of the increase in perinatal deaths is uncertain and may be due to a combination of factors including contaminant pollution, disease, or environmental changes. It also may be related to vessel traffic. That is because some newborn calves may die when their mothers are killed or seriously injured by boat collisions, when they become permanently separated from their mothers while dodging intensive boat traffic, or when stress from vessel noise or traffic induces premature births.

In any case, whereas vessel-related and dependent calf deaths together accounted for about one-third of the total known mortality in the late 1970s and early 1980s, it has accounted for more than 50 percent of total mortality in recent years. Although a reliable measure of population trends has proven elusive, it is

likely that current mortality exceeds recruitment and that the population is declining.

The second primary threat to Florida manatees is degradation and loss of habitat due to coastal development. Florida's human population is now growing at a rate of more than 1,000 people per day. Development accompanying this growth has occurred largely along coastal waters and rivers used by manatees. Siltation, nutrient enrichment, other forms of water pollution, and direct removal or filling of wetlands for shoreline development degrade manatee habitat. This degradation, in turn, reduces manatee food supplies, eliminates natural secluded areas for mating, calving, and nursing, and generally reduces the capacity of coastal and river ecosystems to support manatees and other aquatic species native to Florida. In the long term, loss of habitat and environmental pollution may well pose the most serious threat to manatees.

Background on Recovery Activities

Although the Fish and Wildlife Service is the Federal agency with lead responsibility for research and management related to manatees, assuring protection of manatees and their habitats is beyond the ability of any one agency or group. It requires extensive cooperation by many State and Federal agencies and other organizations. In this regard, the Commission has played a major role in helping the Service and other agencies identify and undertake cooperative efforts.

Late in the 1970s, the Commission provided the Service detailed comments and advice on developing a recovery plan for manatees, and the first manatee recovery plan was adopted by the Service in 1980. Using a special one-time appropriation from Congress that year, the Commission assisted the Service in initiating and coordinating priority work under the plan. It also helped the Florida Department of Natural Resources by providing seed money to constitute a Manatee Technical Advisory Council to provide recommendations and advice on recovery priorities.

The 1980 plan helped forge cooperative efforts among the Service, the Florida Department of Natural Resources, several other State agencies, the Coast Guard, the Army Corps of Engineers, industry groups, such as the Florida Power & Light Company and various marine zoological parks in Florida, and many other groups. Among other things, work under the plan produced new information and fostered development of novel research techniques (such as satellite tagging of manatees) to shed light on manatee movements and ecology. Progress was also made in reducing manatee mortality associated with some human-related perturbations (*e.g.*, entrapment in flood gates), increasing efforts to review and mitigate site-specific impacts of coastal development projects in manatee habitat, and acquiring and protecting critical manatee habitat in Kings Bay, a major warm-water refuge on Florida's west coast.

During the 1980s, efforts to protect manatees were greatly enhanced by the Florida Department of Natural Resources as it assumed an increasingly prominent role in supplementing the Service's research and management efforts. For example, in 1985, it assumed responsibility from the Service for the manatee salvage and necropsy program, which is the primary source for determining trends in manatee mortality. By doing so, it freed Service support for urgently needed studies of manatee movements and ecology. The Department also supported other needed research (*e.g.*, aerial surveys), established and enforced 20 boat speed regulatory zones in important manatee habitats, and increased efforts to acquire manatee habitat for the state park, reserve, and preserve systems.

While all of these efforts were well placed, they proved insufficient. Given the movement of animals throughout the State and the magnitude of increases in vessel traffic and shoreline construction, vessel-related deaths increased and preferred habitat continued to be degraded. Therefore, in 1987, the Commission recommended that the Service re-examine research and management efforts and update the West Indian Manatee Recovery Plan.

The Service agreed and, while work on revising the plan was underway, the Commission provided the Service and the State with additional recommendations (see, for example, Appendix B, Reynolds and Gluck-

man 1988 and Marine Mammal Commission 1989). The Commission urged development of an effective satellite tagging and tracking program to gather more precise information on manatee habitat use patterns. It also recommended site-specific actions to enlarge the system of boat speed regulatory zones, strengthen enforcement, acquire important manatee habitat, control shoreline development in key manatee areas, improve the manatee salvage and necropsy program, and speed development of a geographic information system for storing, manipulating, and retrieving research data crucial for manatee management.

The Service completed work on the revised recovery plan and, in May 1989, adopted it. The revision was exceedingly well done and, in a strong show of support for carrying out its provisions, it was signed by the heads of 12 other cooperating Federal and State agencies and private organizations, including the Marine Mammal Commission. The new plan reflects most of the Commission's recommendations and, consistent with its provisions, research and management efforts are being further increased. Major new efforts are focusing on tagging and tracking manatees, expanding boat speed regulatory zones, and acquiring and protecting important manatee habitat.

Activities in Support of the Revised Manatee Recovery Plan

Research and Management Funding — The revised manatee recovery plan adopted in 1989 clearly identifies the need for expanding research and management efforts. While it calls for additional support from all cooperating agencies, most increased commitments fall upon the Fish and Wildlife Service and the Florida Department of Natural Resources.

As noted in previous Annual Reports, the Florida Legislature substantially increased funding and personnel limits to enable the Florida Department of Natural Resources to meet its expanded responsibilities under the recovery plan. In 1990, it authorized nine additional staff positions for the Department's manatee/marine mammal program. In 1991, these positions were filled, doubling the size of the program's staff.

In 1989, the Florida Legislature established a Save the Manatee Trust Fund, which provides support for the State's manatee program. The Fund is maintained by annual contributions from a part of State boat registration fees, fees for an optional State automobile license plate featuring a manatee, voluntary contributions, and other sources as authorized by the Florida Legislature. To cover increases in salaries and expenses for the manatee program, the Legislature provided supplemental program funding and authorized an increase in certain Fund contributions. For Florida's Fiscal Year 1990-1991 (1 July 1990 - 30 June 1991), the program's budget was $1,171,406; for Fiscal Year 1991-1992, it is $2,210,336.

The additional staff and funding are being used to: (1) develop and help implement county-wide boat speed regulatory zones in 13 key counties where the risk of boat kills is particularly great; (2) help develop county manatee protection plans in those counties; (3) shorten response times and improve facilities for manatee necropsy and rescue efforts; (4) improve understanding of manatee habitat use patterns through aerial surveys and radio-tagging studies; (5) develop a geographic information system to compile and map relevant information for management decisions; (6) review permit and submerged lands lease applications for development projects and marine events (*e.g.*, boat races) in manatee habitat; and (7) support the development and distribution of public information and education materials.

Early in 1990, however, it was not clear whether the Fish and Wildlife Service was taking the steps necessary to support the most critical elements of its responsibilities under the revised plan. Therefore, the Commission, in consultation with its Committee of Scientific Advisors, reviewed tasks identified in the plan and, on 2 March 1990, wrote to the Service.

In its letter, the Commission expressed concern that the level of funding needed to meet Service responsibilities was not adequate for even maintaining past levels of effort. It also set forth views as to minimum levels of funding and personnel needed by the Service to address only its highest priority work in Fiscal Years 1991 through 1995. For Fiscal Years 1991 and 1992, it recommended that Service research

funding be no lower than $583,000 and $598,000, respectively, and that funding for management work be at least $315,000 and $327,000, respectively.

Late in 1990, the Service received a special Congressional appropriation for additional work on manatees and other endangered species. It was not clear how much of that special appropriation would be used for manatee work. Therefore, on 20 November 1990, the Commission wrote to the Service asking for information on immediate and longer term funding plans. The Service replied by letters of 12 March and 20 May 1991. The letters indicated that the Service planned to support manatee work in 1991 and 1992 at levels that would exceed the minimum levels identified in the Commission's 2 March 1990 letter. The Service further expressed an intent to fund research and management needs after 1992 at levels comparable to those in the Commission's letter.

Among other things, the Service's strong support for manatee work in 1991 enabled it to hire two additional staff members to help review permit applications for shoreline construction projects and to otherwise help implement the revised manatee recovery plan. It also allowed the research staff to develop and implement an expanded satellite tagging and tracking program to generate accurate information on manatee movement and habitat use patterns. Such information is essential for directing efforts to develop site-specific boat speed regulations, to assess shoreline development proposals, and to guide land acquisition plans. The Service also was then able to increase its efforts to study manatee population dynamics, ecology, and life history.

As described in this and previous Annual Reports, the Marine Mammal Commission also increased its efforts in support of the revised recovery plan. Among other things, it provided funds to the Fish and Wildlife Service to purchase additional satellite-linked tags for tracking manatee movements, provided partial support for a study to develop and apply techniques to estimate the age of salvaged manatees based on bone samples, helped fund a study of energetics requirements and thermal tolerances of lactating females and their calves, and increased efforts to review and comment on research and management activities by State and Federal agencies.

Other agencies also have increased their effort to address critical issues. A particularly good example in this regard is the Navy's efforts to install propeller shrouds on its tug boats at the Kings Bay Naval Base in southern Georgia. Following the death of a few manatees that apparently were killed by the large propellers of the Base's tugs in 1989, the Navy, in consultation with the Fish and Wildlife Service, promptly began engineering studies to design a propeller guard to prevent animals from coming into contact with the propeller blades. The designs were tested and found satisfactory in 1991 and efforts are now proceeding to install shrouds on all large tugs at the Base.

Status of Boat Speed Regulatory Zones — The dark, turbid waters in which manatees live make spotting manatees from boats extremely difficult even for trained observers. Expecting operators of speeding boats to spot and avoid hitting manatees is therefore unrealistic. The only effective ways to reduce collisions between manatees and boats, therefore, are by: (1) slowing boats down in areas where manatees are likely to occur to afford animals a chance to avoid oncoming vessels, and (2) excluding boats from core areas with exceptionally dense concentrations of animals.

Because of the extensive movements of manatees throughout Florida and the lack of speed restrictions along most of the State waterway system, slowing boats down over an area wide enough to provide effective protection requires imposing new speed restrictions for a substantial part of the State's waterways. Doing so, however, increases travel time for many boaters. Public acceptance of and compliance with new speed rules therefore requires a major change in the conduct of boat operators. Even more basic, they require a change in attitudes regarding responsible behavior on public waterways.

Although such factors underscore the difficulty and magnitude of efforts to implement an effective boat speed regulatory system to protect manatees, the Florida Governor and Cabinet members recognized

the limited options available and the need to reduce manatee deaths and injuries by boats. They therefore approved a bold recommendation by the Florida Department of Natural Resources to begin developing boat speed regulatory systems in 13 key counties where manatees are most common and mortality is high. The recommended action also required those counties to develop and implement comprehensive manatee protection plans. These efforts were to be followed by similar efforts for other counties containing important manatee habitat.

The recommendation was approved late in 1989. As a first step, the Department cooperated closely with officials and residents in each of the 13 counties to begin developing proposed boat speed regulations for all waters used by manatees in their respective counties. After developing proposed rules for a county that reflect a best effort to accommodate needs of both manatees and boaters, the Department must submit each county proposal to the Governor and Cabinet for review and adoption into the State regulatory code.

Using information on manatee distribution and local boating patterns, the Department and county officials have sought to apply various types of speed restrictions throughout manatee habitat. The goal has been to confer effective manatee protection while minimizing inconvenience to boaters. Examples of the types of speed zones considered are: year-round or seasonal slow and idle speed zones for water bodies or river segments of particular importance to manatees; shoreline slow or idle speed zones applicable within a set distance (*e.g.*, 50, 100, or 500 feet) from shore; zones in which non-channel areas are slow or idle speed while marked channels are set at higher speeds (*e.g.*, 25 mph); seasonal or year-round no-entry areas in which all vessel traffic is prohibited; and high-speed (*e.g.*, 30 or 35 mph) water sports areas.

As noted in previous Annual Reports, representatives of the Commission testified before the Florida Governor and Cabinet in 1989 in strong support of the recommended approach. In 1990, the Department completed, and the Governor and Cabinet adopted, rules for 4 of the 13 key counties for manatees (Brevard, Collier, Martin, and Palm Beach Counties). During 1991, the rules for Palm Beach County were amended and rules for four additional counties (Volusia, Dade, Sarasota, and Citrus Counties) were developed and adopted.

During 1991, the Commission, in consultation with its Committee of Scientific Advisors, provided comments to the Department of Natural Resources on proposed rules for Palm Beach, Volusia, Dade, and Citrus Counties. It also provided comments to, and in some cases testified before, the Florida Governor and Cabinet during deliberations on proposed county rules.

Without exception, proposed county rules significantly strengthened manatee protection. In all cases, the Commission expressed strong support for the proposals. In general, it noted that the proposed speed restrictions reflected the best available information on manatee habitat use patterns. In almost all cases, areas known to be used intensively by manatees (*e.g.*, warm water refuges) received high levels of protection (*e.g.*, no-entry or slow and idle speed limits).

In addition, major travel corridors, feeding areas, and other important habitats used regularly by manatees received important, though more moderate, protection (*e.g.*, shoreline or non-channel slow speed limits). For those counties addressed to date, all areas identified by the Commission as needing stronger boat speed regulations in its 1989 report on east coast manatee habitat protection needs (see Appendix B, Marine Mammal Commission 1989) have been addressed in adopted county rules. Notwithstanding its strong support for rule proposals overall, the Commission suggested a number of technical and substantive changes. Many of these have been adopted.

In 1992, efforts will be undertaken to complete and adopt boat speed regulations for the remaining five key counties (Indian River, St. Lucie, Duval, Lee, and Broward Counties). After adopting rules for all 13 key counties, the Department anticipates developing similar rules for important manatee habitat in other counties. It also will continue working with county and municipal officials on local manatee protection plans. These plans may refine boat speed

regulatory systems as well as address other needs, such as marina siting policies and guidelines for shoreline development in manatee habitat.

Boat Speed Regulations in the Lake Woodruff National Wildlife Refuge — There has been broad support for strengthening boat speed rules to protect manatees. This support includes segments of the boating community anxious to limit speeds to improve boater safety because waterways are becoming increasingly congested with faster and faster boats (some of which are capable of speeds in excess of 100 mph). However, there also has been strong opposition from some marine industry groups and other segments of the boating community. Opponents of the new rules believe the new speed limits cover too much area and cause vessel transit times to be unacceptably lengthened.

A particularly contentious case in this regard arose in 1991 in Volusia County. Over the objections of local officials and some residents, the Department of Natural Resources proposed a slow speed rule for a 10-mile stretch along two County waterways, the Norris Dead River and the Zeigler Dead River, associated with the upper St. Johns River. Radio-tracking data indicate that manatees using the Blue Spring warm-water refuge 10 miles to the south regularly occupy both waterways.

Although most lands along the two rivers are part of the Lake Woodruff National Wildlife Refuge, a privately owned sport fishing camp on the Norris Dead River has long operated from a tract of land surrounded by the Refuge. For guests at the fish camp to reach certain preferred fishing sites, the proposed rules would increase travel time by an hour or more. The owner of the fish camp stated the rule would encourage his clientele to go elsewhere and force him out of business. After examining the issue, including comments and testimony provided in support of the Department's slow speed proposal by the Marine Mammal Commission, the Governor and Cabinet adopted the proposed rules for Volusia County on 25 June 1991.

State law allows affected parties to challenge such rules. Pending resolution of a challenge, the rules are not effective. Local residents, including the fish camp owner and operators of marine-oriented businesses, made known their intent to challenge the Volusia County rules adopted by the Governor and Cabinet. In response, the Environmental Defense Fund wrote to the Fish and Wildlife Service on 7 August 1991 recommending that the Service develop Federal regulations to back up the State regulations in the Lake Woodruff National Wildlife Refuge. The letter urged the Service to use its independent authority for regulating boat speeds within National Wildlife Refuges.

A copy of the letter was sent to and reviewed by the Commission. While the Commission agreed that developing back-up regulations was prudent, it was not clear whether the State or the Service retained jurisdiction over the rivers and lakes within the Lake Woodruff Refuge. Therefore, on 10 September 1991, the Commission wrote to the Service recommending that it consider and act promptly on the Environmental Defense Fund's recommendation. It also noted that, if the rivers and lakes were determined to be outside refuge boundaries and, thus, not subject to refuge management authority, the Service could set speed limits using authority under the Endangered Species Act and the Marine Mammal Protection Act to establish "Manatee Refuges" under 50 CFR Part 17 of the Service's regulations.

On 17 October 1991, the Service replied noting that it intended to publish a notice of intent to prepare rules under the authority cited by the Commission. Concerned about the need to act promptly, the Commission wrote to the Service on 19 November 1991 recommending that the Service expedite the intended notice. It also recommended that, if the Service had not already done so, it should immediately begin developing proposed rules that include measures at least as strong as those in the State rules adopted by the Governor and Cabinet for Volusia County.

On 27 November 1991, a formal challenge to the State's Volusia County boat speed rules was filed by a local citizens' boating group. By the end of 1991, the Service had not yet published its proposed notice.

While boat speed regulations being adopted by the State afford a strong legal foundation for protecting manatees, their effect cannot be realized until signs are posted, enforcement efforts are implemented, and vessel operators become accustomed to the new restrictions. Logistic matters, including approving sign placement locations and contracting for sign installation, dictate at least some delay between the date of rule adoption and the point at which enforcement can begin.

The two Florida inland navigation districts are responsible for posting new manatee speed zones, while enforcement duties fall primarily to the Florida Marine Patrol. Substantial progress is being made in posting newly regulated areas. More than 200 miles of waterway were posted or approved for posting in 1991. However, all newly approved speed zones are not yet fully posted and enforced. It will probably take several years to develop, post, and enforce rules for new manatee speed zones and to evaluate their effectiveness in reducing vessel-related manatee deaths.

Manatee Sanctuaries — Perhaps the single most important habitat for manatees in Florida is Kings Bay at the head of Crystal River on the west coast of Florida. The Bay is about one mile long and one half to one mile wide. It is formed by the discharge of a few large natural warm-water springs and many smaller ones. In winter, more manatees depend on the Bay's warm waters than any other natural warm-water refuge in Florida.

In recent years, peak winter manatee counts have increased significantly, making Crystal River manatees one of only two groups of animals in the State known to be increasing in number. Whereas maximum counts early in the 1980s were about 100 animals, they are now about 300 animals. The increase, which appears to be due to natural recruitment, very high adult survival rates, and immigration of animals from central and southwest Florida, indicates the special importance and suitability of habitat in and around Crystal River for manatees. The Bay, also used regularly in summer by smaller numbers of animals, is surrounded by residential and commercial development. Its clear, warm waters and the presence of manatees have attracted large and increasing numbers of recreational divers.

In response to the increasing numbers of divers and boaters and their potential to affect manatee use of Kings Bay, the Fish and Wildlife Service established three small manatee sanctuaries in parts of Kings Bay in 1980. The three areas, which cover about five acres combined, were designated using the Service's authority under the Marine Mammal Protection Act and Endangered Species Act (50 C.F.R. Part 17) to establish "Manatee Sanctuaries" (*i.e.*, areas in which no waterborne activities are permitted) and "Manatee Refuges" (*i.e.*, areas in which specific waterborne activities can be regulated).

The three sanctuaries in Kings Bay are clearly marked by ropes and buoys, and all waterborne activities, including diving and boating, are prohibited. They offer havens where manatees can retreat to avoid human disturbance. Manatees have learned to use these sanctuaries and their importance is apparent. During periods when large numbers of divers are present, manatees often concentrate within or close to sanctuary boundaries.

Since 1980, the number of divers and boaters, as well as manatees, has increased significantly. As a result, it is no longer clear whether the three sanctuaries are providing adequate manatee protection. To examine this issue, the Service provided support for a study completed in 1990 to assess manatee habitat use patterns in Kings Bay and the effects of human activities on them. The report noted that the three existing sanctuaries did not include significant feeding areas and that additional sanctuaries in other parts of the Bay appear warranted, given increasing numbers of animals using the Bay, their distribution, and human activity patterns.

Based on the report and other information, the Service proceeded to identify and assess additional possible manatee sanctuaries in Kings Bay. On 21 March 1991, it convened a public meeting in Crystal River to receive comments on several possible sites under consideration. To provide manatees protection during the coming winter when their use of the Bay peaks, the Service promulgated emergency rules in

November 1991 to establish four additional manatee sanctuaries. The four areas cover a total of about 32 acres and include grassbeds used regularly by manatees for feeding. The emergency rules went into effect on 15 November 1991 and expire on 14 March 1992. Like rules for the three existing sanctuaries, they prohibit all waterborne activities, including swimming, diving, and boating. Early in 1992, the Service expects to publish proposed rules to establish new permanent manatee sanctuaries in Kings Bay.

Land Acquisition — Acquiring important manatee habitats for inclusion in existing Federal and State protected area systems is a major part of the manatee recovery program. It is one of the most important means of addressing long-term habitat protection objectives. Often habitat most important to manatees also is vital to many other wildlife species as well. Thus, while a few acquisitions may be primarily to further manatee protection, more often a potential site's importance as manatee habitat is but one important factor favoring the action.

At the Federal level, most acquisitions to protect manatees are carried out by the Fish and Wildlife Service using money from the Federal Land and Water Conservation Fund. Acquired sites are added to the National Wildlife Refuge System, which is managed by the Service. At the State level, most acquisitions are made through Florida's Conservation and Recreation Lands Trust Fund. The State Fund is administered by the Florida Governor and Cabinet, which serve as the Fund's Board of Trustees, and by a Land Acquisition Advisory Council. The latter group evaluates and ranks acquisition projects and the Board approves or deletes listed projects. The Division of State Lands in the Department of Natural Resources provides staff support, and the Office of Protected Species Management identifies acquisition projects important for manatees. Projects important for manatee protection are eligible for priority funding through the Trust Fund.

Acquisitions in the Crystal River Area: The first land acquisition principally for manatees was in the Crystal River area on Florida's west coast in 1982 when The Nature Conservancy acquired the islands in Kings Bay to prevent their proposed development. In 1984, the Conservancy sold the islands to the Fish and Wildlife Service, which incorporated them into the National Wildlife Refuge System as the Crystal River National Wildlife Refuge.

While protecting manatee habitat in Kings Bay is essential because of its fundamental importance as a winter refuge, accompanying efforts also must be made to protect habitat used by manatees in other seasons. To help address this need, the Commission prepared a report on habitat requirements and protection needs for the Crystal River manatees in 1984 (see Appendix B, Marine Mammal Commission 1984).

The report recommended that the Service and the State work together to expand the regional network of Refuges and Reserves to include more of the areas most important to manatees. The report urged attention to a four-county area (Dixie, Levy, Citrus, and Hernando Counties) that contained the region's most important manatee habitat. It recommended areas for acquisition along the Crystal River and efforts to coordinate Federal and State regional acquisition efforts. In response, the Service convened a meeting in March 1985 to develop a recommended joint Federal-State approach for expanding regional acquisition efforts to better protect manatee habitat.

Since 1985, much has been accomplished. In the late 1980s, the Fish and Wildlife Service acquired most of the 56,000-acre Lower Suwannee National Wildlife Refuge. The refuge includes some of the region's most important summer feeding and resting areas for manatees. The Service also developed and approved a proposal to add 3,000 acres along the lower Homosassa River to its regional refuge system. The lower Homosassa River is an essential access corridor to the warm-water refuge at the head of the river and a feeding and resting area for manatees in non-winter months. In 1991, the Service received $500,000 through the Land and Water Conservation Fund to acquire the area as part of the Crystal River National Wildlife Refuge and acquisition is expected to proceed in 1992.

In 1990, the Service also acquired a 3.5-acre site on Kings Bay to serve as a headquarters for its regional refuge management staff. The site, selected

to strengthen enforcement of manatee protection rules in Kings Bay, has a direct line of vision to the Bay's main spring, used most intensively by manatees and divers.

Recent acquisition efforts by the State in the Crystal River region have focused on a 25-mile stretch of coast from Crystal River south to Weeki Wachee Springs. The northern two-thirds of this area includes natural warm-water refuges at the heads of the Crystal, Homosassa, and Chassahowitzka Rivers and forms the core of the region's winter manatee habitat. These rivers and the network of creeks between them also are used by smaller numbers of manatees in other seasons.

Since 1984, five adjacent land acquisition projects in this area have been added to the State's Conservation and Recreation Lands priority acquisition list (Stoney-Lane, Crystal River, St. Martins River, Homosassa Springs, and Homosassa Reserve). Together, they include nearly 23,000 acres. More than 10,000 acres had been acquired as of the end of 1991.

Among the areas acquired to date is a 150-acre site around the large warm-water spring at the head of the Homosassa River. Discharge from the spring run provides the region's second most important winter refuge for manatees. Land around the spring has been designated as a state park and the upper part of the spring run is used as a site for rehabilitating injured manatees and offering the public a chance to view manatees in a natural environment. In addition, a previously listed State project in the southern third of the 25-mile stretch (Chassahowitzka Swamp) was expanded in 1988 to 23,000 acres. More than 18,500 acres of that project have been purchased.

The State's six regional projects surround the 30,000-acre Chassahowitzka National Wildlife Refuge. If all six projects are completed, Federal and State protection would cover more than 75,000 acres of contiguous undeveloped creeks, rivers, wetlands, and uplands. In combination with the Lower Suwannee National Wildlife Refuge and existing State Reserves and Preserves in the four-county area, an outstanding protected area system would be established containing much of the region's important manatee feeding and resting habitat.

Acquisitions in the Blue Spring Area: After Kings Bay, Blue Spring is Florida's second most important natural warm-water refuge for manatees. Waters north and south of the spring along a 25-mile stretch of the St. Johns River include important non-winter habitat for a significant number of the Blue Spring manatees. While Blue Spring itself is protected within a state park and portions of the surrounding region important to manatees also are protected (*e.g.*, in the Hontoon Island State Park and Lake Woodruff National Wildlife Refuge), many of the most important surrounding areas used for travel, feeding, resting, and mating are outside the bounds of protected areas.

In 1988, the Marine Mammal Commission completed a second report on manatee habitat protection needs. The 1988 report addresses manatees on the east coast of Florida, including the St. Johns River (see Appendix B, Marine Mammal Commission 1988). In part, the report recommends a focused acquisition effort along the upper St. Johns River near Blue Spring to consolidate the regional network of protected areas and better protect important manatee habitats.

In 1990, the State's Land Acquisition Advisory Council and Board of Trustees acted on two acquisition projects important to Blue Spring manatees. It revised an 8,290-acre project along the St. Johns River by adding 3,700-acres. The modified project (Wekiva-Ocala Connector) includes about 10 miles of undeveloped shoreline along the St. Johns River and Hontoon Dead River north and south of Blue Spring. The Board and Council also added a new 37,000 acre project (Lake George) along the St. Johns River, Lake Dexter, and Lake George north of the Lake Woodruff National Wildlife Refuge. More than 19,000 acres of the Lake George project have been acquired.

If the two projects are completed, a continuous wildlife corridor of Federal and State lands would be established along most of the St. Johns River north and south of Blue Spring from Lake George to the Wekiva River. The 25-mile corridor would provide

a solid basis for securing long-term habitat protection for Blue Spring manatees.

Acquisitions Elsewhere in Florida: Still other acquisition projects important to manatees are on the State's Conservation and Recreation Lands priority list. These include: Sebastian Creek (3,776 acres) and Spruce Creek (1,790 acres), both of which are manatee feeding and resting areas and freshwater sources along the east coast manatee travel corridor; Rookery Bay (44,846 acres), which is a manatee feeding, resting, and mating area in southwest Florida; and Dunns Creek (8,900 acres), a travel corridor and a feeding and resting area connecting Crescent Lake and the St. Johns River. During 1991, the State completed acquisition of the Seabranch project (939 acres), which includes more than a mile of shoreline along a critical segment of the east coast manatee travel corridor north of Hobe Sound.

Permit Reviews — Each year, public and private interests submit many hundreds of requests to Federal and State agencies for permission to develop or hold events in public waterways. Most of these requests are for dredge and fill permits from the Corps of Engineers and the Florida Department of Environmental Regulation. Many requests also are filed with the Coast Guard for permission to hold events such as boat races or waterskiing contests. The Fish and Wildlife Service and the Florida Department of Natural Resources' Office of Protected Species Management review and comment to the responsible permitting agency on such permit applications when they may affect manatees.

For example, under authority of the Fish and Wildlife Coordination Act and the Endangered Species Act, the Service reviews many hundreds of permit applications to the Army Corps of Engineers for dredge and fill projects in manatee habitat. Each application must be examined individually to assess the potential impact of construction work, as well as completed projects, on manatees and their habitat. For those that may affect manatees, formal consultations with the permitting agency must be undertaken. As part of this process, recommendations for permit conditions to mitigate or avoid possible effects must be provided and meetings with permit applicants may be scheduled.

Because of the broad distribution of manatees in Florida and the number of projects proposed in manatee habitat, the review process is demanding. Based on reviews of the hundreds of permit application notices circulated by the Corps of Engineers annually, the Service has initiated consultations on an average of nearly 200 applications per year in recent years. These manatee-related consultations have produced more jeopardy opinions (*i.e.*, projects judged to be unacceptable because of risks to the species) than for all other listed endangered species in the United States combined. Comparable review efforts have been undertaken at the State level by the State's Office of Protected Species Management.

As noted above, the Commission recommended that the Service increase funding and staff to address permit review needs. In 1991, the Service did so. To help speed and improve reviews, the Commission also has urged accelerating work on a geographic information system to facilitate access and retrieval of site-specific manatee related information needed for reviewing permits (see Appendix C, Reynolds and Haddad 1990). The Florida Department of Natural Resources, in cooperation with the Service, has taken the lead in addressing this need. Despite these efforts, the incremental effect of approved projects is a source of serious concern.

Conclusions

Over the past three years, manatee recovery efforts have been redoubled. This is thanks largely to the efforts of the Fish and Wildlife Service, the Florida Legislature, the Florida Governor and Cabinet, and the Florida Department of Natural Resources. They are now at a point where they have a reasonable chance of being effective, provided efforts to see them through are continued vigorously. Because of the scope of what remains to be done, however, it will be several years before all management components can be put in place, tested, and refined as necessary.

In the interim, Florida manatees remain at serious risk. Their future will depend on the ability of

responsible management agencies to maintain and expand the efforts that have been begun. The Commission will continue working with those most involved to ensure, to the extent possible, that this is done. In this regard, the Commission plans to hold its 1992 annual meeting in Florida and to devote much of its meeting to a review of the status and direction of manatee recovery efforts. Based on its review, the Commission will provide recommendations, advice, and assistance as appropriate.

Hawaiian Monk Seal (*Monachus schauinslandi*)

The Hawaiian monk seal is the most endangered seal in U.S. waters. It occurs almost exclusively along the chain of small, mostly uninhabited islets and atolls stretching 1,100 miles northwest of the main Hawaiian Islands. Although two other species of monk seals have been described — the Caribbean monk seal (*M. tropicalis*) and the Mediterranean monk seal (*M. monachus*) — there have been no reliable sightings of the Caribbean species since 1952, and the Mediterranean species, which may number fewer than 500 animals, is one of the world's most endangered seals. Thus, the fate of the entire monk seal genus may depend on the survival of Hawaiian monk seals.

The five major breeding sites for Hawaiian monk seals are Kure Atoll, Pearl and Hermes Reef, Lisianski Island, Laysan Island, and French Frigate Shoals (Figure 1). Nearly half of the species' pups are born at the last site, which contains the largest colony. Although monk seals likely occurred on the main Hawaiian Islands before human occupation, there is virtually no record of their presence in Polynesian history. Recently, however, a number of sightings have occurred on Kauai and, in 1991, two births were recorded in the main Hawaiian Islands, on Oahu and Kauai.

Shipwrecked sailors and commercial sealers are believed to have reduced the number of monk seals to very low levels in the 1800s. The first systematic counts of seals were made in the 1950s. By 1983, when the total population (including pups) was estimated at 1,488 animals, beach counts were roughly half those recorded in 1958. A new estimate of 1,752 seals was derived from beach counts in 1988. However, because of assumptions required in calculating these numbers, both estimates are believed to be high.

Population estimates have not been developed since 1988. In part, this is because the National Marine Fisheries Service has been unable to support all the field work needed for such analyses. Based on other population indicators, however, Hawaiian monk seals appear to have declined significantly since 1988.

Between 1989 and 1990, total recorded births at the major pupping beaches declined nearly 40 percent from the 1988 level and about 30 percent from the average annual level between 1983 and 1988. Declines were reported at all five major breeding sites in 1990. In 1991, the number of births recovered to previous levels at three sites, but continued to decline at the largest pupping colony (French Frigate Shoals) and remained low at Lisianski Island. Total births in 1991 (165) remained about 30 percent below the 1988 level (224). In addition, at French Frigate Shoals, mean beach counts of juvenile and adult seals declined about 30 percent from 1989 to 1991. Although immature animals have been the primary group affected by the decline, counts decreased for all age and sex classes. The data suggest a possible loss of 150-200 animals from that colony.

The cause of these recent trends is not clear. They may be caused by a combination of human and natural factors that differ from island to island. Among those that may be at least partly responsible are interactions with commercial fishing gear and fishermen, declines in available prey due to over fishing or natural environmental changes, entanglement in lost or discarded nets or other marine debris, human disturbance on pupping beaches, die-offs due to disease or naturally occurring biotoxins, shark predation, and, on Tern Island at French Frigate Shoals, entrapment in a decaying seawall. In recent years, an additional concern has been a "mobbing" phenomenon involving the death and injury of adult female seals and young animals of both sexes caused by overly aggressive groups of male seals attempting to mate.

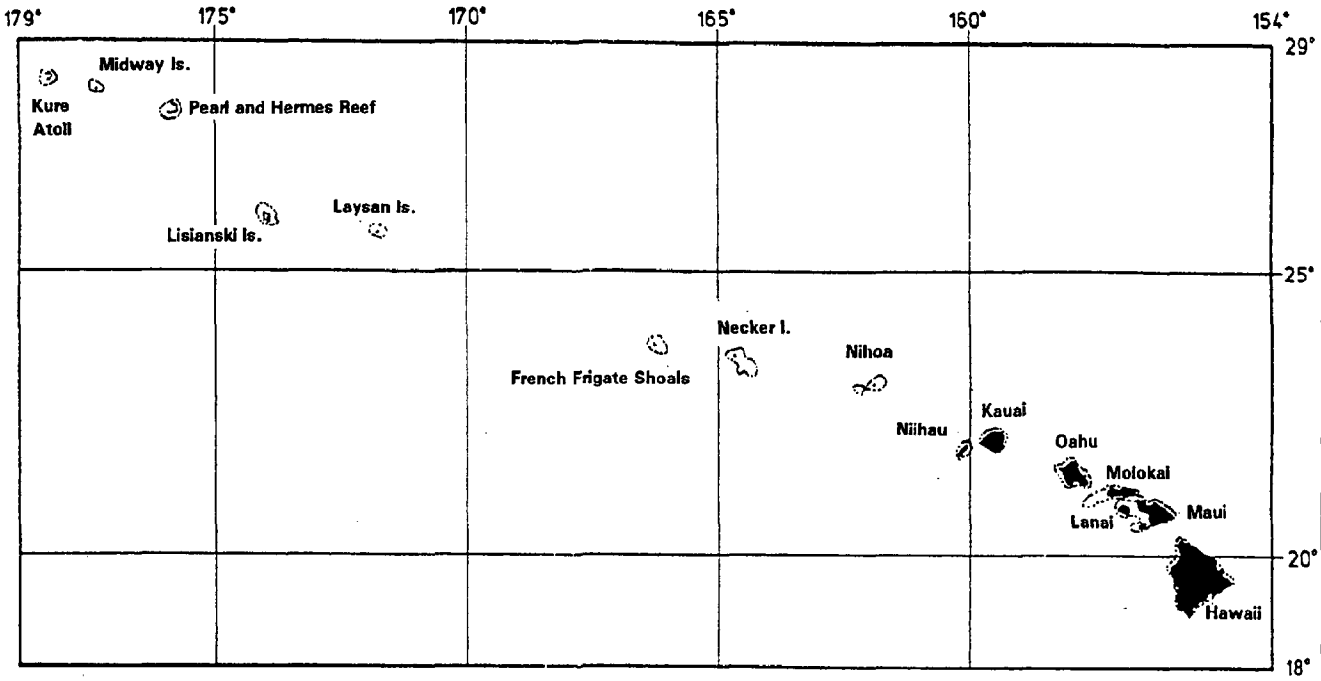

Figure 1. The Hawaiian Archipelago

During 1991, particular emphasis was placed on addressing interactions with commercial fishing, protecting and rehabilitating pups for release back into the wild, cleaning up hazardous debris, correcting structural and contamination problems at Tern Island in French Frigate Shoals, reducing the death and injury of adult female and immature seals due to "mobbing," and monitoring the five major breeding populations.

Interactions with Commercial Fisheries

Hawaiian monk seals interact with at least four commercial fisheries operating around the Northwestern Hawaiian Islands — the pelagic longline fishery for swordfish, other billfish, and tuna; the hook and line bottomfish fishery for snapper and grouper; the lobster fishery; and the high seas squid driftnet fishery. Interactions may be direct (*e.g.*, entrapment in gear or clubbing and shooting by fishermen seeking to protect gear or catch) or indirect (*e.g.*, depletion of seal prey species).

Interactions with Longline and Bottomfish Fisheries — In 1990, there were several reports of seals, as well as albatrosses, being killed or injured as a result of interactions with longline and bottomfish fisheries. As discussed in its previous Annual Report, the Commission provided recommendations to the National Marine Fisheries Service on steps to investigate and respond to the reports. Among other things, the Service interviewed fishermen returning from the Northwestern Hawaiian Islands, advised fishermen of concerns about potential interactions and legal requirements, and placed observers aboard some longline and bottomfish vessels fishing in the Northwestern Hawaiian Islands.

Although no injuries to seals were reported by observers placed aboard fishing vessels as of early 1991, Fish and Wildlife Service personnel stationed on Tern Island began finding injured seals and albatrosses. By April 1991, seven seals had been seen on the beaches at French Frigate Shoals or swimming in open water with embedded hooks, cut lips, or head

injuries suggesting that they had been clubbed. There were also reports of large numbers of albatrosses killed or injured by longline fishermen. The increase in reported deaths and injuries coincided with expansion of the pelagic longline fishing fleet in Hawaiian waters from about 15 vessels in 1988 to more than 150 vessels in 1991. In addition, a number of longline vessels were observed fishing within sight of French Frigate Shoals.

Concerned that observed injuries were but a fraction of the total number of animals being killed or injured and also alarmed by the rapid growth of the longline fleet, the Western Pacific Regional Fishery Management Council and the National Marine Fisheries Service took a number of steps in 1991. In particular, the two agencies acted on various emergency rules and amendments to fishery management plans for pelagic longline and bottomfish fisheries off the Northwestern Hawaiian Islands. The Commission, in consultation with its Committee of Scientific Advisors, provided recommendations throughout the process (see Appendix A, 7 February, 1 April, 19 April, 23 April, 9 August, 16 August, 20 September (two letters), 17 December, and 20 December 1991).

In its series of letters, the Commission recommended that: waters within 50 nautical miles of the Northwestern Hawaiian Islands be closed to pelagic longline fishing; observers be placed aboard a representative sample of longline vessels fishing between 50 and 100 nautical miles of the Northwestern Hawaiian Islands and a sample of bottomfish vessels operating over adjacent reefs to document any interactions with seals; formal consultations under section 7 of the Endangered Species Act be reinitiated to address the effect of the fisheries on monk seals; haulout beaches be monitored closely for further evidence of fishery-related effects; steps be taken to evaluate the application and required use of satellite-linked radio transmitters aboard longline vessels to monitor vessel positions in real-time; and satellite tagging studies of seals be designed and implemented by the 1992 field season to provide a better basis for assessing the occurrence and habitat use patterns of seals beyond 50 nautical miles from shore.

The National Marine Fisheries Service acted shortly after receiving the new reports of injured seals early in 1991. It began investigating the extent of the problem by interviewing fishermen returning to port from the Northwestern Hawaiian Islands, sending researchers to haulout beaches in the area to look for additional evidence of injured seals, and placing observers aboard bottomfish and longline vessels fishing around the Northwestern Hawaiian Islands.

At the same time, the Western Pacific Regional Fishery Management Council also began assessing how to respond to the reports. With regard to regulatory measures, the Council recommended, and the Service adopted, emergency rules on 18 April 1991 to establish a Protected Species Zone within 50 nautical miles of the Northwestern Hawaiian Islands and in corridors between the islands. The rules prohibited pelagic longline fishing within that zone and required bottomfish fishermen to notify the Service before leaving port if they planned to fish in that area. The latter provision, adopted as a permanent rule on 30 May, was intended to assure the Service an opportunity to place observers aboard bottomfish vessels. At the recommendation of the Council, the Service extended the emergency rules establishing the Protected Species Zone on 19 July. The rules were made permanent on 18 October 1991.

Some longline fishermen attempted to continue fishing in the closed area by using longline gear shorter than the one-mile regulatory definition of such gear. In response, the Service adopted an emergency rule on 2 August 1991 redefining longline gear within the Protected Species Zone as longline gear of any length. Emergency rules limiting new entries into the longline fishery also were adopted on 12 April 1991 and extended on 24 June and 22 August.

The Coast Guard is responsible for assisting the National Marine Fisheries Service with enforcement of fishery regulations. Because of limited funds, however, the Coast Guard was not making overflights off the Northwestern Hawaiian Islands early in 1991. On 25 February 1991, the Commission wrote to the Coast Guard asking that the Coast Guard assist efforts to detect and enforce fishing violations in monk seal habitat by providing surveillance flights off the

Northwestern Hawaiian Islands. The Coast Guard responded positively and so advised the Commission by letter of 21 March 1991.

To help address long-term enforcement needs, the Western Pacific Regional Fishery Management Council contracted for a study to test various types of real-time vessel tracking systems. The study was carried out in the spring and summer of 1991 and a copy of the study report was sent to the Commission by the Council. The report indicated that available technology was reliable, could assure confidentiality of location data, and was not cost-prohibitive. On 20 November 1991, the Commission wrote to the Service commending the Council's efforts and recommending that the Service immediately review the report with a view towards developing a strategy that would require vessel tracking devices aboard longline vessels at the earliest possible date.

As of the end of 1991, no injured seals other than those reported early in the year had been documented by fishery observers or researchers on island beaches. However, the Service rejected the Commission's recommendation to place observers aboard longline vessels fishing between 50 and 100 nautical miles from shore. In doing so, the Service stated that, because nearly all monk seals occur only in the 50-nautical-mile Protected Species Zone, it assumed that all seal injuries occurred within this zone, and it believed that the expense of placing observers aboard longline vessels was not justified.

The Commission is aware of no reliable information on at-sea movement patterns of seals during their absence from island beaches or on the geographic range of fishery interactions. In rejecting the Commission's recommendation for longline observers between 50 and 100 nautical miles, the Service provided no data on at-sea movements to support its statements. Thus, the Commission remains concerned that seals may be injured by longline fishing beyond 50 nautical miles from shore and may die before they can reach shore. At the end of 1991, it was the Commission's understanding that the Service planned to support the study recommended by the Commission to begin tagging seals and tracking their movements at sea in 1992. The study should provide at least some data to address this critical concern.

Interactions with the Lobster Fishery — Depletion of lobster and other prey species by commercial fishermen in the Northwestern Hawaiian Islands also may adversely affect monk seals and impede their recovery. Among other things, decreased prey availability could depress birth rates and increase mortality, particularly among pups, as has been observed in recent years. Lobsters are suspected to be important prey of Hawaiian monk seals. During 1990 and early 1991, lobster stocks were reduced by commercial fishermen and/or possible environmental changes to levels approaching, and perhaps lower than, 20 percent of the pre-exploitation level.

The fishery management plan adopted by the National Marine Fisheries Service for lobster in the western Pacific defines "overfishing" of lobster stocks in the Northwestern Hawaiian Islands as fishing which reduces the stock to a level equal to or less than 20 percent of the spawning stock biomass that existed before exploitation, which began in 1978. In response, the Western Pacific Regional Fishery Management Council requested, and the Service adopted, an emergency rule closing the lobster fishery in the Northwestern Hawaiian Islands as of 8 May 1991.

In addition, the Council began developing a recommended amendment to the crustacean fishery management plan for the western Pacific. Its proposed amendment called for a limited-entry system that would freeze the size of the lobster fleet at approximately current levels, an annual six-month closed season prior to and during part of the spawning season, and a system for setting annual harvest quotas. By letter of 7 November 1991, the Service asked the Commission for comments on the Council's proposed amendment.

The Commission, in consultation with its Committee of Scientific Advisors, replied on 6 December 1991, supporting all measures proposed by the Council. The Commission noted, however, that recent declines and the ultimate recovery of Hawaiian monk seals may be related to the recent declines and recovery of lobster stocks in the Northwestern Hawaiian

Islands. It therefore recommended that the Service consult with the Council under section 7 of the Endangered Species Act. The purpose of the consultations would be to determine whether, in light of the recent declines in both species, the definition of overfishing and other measures in the crustacean fishery management plan fully reflect ecological relationships between monk seals and lobsters as required by the Magnuson Fishery Conservation and Management Act. Also, the consultation should determine whether the plan provides a level of protection for lobster stocks sufficient to assure recovery of monk seals.

Head Start and Pup Rehabilitation Programs

Since the late 1950s, Hawaiian monk seal numbers have declined significantly in the western end of the Northwestern Hawaiian Islands. At Kure Atoll, the westernmost island in the chain, the decline appears to have been related to the disturbance of seals on pupping beaches by Coast Guard personnel stationed on the atoll and to a very low pup survival rate through the first year of life. Births on the atoll gradually declined as breeding females disappeared and apparently died. They reached a low point in 1986 when only one pup was born.

To help rebuild the number of breeding females at Kure, the National Marine Fisheries Service began a head start program in 1981. The effort involves removing newly weaned female pups from the beaches of Kure, placing them in an enclosed pen on the atoll's shoreline, raising them through their first summer in the protective enclosure, and releasing them back into the wild at Kure. From 1981 through 1991, 33 pups were treated and released, including 5 in 1991. As of the end of the 1991 field season, 25 of the 33 head start animals released on Kure Atoll were known to be alive.

To supplement these efforts, emaciated female pups unlikely to survive on their own have been taken from French Frigate Shoals for rehabilitation since 1984. These animals are moved to facilities in Honolulu, hand-reared, and later released at Kure. As of the end of 1990, 14 rehabilitated pups had been released at Kure. In addition five healthy pups were taken from French Frigate Shoals and released on Kure in 1990. In 1991, six additional animals were rehabilitated and released. Fourteen of the 20 animals rehabilitated and released at Kure were known to be alive as of the end of the 1991 field season.

In recent years, the Coast Guard has helped rebuild the Kure Atoll seal colony by reducing human disturbance of pupping beaches. This has been done by placing some, though not all, beach areas off-limits to its station personnel. During 1991, the Coast Guard announced its intent to close the Kure Atoll LORAN station by July 1992. At that time, the island will be returned to the State of Hawaii, and disturbance should be effectively eliminated. During 1991, the Coast Guard began consultations with the State and the National Marine Fisheries Service on steps that would be taken to close the station.

Seals released from the head start and pup rehabilitation programs now constitute a majority of the females giving birth on Kure Atoll, and beach counts on the atoll have increased significantly since 1981. In light of the Coast Guard's plans and the past success of efforts to reverse the decline in the Kure Atoll seal colony, the Service plans to shift efforts in 1992 to Midway, the atoll immediately east of Kure.

The seal colony at Midway has declined to only a few individuals, and in 1991 only two births were reported. A study to test for ciguatera, a naturally occurring biotoxin that may accumulate in monk seal prey, will be done at Midway early in 1992. If the results indicate that levels of the toxin pose no threat to monk seals, rehabilitated pups from French Frigate Shoals will be released at Midway later in 1992. Head start efforts will not be undertaken at Midway unless it is determined that pup survival rates are low. Efforts at Kure in 1992 will be limited to monitoring the colony to determine if further efforts to rebuild the population are necessary.

Interactions with Marine Debris

Hawaiian monk seals, particularly pups, can be attracted to derelict fishing nets and other marine debris. Once attracted to such material, they may become entangled, possibly leading to injury or death

(see Chapter VI). Seals also may ingest small items of debris. While evidence of entanglement is clear, no documented cases of monk seals' ingesting debris have been reported. Ingestion of debris has been reported in other seal species.

From 1974 through 1984, at least 35 cases of entangled monk seals were documented. In most cases, seals were able to free themselves without injury. From 1985 through 1990, 51 entanglement incidents were observed, including four instances in which seals were known to have died. A few other seals that were badly entangled likely would have died had researchers not freed them. Derelict trawl net webbing appears to be the most common and most hazardous form of debris for seals. Routine efforts were begun in 1982 to remove hazardous debris washing ashore.

Observed entanglement rates have fluctuated. From 1982 to 1985, they declined to a low point of about 0.05 incident per 100 camp days per 100 seals (including pups and adults). Between 1985 and 1988, they increased steadily to a high of about 0.5 incident per 100 camp days per 100 animals. For pups alone, entanglements in 1988 averaged about 1.5 incidents per 100 camp days per 100 pups.

In 1989, observed entanglement rates declined slightly, in 1990 they declined substantially, and in 1991 they increased again to a level approximately half that observed in 1988. Six entanglements were recorded in 1991, none of which are known to have resulted in the animal's death. Entanglement rates vary from island to island and have consistently been greatest at Lisianski Island where, between 1982 and 1988, they averaged 4.4 entanglements per 100 camp days per 100 seals. Unfortunately, there is no basis for estimating the number of animals entangled offshore that do not make it back to the beach.

To mitigate the problem, researchers attempt to free any observed entangled animals and to remove or destroy debris that washes ashore. Since 1985, the Service's Marine Entanglement Research Program has provided funds to help defray program costs needed to accomplish these objectives. Since 1985, the amount of debris observed and removed or destroyed from the Northwestern Hawaiian Islands has more than doubled. Efforts to reduce sources of marine debris are discussed in Chapter VI.

In 1991, derelict "lightsticks" used by longline fishermen also became a source of concern. Lightsticks are sealed plastic tubes, several inches in length, filled with liquid. When bent, an interior tube is snapped, releasing chemicals that react to produce a phosphorescent glow lasting several hours. Lightsticks are attached near baited hooks where their light attracts target species, such as swordfish and albacore, as well as other animals during nighttime fishing. Fish and Wildlife Service personnel stationed on Tern Island in French Frigate Shoals began finding large numbers of lightsticks washing ashore early in 1991 during the period when longline fishermen operate closest to the Northwestern Hawaiian Islands.

There was no evidence of lightsticks being ingested by seals. However, they did find lightsticks in the gullets of some albatrosses. It appeared that lightsticks, used in the tens of thousands by longline fishermen, were being discarded after use. Discarding any plastics in U.S. waters is illegal. When the matter was brought to the attention of the Western Pacific Regional Fishery Management Council, it wrote to the National Marine Fisheries Service asking that steps be taken to assess possible effects on Hawaiian monk seals. A copy of the Council's 5 July 1991 letter was sent to the Commission and, on 16 August 1991, the Commission wrote to the manager of the Service's Marine Entanglement Research Program.

In its letter, the Commission noted the need to investigate possible toxic effects of chemicals in lightsticks on wildlife as well as possible mechanical injury due to ingestion by seals or albatrosses. It also noted that fishermen should be advised that lightsticks were being found on island beaches and posed a hazard to protected species, that intentional discard is illegal, and that fishermen are obligated to take steps to prevent intentional or unintentional losses.

The program manager replied on 27 September 1991, noting that brochures and placards had been provided to the Service's Regional Office in Honolulu

describing legal requirements governing the disposal of plastics and other garbage at sea. The materials would be provided to fishermen during meetings on various fishery issues, including the need to retain lightsticks for disposal back in port. The letter also advised that a preliminary assessment of the chemicals in lightsticks indicated that they are non-toxic and that the matter was being further investigated by contacting the manufacturer.

Late in 1991, there was a significant decline in the number of lightsticks found on French Frigate Shoals by Fish and Wildlife Service personnel. In the past, however, peak occurrence on the beaches has been in late winter when fishing vessels were closest to the Northwestern Hawaiian Islands. Thus, it is not yet clear whether the decline resulted from a reduction in the number of lightsticks being lost or discarded or from the seasonal location of fishing operations.

Tern Island Cleanup and Seawall Repair

Tern Island is a strategically vital facility for protecting Hawaiian monk seals, seabirds, and sea turtles. Located 500 miles west-northwest of Honolulu, it is the only permanently occupied field station in the Hawaiian Islands National Wildlife Refuge, which includes a number of small islands extending nearly 1,000 miles from Nihoa Island to Midway.

The island is little more than a 3,000-foot runway built by the Navy on an 11-acre island in 1942. Navy construction expanded the island to 37 acres, most of which was sand and coral backfill behind a sheet-metal bulkhead. In 1952, the Coast Guard took over the island to establish a LORAN navigation station. In 1979, the Coast Guard station was closed and the Fish and Wildlife Service began using the facilities as a full-time field station.

As in previous years, the importance of the field station and its facilities was illustrated again in 1991 when Fish and Wildlife Service personnel documented evidence of commercial fishery-related injuries to monk seals and albatross and alerted fishery managers. Field station personnel also documented the occurrence of and problems associated with lightsticks, helped monitor the status of seal and other wildlife populations, assisted in airlifting emaciated seal pups to rehabilitation facilities for subsequent restoration of other island colonies, and freed monk seals and sea turtles that might otherwise have died from debris and entrapment in the island's deteriorating seawall.

Tern Island, however, is also a source of serious problems and faces an uncertain future. When constructing the runway, the Navy installed 20 underground fuel tanks. When the Navy withdrew from the island, many of the tanks were left full or partially full. With age, the tanks began leaching their hazardous contents into island subsoil. Large amounts of cable and other debris capable of entrapping wildlife also were buried when the runway was built or left on an adjacent island. When the Coast Guard abandoned the island, it left behind generators and electrical equipment containing highly toxic polychlorinated biphenyls (PCBs). Complicating these problems, the protective seawall has deteriorated to a point where complete structural failure and massive erosion are imminent.

In the late 1980s, the Fish and Wildlife Service considered abandoning the field station as a cost-cutting measure. The Commission, as well as Congress and others, urged the Service not to do so. After further analysis and with special Congressional appropriations for the Hawaiian Islands Refuge, the Service agreed. Since then, the Commission, the Service, the Navy, the Corps of Engineers, and the National Marine Fisheries Service have worked closely to organize efforts to clean up the island and repair its seawall. In 1991, involved agency officials reviewed progress and coordination needs during the Commission's 25-27 April annual meeting in Bellevue, Washington, and during a 5-6 November Hawaiian monk seal program review in La Jolla, California.

As part of initial efforts, the Fish and Wildlife Service and the Corps of Engineers signed an agreement late in 1990 for an engineering study to identify alternative approaches for restoring the seawall. In 1991, the two agencies also reached an agreement for immediate action to proceed with cleanup efforts. Using funds available under the Defense Environmental Restoration Act, which establishes an account to

support work on mitigating environmental damage and hazards caused by Defense Department activities, the Corps emptied the underground storage tanks, filled them with a concrete slurry to stabilize them, and removed the electrical equipment containing PCBs. Further work to treat or remove soils contaminated by leaking fuel may be undertaken in 1992.

With regard to repair of the deteriorating seawall, the Fish and Wildlife Service has conducted a bathymetric survey and provided funds to the Corps for the engineering study. Based on the results, a recommended approach will be selected and the Corps will enter a project design phase expected to be completed in 1993. Construction could begin by 1995.

Male Mobbing Behavior

As noted above, recovery of Hawaiian monk seals at some of the major breeding colonies is being impaired by the death of females and immature seals as a result of aggressive attacks by groups of up to 25 male seals attempting to mate. These incidents are believed to have caused a skewed sex ratio favoring males at some atolls. During mobbing incidents, aggressive males repeatedly bite and scratch their victims on the back and neck, often causing serious injuries. Some female victims die directly from the injuries and others are probably killed by sharks attracted by secretions from open wounds. Mobbing incidents have been most apparent at Laysan Island but have also been seen on Lisianski Island and French Frigate Shoals. The frequency of these incidents appears to have increased in recent years.

Mobbing behavior threatens the reproductive potential of affected colonies by reducing the number of breeding females. For example, at Laysan seven mature females were killed in 1989, while only one animal was recruited to the breeding population. In 1990, two mature females were killed and two recruited. In both years, male and female pups were also killed in mobbing incidents at the island. If the behavior continues, the ratio of males to females will become more strongly skewed towards males, which could exacerbate the problem.

To address this problem, the National Marine Fisheries Service has investigated the possibility of removing selected male seals known or suspected to have engaged in male mobbings, and administering a drug to suppress testosterone production and reduce their libido, or otherwise treating problem males. Because of risks to the island colonies, including the possibility of removing or otherwise interfering with dominant males responsible for siring pups, the Service has proceeded cautiously. Work to date has been limited to monitoring the nature and frequency of mobbing incidents, identifying male seals involved, collecting tissue samples for analyses to identify male seals responsible for siring pups, and testing on captive males a drug that temporarily suppresses testosterone levels.

In previous years, the Commission has recommended that certain background studies be completed before any field testing to address the problem. Although much background work has been done, all of the recommended studies have not been completed and some critical questions remain unanswered. For example, genetic studies to identify dominant male seals responsible for siring pups have not been completed. Also, while a testosterone suppressant drug has been tested on captive animals and shown to depress testosterone levels, it has not been determined whether doing so will also decrease the libido of treated males.

Nevertheless, the number of female seals being killed as a result of male mobbing is far out-pacing recruitment at some colonies and thereby is seriously threatening their future reproductive potential. Therefore the Service is considering a limited field trial of the testosterone suppressant drug during the 1992 field season to examine behavioral and social structure effects of chemically "removing" males involved in mobbing. Favorable results from the experiment would be followed by further drugging and/or actual physical removal of offending males. At the end of 1991, a decision on whether to proceed had not been made and was to be considered further at a Hawaiian Monk Seal Recovery Team meeting scheduled for 13-15 January 1992.

Hawaiian Monk Seal Program Review

As described in previous Annual Reports, in the late 1980s, support and direction of the Hawaiian monk seal recovery activities did not appear to be commensurate with the species' critical status. To help address problems facing the species, the Commission recommended to the National Marine Fisheries Service that the Hawaiian Monk Seal Recovery Team, which had not met since 1984, be reconvened. The Service agreed and scheduled a meeting for 12-14 December 1989. To ensure that the Service and the Team had a careful review of the critical issues, the Commission, in cooperation with the Service, also convened a 4-5 December 1989 review of the Hawaiian monk seal recovery program. The Commission provided results from the review, including recommendations, to the Service and the Recovery Team by letter of 11 December. As noted in the 1990 Annual Report, most of those recommendations were adopted.

As indicated above, many critical recovery issues remain. To provide further assistance in identifying priority needs, the Commission, again in cooperation with the National Marine Fisheries Service, scheduled another program review for 5-6 November 1991 at the Service's Southwest Fisheries Science Center in La Jolla, California. The review was again scheduled so that the results could be provided to the Recovery Team in time for its meeting later in the winter. To make the review as productive and as valuable as possible, the Commission invited representatives of the Fish and Wildlife Service, the Navy, the Corps of Engineers, and the Coast Guard.

The review confirmed that much progress had been made since the 1989 program review. For example, the Recovery Team had resumed a regular meeting schedule, the budget for monk seal recovery activities had been increased, and the overview of monk seals in captivity had been greatly strengthened. Participants noted, however, that most funding and staff effort was still being devoted to population monitoring and data analyses that do little in and of themselves to actually restore the species. Participants felt strongly that the information base had evolved to a point where greater emphasis could and should be placed on work directly related to specific restoration tasks.

On 20 December 1991, the Commission, in consultation with its Committee of Scientific Advisors, provided its conclusions and recommendations to the National Marine Fisheries Service and the Recovery Team. Regarding interactions with commercial fisheries, the Commission recommended that: (1) a pilot program to track monk seals using satellite-linked tags be designed and organized in time for use in the 1992 field season to assess at-sea foraging and habitat use patterns; (2) fishery observer programs be reviewed to ensure that they provide useful and reliable data on interactions between monk seals and fishing operations, including those for vessels operating between 50 and 100 nautical miles of the Northwestern Hawaiian Islands; (3) information on monk seal prey species, particularly those taken by commercial fisheries, be compiled and used to design studies to monitor prey abundance; (4) a pending proposal be adopted to limit new entrants to the Northwestern Hawaiian Island lobster fishery and develop annual harvest quotas; and (5) the Service evaluate whether its definition of overfishing for lobsters, which allows lobster stocks off the Northwestern Hawaiian Islands to decline to a level 80 percent below historic levels, provides adequate protection for monk seals, given predator-prey relationships between the two species.

With respect to the male mobbing problem, the Commission recommended that the Service provide the Recovery Team and the Commission with key background information on the mobbing issue so that the best possible advice on how to proceed in the coming field season could be developed during and after the January 1992 Recovery Team meeting. Among other points, the background materials should cover information on the nature and frequency of mobbing events, alternative and recommended courses of action, possible beneficial and detrimental effects of each alternative, and the results of studies to date to identify animals that would and would not be treated. Also, if the Service's preferred approach continues to be experimental use of the testosterone suppressant drug, the Commission recommended that the background material include an experimental design with decision criteria for evaluating study results.

In other areas, the Commission also recommended that: (1) population monitoring studies be continued

during the coming field season, but that use of alternative sampling and census techniques (*e.g.*, alternate year or triennial censuses of indicator groups, remote sensing, and aerial photogrammetry) be pursued to allow shifting more funds and staff time to tasks directly contributing to recovery; (2) membership of the Recovery Team be expanded to include additional behavioral expertise, a physical oceanographer, and a representative of the Fish and Wildlife Service; (3) officials involved in inspecting facilities maintaining captive monk seals be augmented to include marine mammal experts; and (4) support be provided to continue regular meetings of an interagency working group formed as a result of the Commission's program review to coordinate efforts to clean up Tern Island and repair its seawall. With respect to the interagency working group, the Corps of Engineers convened the group soon after the November 1991 program review to discuss the range of issues affecting restoration of the seawall on Tern Island.

With regard to closing the Coast Guard's LORAN station on Kure Atoll in 1992, the Commission recommended in its letter that the Service complete consultations with the Coast Guard on the effects of activities associated with closing the station. Among the needs and activities of concern are the complete removal of the solid waste dump on the island, demolition of some of the buildings, dismantling of equipment, and removal of all hazardous materials associated with generators and other equipment at the station. To ensure that such work is carried out with minimal effect on the atoll's seal population, the Commission recommended that the Service place an observer on the island to monitor and, as necessary, provide advice on measures to protect seals during the principal work period to dismantle and remove equipment.

At the end of 1991, the Commission looked forward to providing continued advice and assistance to the many agencies whose cooperation is so important to the success of the Hawaiian monk seal recovery program. It also looked forward to the results of the January 1992 Hawaiian Monk Seal Recovery Team meeting and the Service's reply to its 20 December 1991 recommendations.

Steller Sea Lion (*Eumetopias jubatus*)

Steller or northern sea lions inhabit coastal areas along the rim of the North Pacific Ocean from the Channel Islands in southern California through the Gulf of Alaska and Aleutian Islands to northern Hokkaido, Japan. In the United States, Steller sea lions are most abundant in the Aleutian Islands and Gulf of Alaska.

Available information indicates that Steller sea lions numbers are declining substantially throughout most of their range. Recent censuses of major rookeries and haulouts in the western Gulf of Alaska and eastern Aleutian Islands in the United States and in the Kuril Islands in Russia indicate declines in some areas of up to 90 percent over the past 30 years. The declines have occurred principally since the mid-1980s. Between 1985 and 1989, for example, the number of sea lions counted in the eastern Aleutian Islands declined by more than 70 percent. A summary of Steller sea lion counts in the United States, Canada, and the former Soviet Union is given in Table 3.

The cause or causes of the declines are uncertain. Natural factors, such as predation by sharks and killer whales, parasites, disease, and natural changes in environmental conditions, may have influenced the population. Likewise, there have been effects resulting from human-caused factors, such as subsistence harvesting by Alaska Natives, mortality incidental to commercial fishing activities, commercial over-exploitation of important prey species, the release of toxic pollutants, entanglement in marine debris (largely lost or discarded fishing gear), disturbance by boats and aircraft, and the deliberate shooting of sea lions as well as discharge of firearms at or near rookeries and haulout sites. In addition, commercial hunting, which ceased in the United States when the Marine Mammal Protection Act was passed in 1972, may have been responsible for at least part of the earlier observed decline.

Table 3. Summary of High Counts of Steller Sea Lions at Rookeries and Haulouts in the United States, Canada, and the Former Soviet Union

Survey Area	1956-1962	1975-1980	1982-1986	1989	1990	1991	Percent Change Since Earliest Count
Former Soviet Union							
Kuril Islands	14,076	—	8-12,000	3,615	—	—	-75
Kamchatka Peninsula	15,000	10-15,000	8-12,000	3,082	—	—	-80
Commander Islands	12,592	4,578	3,500	890	—	—	-93
Okhotsk Sea	5,000	1,200	1,500	900	—	—	-82
Robben Island	200	—	—	200	—	—	0
Alaska							
Western Aleutians	17,910	27,228	—	9,516	—	4,922	-73
Central Aleutians	31,040	41,677	25,759	7,759	8,711	8,966	-71
Eastern Aleutians	52,530	23,922	10,802	3,145	4,875	5,291	-90
Bering Sea	7,000	4,950	1,000	667	—	—	-90
Central and Western Gulf of Alaska	59,470	45,594	31,056	14,094	14,274	13,056	-78
Eastern Gulf of Alaska	—	7,053	—	7,241	5,444	4,596	-35
Southeast Alaska	7,000	6,376	6,898	8,471	7,629	7,715	+10
British Columbia							
(three rookeries)	11,500 (pre-1965)	3,500	4,000	4,000	—	—	-65
Continental U.S.							
California, Oregon, and Washington	8,000	5,410	4,500	4,000	—	—	-50
Farallon Islands		110	75	49	97	—	-12
Año Nuevo	1,334	1,497	1,169	—	458	—	-65
Oregon	—	1,214	2,019	1,854	2,569	—	+53

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The most likely causes of the recent declines are incidental take by trawl fisheries (more than 20,000 animals between 1966 and 1988), commercial exploitation of important prey species, particularly walleye pollock (*Theragra chalcogramma*), and shooting by fishermen to defend their gear or catch. Sea lions in the central Gulf of Alaska seem to be growing more slowly and reaching sexual maturity later in life, suggesting that decreased food availability may be at least one of the causes of the declines. At present, one cannot say whether the apparent nutritional problem is due to natural or human-related causes or a combination of the two. Ecologically sound management dictates that, unless it is determined that the declines are due to natural factors, efforts should be focused on eliminating or minimizing human-caused mortality, injury, and habitat degradation.

Protective Actions

In May 1988, the National Marine Fisheries Service published an advance notice of proposed rulemaking to designate the Steller sea lion as depleted under the Marine Mammal Protection Act. By letter of 8 July 1988, the Commission recommended that the Service proceed immediately with the proposed designation and that a conservation plan, similar to a recovery plan for endangered and threatened species, be developed to guide management and research efforts. The 1988 amendments to the Marine Mammal Protection Act subsequently directed the Service to prepare a Steller sea lion conservation plan by 31 December 1990. By letter of 6 December 1988, the Commission advised the Service that much of the information and analyses needed to prepare the plan were available in the Steller sea lion chapter of the Commission's 1988 Alaska species reports (see Appendix B, Lentfer 1988), and that the Service therefore should be able to complete the conservation plan well before the 31 December 1990 date set by Congress.

The Service, in 1989, failed to prepare a conservation plan or publish a proposed rule to designate the Steller sea lion as depleted. On 21 November 1989, the Environmental Defense Fund petitioned the Service for an emergency listing of the Steller sea lion as endangered under the Endangered Species Act. By letter of 20 December 1989, the Commission recommended that the Service act immediately on the petition and that it complete and distribute a draft Steller sea lion conservation plan by March 1990. The Commission wrote the Service again on 31 January 1990 to stress the importance of acting promptly on the Environmental Defense Fund's petition and completing a recovery plan or conservation plan for Steller sea lions. At that time, the Commission also recommended that the Service take steps to prepare proposed rules listing the Steller sea lion under the Endangered Species Act, and establish a Steller Sea Lion Recovery Team to expedite the preparation of a recovery or conservation plan.

On 5 April 1990, the National Marine Fisheries Service published a *Federal Register* notice: (1) listing the Steller sea lion as threatened under the Endangered Species Act on an emergency basis; (2) announcing the establishment of the Steller Sea Lion Recovery Team; (3) repealing existing regulations that allowed fishermen to shoot at or near sea lions to prevent sea lion interactions with their fishing gear; (4) reducing by half (from 1,350 to 675) the number of Steller sea lions allowed to be taken incidental to commercial fishing operations in the region west of 141° west longitude (although the total allowable take remained at 1,350, as an additional 675 were allowed to be taken east of 141° west longitude); and (5) establishing no-entry buffer zones around the principal Steller sea lion rookeries in parts of Alaska. The emergency rules were effective through 3 December 1990.

By letter of 18 May 1990, the Commission advised the Service that: (1) the conservation measures contained in the 5 April 1990 emergency rule could be insufficient to reverse the observed population decline; (2) the Commission continued to believe that the species should be listed as endangered rather than threatened; (3) with the exception of prohibiting the discharge of firearms at or near Steller sea lions, all measures contained in the emergency rule were limited to Steller sea lions in Alaska and the Service should consider adopting additional measures, including designating critical habitat for Steller sea lions in Washington, Oregon, and California as well as Alaska; and (4) a critical habitat designation for

Steller sea lions should include all major rookery areas and sufficient forage habitat around those areas to allow successful breeding and pup rearing.

On 20 July 1990, the National Marine Fisheries Service published a proposed rule to designate the Steller sea lion as threatened under the Endangered Species Act and to enact protective measures to replace those in the emergency rule. The final rule was published on 26 November 1990 and, in the 4 December 1990 *Federal Register*, the Fish and Wildlife Service announced the addition of the Steller sea lion to the List of Endangered and Threatened Wildlife. In the 26 November 1990 rule, the National Marine Fisheries Service stated a number of reasons why the Steller sea lion was being listed as threatened rather than endangered. The Service noted that: (1) there is no basis for considering animals in different geographic regions as separate populations (therefore the status of the species as a whole must be considered); (2) there are areas in the species' range where abundance has been stable; and (3) preliminary results of counts done in 1990 appeared similar to those done in 1989, suggesting that the decline may have slowed or stopped.

Also during 1990, the Steller Sea Lion Recovery Team met four times. The principal activity of the recovery team was to prepare a recovery plan, which it completed in draft form and provided to the National Marine Fisheries Service.

Late in March 1991, the Service sent the Commission a copy of the Technical Draft Steller Sea Lion Recovery Plan prepared by the Recovery Team. The plan recommended "immediate actions... to reduce human-caused mortality to the lowest level practicable, protection of important habitats through buffer zones and other means, and enhancement of population productivity by ensuring that there is an ample food supply available." To implement these objectives, the draft plan presented several recommended research and conservation actions, including: (1) identifying habitat requirements and protecting areas of special biological significance; (2) identifying management stocks; (3) monitoring the status and trends of the species; (4) monitoring the health, condition, and vital parameters of the species; (5) assessing and minimizing the causes of mortality; (6) investigating feeding ecology and factors affecting energetic status; and (7) implementing the recovery plan and coordinating recovery activities.

On 11 April 1991, the Recovery Team also recommended that the National Marine Fisheries Service designate critical habitat for Steller sea lions at major rookeries and haulout sites throughout Alaska, Washington, Oregon, and California. The Recovery Team also identified sites in British Columbia and the Kuril Islands for inclusion in the critical habitat designation and recommended that the National Marine Fisheries Service, through the State Department, work with the Governments of Canada and the Soviet Union to protect Steller sea lion habitat.

On 13 May 1991, the Commission provided comments to the National Marine Fisheries Service on the draft plan. The Commission recommended that the Service complete and adopt the plan as quickly as possible and that the Service initiate efforts immediately to implement the plan. The Commission further recommended that the Service take steps to: (1) appoint or hire a full-time Steller sea lion coordinator; (2) reconvene the Recovery Team to solicit advice on actions that the Service should undertake in the coming year as matters of highest priority, given available funding and personnel resources; and (3) develop an implementation plan and strategy to assign priorities and foster the involvement of other appropriate agencies and groups in implementing recovery actions. The Commission also recommended that the Service convene a separate recovery plan implementation team composed of representatives of relevant agencies and groups to assist in developing and directing plan implementation.

On 15 July 1991, the Commission wrote to the National Marine Fisheries Service inquiring about the status of the recovery plan and actions on the Recovery Team's critical habitat recommendations. The Service responded on 1 August 1991, noting that the Commission's comments, as well as other comments on the draft recovery plan, had been forwarded to the chairman of the Recovery Team for review and discussion at its sixth meeting, scheduled for 15-16 August 1991. The Service also noted that it was

drafting proposed regulations to designate critical habitat.

At the end of 1991, the National Marine Fisheries Service had not yet published proposed rules for Steller sea lion critical habitat designation. The Commission also understood that, on 3 October 1991, the Steller Sea Lion Recovery Team forwarded a revised draft recovery plan to the National Marine Fisheries Service. At the end of 1991, it was the Commission's understanding that the plan was undergoing final review by the Service and adoption of the plan was expected in 1992.

Recognizing the need for a complete, up-to-date summary of information on Steller sea lions, given the considerable amount of new information on this species generated over the past three years, the Commission provided funds to the Alaska Department of Fish and Game in September 1991 to update the Steller sea lion species report (see Appendix B, Lentfer 1988). The updated report, expected to be published in mid-1992, will improve the basis for evaluating and implementing priority tasks identified in the recovery plan. The Commission, in consultation with its Committee of Scientific Advisors, will review the revised species report and recommend appropriate follow-up actions.

Steller Sea Lion-Fisheries Interactions

As noted above, a possible cause of observed declines in Steller sea lion abundance is the overexploitation of prey species, particularly walleye pollock, by commercial fisheries. In December 1990, the North Pacific Fishery Management Council proposed increasing the total allowable catch of pollock in the Gulf of Alaska from 73,400 metric tons in 1990 to 133,400 metric tons in 1991. In response, the Sierra Club Legal Defense Fund, on behalf of Greenpeace and several other environmental groups, wrote to the Service on 28 January 1991 advising that it intended to file suit under the Endangered Species Act and the National Environmental Policy Act if an increased harvest level were adopted.

Approval of the 1991 pollock catch level was deferred by the National Marine Fisheries Service to allow for further analysis of the effects on Steller sea lions. Based upon a reassessment of available fisheries data, the Service's Northwest and Alaska Fisheries Science Center recommended that the total allowable catch of pollock for 1991 be set at 103,400 metric tons. The Center also recommended that measures be taken to protect the Steller sea lions' food supply, including allocation of the quota by region, as well as by quarter, and imposition of a trawling prohibition around Steller sea lion rookeries. The Service also solicited the views of the Recovery Team on the proposed catch limit. The Recovery Team, considering "only what is best for conservation and recovery of sea lions," recommended a total allowable catch of zero, or one equal to or less than the 1990 level.

Based on this and other advice and information, the Service prepared an Environmental Assessment and undertook consultations pursuant to section 7 of the Endangered Species Act on a recommended 1991 pollock catch level of 103,400 metric tons. Based on these further steps, the Service adopted the Northwest and Alaska Fisheries Science Center's recommended catch quota on 13 June 1991. Emergency regulations were also issued on that date allocating the quota among sub-areas, limiting the amount of unharvested pollock that may be taken during subsequent quarters in a fishing year, and prohibiting fishing within 10 nautical miles of 14 designated sea lion rookeries.

On behalf of Greenpeace and other environmental groups, the Sierra Club Legal Defense Fund filed a lawsuit (*Greenpeace* v. *Mosbacher*) in the U.S. District Court for the Western District of Washington on 26 June 1991. Plaintiffs alleged, among other things, that the Service had violated the Endangered Species Act by improperly finding that the 1991 pollock catch level was not likely to jeopardize the continued existence of the Steller sea lion and by failing to use the best scientific and commercial information available in determining the allocation. Plaintiffs also contended that the Service's conclusion that the 1991 pollock catch level would not have significant environmental impacts and its decision not to prepare an environmental impact statement on the action violated the National Environmental Policy Act.

On 11 July 1991, plaintiffs filed a motion for a preliminary injunction seeking to close the pollock fishery because of the alleged violations and the potential harm to Steller sea lions. A hearing on the motion was held on 26 July 1991. Two days before the hearing, however, the fishery was closed by the Service until 29 September 1991 because the quarterly pollock quota had been reached. In light of that closure, the Court determined that expedited review was not necessary and directed the parties to file briefs on the merits during August.

Following briefing and a hearing on cross-motions for summary judgment, the Court ruled in favor of the Federal defendants. In its 10 October 1991 order, the Court found that the Service had used the best available information in determining that the 1991 pollock catch level would not jeopardize the continued existence of the Steller sea lion. In this regard, the Court noted that the defendants provided "plausible, factually based arguments" that conservation measures adopted by the Service would "adequately mitigate any potential (and unproven) harm to the Steller sea lion from pollock fishing." The Court also noted that, while plaintiffs may reasonably debate the efficacy of the mitigation measures, "[r]easonable differences of opinion...do not indicate that the Secretary's no-jeopardy determination was irrational or conclusory."

The Court also found the plaintiffs' National Environmental Policy Act claims to be unpersuasive. It ruled that, "[w]hile the Secretary [of Commerce] has acknowledged that *past* pollock fishing may have adversely impacted Steller sea lions and harbor seals," the action at issue in this case, the 1991 pollock catch level, "avoids those risks because of mitigation measures" (emphasis in original). The Court also ruled that the controversy as to the possible effects of the pollock catch level were insufficient to warrant preparation of an environmental impact statement.

Greenpeace appealed the District Court ruling to the Ninth Circuit Court of Appeals on 11 October 1991. Federal appellees, in their 16 December 1991 reply brief, reiterated the substantive arguments made in the lower court, but also argued that, inasmuch as the challenged fishery closed on 25 October 1991, the case should be dismissed as being moot. Consideration of the matter by the Court of Appeals is expected in 1992.

As a related matter, on 18 November 1991, the National Marine Fisheries Service published in the *Federal Register* a proposed rule to revise several measures designed to reduce the impact of groundfish fisheries on Steller sea lions in Alaska. The Service proposes to adopt: (1) year-round trawl fishery closures in the Gulf of Alaska and Bering Sea/Aleutian Islands area within 10 nautical miles of key Steller sea lion rookeries, and (2) new Gulf of Alaska walleye pollock management districts and a limit on seasonal harvest allocations for each district.

Sea Lion Rock

Sea Lion Rock is a small exposed reef in the Copalis National Wildlife Refuge on the outer coast of Washington. It is used as a seasonal haulout site by Steller sea lions, California sea lions (*Zalophus californianus*), and harbor seals (*Phoca vitulina*); it is also used by many species of seabirds and waterfowl.

In May 1944, the Secretary of the Interior granted permission to the U.S. Navy to conduct practice bombing activities on Sea Lion Rock as part of the Naval Air Training Program, with the stipulation that the program's use of the island would cease six months after the end of World War II. In July 1949, the Navy again requested permission to use Sea Lion Rock as a practice bombing site. The Secretary of the Interior granted the request and gave the Navy permission to use the island for an indefinite period of time. In 1970, Sea Lion Rock and a number of surrounding islands in the refuge were included in the Washington Islands Wilderness Area under the Wilderness Act of 1964. The Navy has continued to use Sea Lion Rock as a practice bombing site since that time.

In 1984, the Washington Department of Game began a two-year study to determine the effect of Navy activities on wildlife in the Copalis National Wildlife Refuge. In its 1986 report, the Department noted that bombing activities may cause the abandonment of Sea Lion Rock by all wildlife, and, as the Navy sometimes bombs other islands in the Refuge

accidentally, the bombing may adversely affect wildlife on those islands as well. In a compatibility determination prepared by the Fish and Wildlife Service's Refuge Division, the Service concluded that under no circumstances could practice bombing of Sea Lion Rock by the Navy be made compatible with refuge objectives to protect and enhance wildlife resources.

On 8 February 1991, the Marine Mammal Commission wrote to the Navy regarding its use of Sea Lion Rock. The Commission noted that the Navy's use of the island for practice bombing purposes was incompatible with other wildlife conservation uses of the island. In particular, the Commission noted that: (1) the island is a part of both a wildlife refuge and a wilderness area; (2) it is used by many marine mammal, seabird, and waterfowl species; (3) the designation of the Olympic Coast National Marine Sanctuary, which would incorporate all islands in the Copalis National Wildlife Refuge, was pending; (4) all marine mammal species are protected under the Marine Mammal Protection Act; (5) the Steller sea lion and gray whale (*Eschrichtius robustus*) also are protected under the Endangered Species Act; and (6) certain seabird and waterfowl species are protected under the Migratory Bird Treaty Act. The Commission further noted that the Navy's practice bombing activities on Sea Lion Rock were inconsistent with provisions of the cited statutes and with the island's wildlife refuge and wilderness status. Therefore, the Commission, in consultation with its Committee of Scientific Advisors, recommended that the Navy stop using Sea Lion Rock for practice bombing and the low level flying that it necessitates. The Commission noted that the Navy cannot continue using Sea Lion Rock unless it takes steps to comply with applicable laws, including the Marine Mammal Protection Act, the Endangered Species Act, the Migratory Bird Treaty Act, and the Wilderness Act. The Commission further noted that the Department of the Interior should give serious consideration as to whether to continue authorizing the Navy's use of Sea Lion Rock for practice bombing.

In an effort to further the Navy's understanding of problems associated with the use of Sea Lion Rock, the Commission supported a group comprised of three researchers and one lawyer expert in Steller sea lion issues to travel to Whidbey Island Naval Base on 14 February 1991 to meet with key Navy personnel. The group, led by a former member of the Commission's Committee of Scientific Advisors, included the National Marine Fisheries Service's Steller sea lion program director and the counsel for the National Oceanic and Atmospheric Administration's Northwest and Alaska Region. The group briefed the commanding officer and his staff on changes in the status of Steller sea lions and the effect of these changes on the Navy's use of Sea Lion Rock. The group also noted that the meeting could help the Navy avoid a major legal conflict.

The group came away from the meeting with six specific findings: (1) the Navy states that Sea Lion Rock is used exclusively as a backup for another, primary practice bombing site; (2) the Navy personnel present at the meeting acknowledged that they need to comply with the Marine Mammal Protection and Endangered Species Acts; (3) the Navy indicated improved compliance with their own protocol (resulting in decreased adverse effects on the islands nearest to Sea Lion Rock); (4) the State will not allow the Navy to place radar reflectors on the islands nearest to Sea Lion Rock, despite the fact that doing so would likely also decrease adverse effects on these islands; (5) no sea lions are hit directly by the inert practice bombs, and therefore the main "take" under the Marine Mammal Protection Act and the Endangered Species Act is harassment of the animals; and (6) as alternative targets, smoke targets were unacceptable to the Navy because of the importance of radar target acquisition to the training activities, and a moored barge was unacceptable due to cost and the inability to use it on short notice.

Following the meeting, the group concluded that the most expeditious way to stop bombing at Sea lion Rock would be to have the Department of the Interior withdraw the Navy's permission to use the island.

On 20 March 1991, the Navy responded to the Commission's 8 February 1991 letter. In its letter, the Navy advised the Commission that it would review the issue of the taking of marine mammals incidental to its activities at Sea Lion Rock and would

initiate appropriate actions as required by relevant statutes.

On 9 May 1991, following a presentation by Navy personnel at the Marine Mammal Commission's annual meeting in Bellevue, Washington, the Commission wrote to the Fish and Wildlife Service regarding Sea Lion Rock. The Commission noted that it found the Navy's use of Sea Lion Rock as a practice bombing target to be incompatible with: (1) its designation as a wildlife refuge and a wilderness area and its pending designation as a marine sanctuary, and (2) the presence of species protected under provisions of the Marine Mammal Protection Act, the Endangered Species Act, and the Migratory Bird Treaty Act. The Commission, in consultation with its Committee of Scientific Advisors, therefore recommended that the Service no longer permit the Navy to use Sea Lion Rock as a practice bombing site.

On 3 June 1991, the Fish and Wildlife Service responded to the Commission's letter. The Service noted that it was currently reviewing the compatibility of the Navy's use of Sea Lion Rock with the island's status as a refuge and wilderness area and the protected status under applicable laws granted to many wildlife species found there.

As of the end of 1991, the Marine Mammal Commission had not yet been advised as to the results of the Navy's and Fish and Wildlife Service's respective reviews of Sea Lion Rock use conflicts. In early 1992, the Commission intends to pursue the issue to a definitive conclusion.

Harbor Seal in Alaska (*Phoca vitulina*)

Harbor seals inhabit temperate and sub-arctic coastal waters in the North Pacific and North Atlantic Oceans and contiguous seas. In the North Pacific, they occur nearly continuously along the Pacific Rim, from San Ignacio Lagoon, Baja California, Mexico, north through southeastern Alaska, and west to the Bering Sea, the Aleutian, Commander, and Kuril Islands, and south to Hokkaido, Japan.

In the early 1970s, approximately 270,000 harbor seals were estimated to occur in the coastal waters of Alaska. Although there is no up-to-date state-wide estimate, counts made sporadically since the early 1970s at harbor seal rookeries and haulout sites in the Gulf of Alaska and Bering Sea indicate significant declines in many areas.

In order to assist research efforts on harbor seal population trends, in 1990 the Commission provided funds to the Alaska Department of Fish and Game to conduct a survey of harbor seals on Tugidak Island in the central Gulf of Alaska. Tugidak was believed to have the largest concentration of harbor seals in the world as recently as the mid-1960s when more than 20,000 seals hauled out on the island. By the mid-1970s, however, the mean count had declined to less than 7,000 seals. The 1990 survey revealed that, since 1976, mean counts at the Island had declined from approximately 6,900 animals to fewer than 1,000, a decrease of 86 percent. A report of the 1990 survey, published in February 1991, recommended that counts be conducted again in 1992 in order to continue monitoring of population trends.

To help determine what, if anything, needed to be done to better protect the declining harbor seal population in Alaska, the Commission provided funds in 1986 to compile and evaluate information on the biology, ecology, and status of harbor seals as well as nine other species of marine mammals in Alaska. The resulting report, published by the Commission in 1988 (see Appendix B, Lentfer 1988), indicated that numbers of harbor seals, as well as Steller sea lions (*Eumetopias jubatus*), had declined dramatically in Alaska since the 1970s. As described elsewhere in this Report, North Pacific fur seals (*Callorhinus ursinus*) also have declined dramatically since the 1970s. Harbor seals were also affected by the *Exxon Valdez* oil spill in March 1989. For further discussion of the spill, see previous Annual Reports and Chapter VII of this Report.

Since publication of the 1988 report, much additional information on harbor seals in Alaska has become available, including the counts at Tugidak Island discussed above. Therefore, early in 1991, the Commission contracted for an update of the 1988

harbor seal report. The updated report will review and make recommendations for needed research and management actions, including: (1) evaluating population status by monitoring relative population sizes and trends and the health, condition, and vital parameters of harbor seals; (2) coordinating cooperative actions involving the Alaska Department of Fish and Game, the National Marine Fisheries Service, the Fish and Wildlife Service, and the National Park Service; (3) initiating a comprehensive study of harbor seals in Bristol Bay, Alaska, where large concentrations of harbor seals occur; (4) studying direct and indirect effects of commercial fisheries on harbor seals; (5) studying the effects of existing and potential harvests on harbor seals; and (6) studying the short- and long-term effects of anthropogenic disturbance, especially in areas subject to heavy boat and aircraft traffic.

The updated report is expected to be completed early in 1992. The Commission, in consultation with its Committee of Scientific Advisors, will review the report to determine whether harbor seals in Alaska merit designation as depleted under the Marine Mammal Protection Act or as either threatened or endangered under the Endangered Species Act.

As a related matter, the Commission held a workshop on 12-13 December 1990 in Seattle, Washington, to identify research needed to resolve critical uncertainties concerning the decline of Steller sea lions, harbor seals, fur seals, and other species in the Bering Sea and Gulf of Alaska (see Chapter VII). The final workshop report, published in July 1991, concluded that a reduction in available food resources and incidental take in fisheries were likely to be major factors in the observed harbor seal declines.

North Pacific Fur Seal (*Callorhinus ursinus*)

North Pacific or northern fur seals occur seasonally in waters along the North Pacific rim from California to Japan. Major breeding locations occur on Robben Island and the Kuril Islands in the Okhotsk Sea, in the western Bering Sea on the Commander Islands, and on the Pribilof Islands in the eastern Bering Sea. The species' largest breeding colony is on the Pribilof Islands, where three-fourths of the global population is found. It is estimated that, when the Pribilofs were discovered in 1786, the islands' fur seal population numbered 2-2.5 million animals. Their numbers subsequently fluctuated widely. Despite being reduced to about 300,000 animals by 1912, the fur seal population on the Pribilofs recovered to what is believed to have been historically high levels in the late 1940s and early 1950s. From the late 1950s to the mid-1980s, however, the number of fur seals on the Pribilof Islands experienced two periods of decline with a net reduction of 60-70 percent. Population estimates from the mid-1980s place the number of seals on the islands at about 870,000 animals, and it is believed that the population has remained stable since that time. A similar decline was observed at Robben Island.

Although causes of the observed declines are not known, several factors may have affected or be affecting North Pacific fur seals. Between 1956 and 1968, more than 300,000 female fur seals were harvested in Alaska. At the time, it was believed that the harvest would result in greater overall productivity within the population. The predicted increase never occurred. Because some nursing females were taken, many of their pups died. The death of these adult females prevented this further contribution to the population.

From the mid-1970s to the early 1980s, the Pribilof Islands' fur seal population declined at a rate of approximately 4-8 percent per year. In the early 1980s, it was suggested that a major cause of this decline was entanglement of seals in marine debris such as net fragments and packing bands. Analyses by the National Marine Fisheries Service estimated that approximately 50,000 juvenile seals (those up to three years old) were lost due to entanglement every year. Direct evidence of such losses, however, was weak. Observed entanglement rates from counts of entangled juvenile male fur seals taken in harvests on the Pribilof Islands in the late 1970s were only about 0.4 percent. Since the late 1980s, observed entanglement rates on the islands have declined to an estimated 0.34 percent in 1990.

However, it is likely that many fur seals that become entangled die at sea, where mortality is not readily observed. Evidence that this occurs includes high fur seal pupping rates followed by low overall survival rates of juvenile animals, and recovery of some dead fur seals in derelict nets found floating at sea. In addition, results of entanglement studies in the late 1980s suggest that entanglement-related mortality among fur seal pups in their first year of life may have exceeded 14 percent in the late 1970s to early 1980s. These results lend further support to the suggestion that entanglement may have been a significant cause of earlier declines. They also suggest that, although population trends have appeared stable over the past few years and observed entanglement in trawl net fragments at the rookeries declined in the late 1980s, entanglement may still be a significant factor slowing or preventing population recovery.

Fur seals are also taken incidentally in large-scale high seas driftnet fisheries in the North Pacific Ocean (see Chapter IV for a more detailed discussion of driftnet fisheries' impacts). Other possible impacts on fur seals are: toxic contaminants; disease; and competition with commercial fisheries. Although little is known about these three effects, they are generally regarded as not being significant. With respect to competition with fisheries, fur seals feed on a variety of fishes and squids, some of which are commercially important. Recent population studies, however, suggest that fur seals in the Pribilof Islands and other areas of the North Pacific are exhibiting increased growth and maturation rates, which are inconsistent with insufficient food resources.

Subsistence Harvest

North Pacific fur seals were harvested commercially for their pelts from the 1700s until 1984. They are presently taken for subsistence purposes by Native residents of the Pribilof Islands in Alaska. As noted in previous Annual Reports, the nations involved in commercial fur seal harvests managed fur seal herds under a series of international agreements during most of the 20th century. Between 1957 and 1984, North Pacific fur seals were managed cooperatively by the Governments of Canada, Japan, the Soviet Union, and the United States under provisions of the Interim Convention on Conservation of North Pacific Fur Seals. The Interim Convention, which was extended four times during that period, sought to bring the North Pacific fur seal population to a level that would provide the greatest annual harvest, with due regard for the productivity of other living marine resources.

The Convention lapsed in 1984, when the United States did not ratify a protocol to extend it. As a result, management authority in the United States became subject to domestic laws, including the Fur Seal Act of 1966 (16 U.S.C. 1151 *et seq.*) and the Marine Mammal Protection Act. Under the latter Act, commercial harvesting of North Pacific fur seals is prohibited and directed taking has been limited to Native subsistence harvest.

The current subsistence harvest of fur seals is limited to sub-adult males taken on St. Paul and St. George Islands between the end of June and the second week of August. In early August, immature female seals begin arriving at the rookeries in large numbers and the rookery structure (*i.e.*, the separation of non-breeding seals from breeding seals) begins to break down. At this time, immature male and female seals, which are not easily distinguished, become intermixed. Extension of the harvest beyond the first week of August has resulted in a marked increase in the number of female seals taken.

The hunt is regulated by the National Marine Fisheries Service under authority of the Fur Seal Act and the Marine Mammal Protection Act. Under applicable regulations, before each year's harvest the Service is required to estimate the minimum and maximum number of seals needed for subsistence purposes by Native residents of the Pribilof Islands. To develop this estimate, the Service must look at previous harvest levels, economic conditions in Native communities, and the current size of the Aleut communities. Once the estimated minimum number of seals is reached, the harvest is temporarily suspended until the Service determines whether subsistence needs have been met or whether additional seals are required. Subsistence harvest levels from 1985 to 1991 are shown in Table 4.

Table 4. Subsistence Harvest Levels for North Pacific Fur Seals in the Pribilof Islands, 1985 - 1991[1]

	1985	1986	1987	1988	1989	1990	1991
St. Paul	3,384	1,299	1,710	1,145	1,340	1,077	1,645
St. George	329	124	92	113	181	164	281
Total	3,713	1,423	1,802	1,258	1,521	1,241	1,926

[1] Data provided by the National Marine Fisheries Service.

In 1990, 1,241 fur seals were taken in the subsistence harvest (1,077 on St. Paul Island and 164 on St. George Island), a decrease from the 1989 total take of 1,521 seals. On 1 May 1991, the National Marine Fisheries Service published in the *Federal Register* estimates of 1991 subsistence needs of the Pribilof Islands Native population. In deriving its estimates, the Service took into account the following facts: (1) the number of seals taken on St. Paul Island in 1990 was the lowest in five years; (2) since 1989, unemployment levels on St. Paul Island have risen from 20-30 percent to 60-80 percent; and (3) the Aleut population has remained relatively stable. Also, according to the Service, pup production estimates indicate that the St. Paul Island fur seal population is stable or possibly increasing.

Based on this information, and using a statistical analysis of previous harvest levels, the Service proposed that the 1991 harvest level for St. Paul Island be set at 1,314 seals. The Service noted that, if this number were reached before 8 August 1991, the Aleut community could request additional seals if needed for subsistence, but that no more than 246 additional seals would be authorized to be taken on St. Paul Island. The Service also noted that economic conditions on St. George Island were similar to those on St. Paul Island, but added that the fur seal population there was declining. The Service stated, however, that, since only sub-adult males were taken in the subsistence harvest, the harvest was likely not contributing significantly to the decline. Based upon these factors and on past subsistence harvest levels, the Service set the estimated 1991 harvest level for St. George Island at 135, with a possible supplemental authorization of no more than 37 additional animals.

After receiving public comments on its proposed harvest levels, the Service decided to abandon the use of purely statistical analysis to set harvest levels and to take into account factors in addition to past harvest levels. Final harvest levels for 1991 were published on 1 August 1991. Subsistence needs on St. Paul Island were expected to range from 1,145 to 1,800 seals and, on St. George Island, from 181 to 500.

On 27 July 1991, Aleut sealers on both St. Paul Island and St. George Island reached the lower ends of their respective subsistence need estimates. As required by regulations, the harvests were temporarily stopped to allow the Service to determine whether subsistence needs had been met and, if not, how many more seals would be required. On 29 July, Natives on St. Paul Island and St. George Island each formally requested that the subsistence harvest be allowed to resume. Based upon the information submitted by the Pribilovians and the National Marine Fisheries Service observers, including the harvest data, the Director of the Service authorized the harvest of an additional 500 seals on St. Paul Island and an additional 100 on St. George Island on 31 July.

On that day, the Humane Society of the United States filed suit in the U.S. District Court for the District of Columbia against the Secretary of Commerce, the Assistant Secretary of Commerce, and the Director of the National Marine Fisheries Service seeking a temporary restraining order to suspend further harvesting of North Pacific fur seals on both St. Paul and St. George Islands. In *Humane Society of the United States* v. *Mosbacher*, the Humane Society alleged that (1) the Service's authorization of a continuation of the Alaska Native subsistence

harvest of North Pacific fur seals violated the Marine Mammal Protection Act and applicable regulations; (2) adequate numbers of seals had been taken to satisfy Native subsistence needs; and (3) seals already harvested had been taken in a wasteful manner.

During consideration of the Humane Society's motion for a temporary restraining order, the Court requested that the Service suspend further seal harvesting, pending a ruling on the motion. After holding two hearings on the matter and reviewing briefs submitted by the parties, the court denied the Humane Society's motion on 2 August 1991. In a written order issued on 5 August 1991 the Court explained the basis for its ruling as follows: (1) the Humane Society did not demonstrate that an authorization to continue the harvest violates the Marine Mammal Protection Act; (2) the Humane Society did not demonstrate that the harvest had been conducted in a wasteful manner, while the National Marine Fisheries Service did demonstrate that it had considered wastefulness or potential wastefulness as a factor in allocating harvest limits; (3) the Humane Society did not sufficiently demonstrate that it would be "irreparably injured" if the injunction was denied; and (4) the Court believed that the injunction, if enforced, would substantially harm the Pribilof Islands' Aleut population by impairing their ability to harvest food resources for the coming year.

After the St. Paul Island harvest was resumed, 500 additional seals were taken, resulting in a total 1991 subsistence take of 1,645 seals. St. George Islanders harvested an additional 100 seals after the harvest was resumed, for a total take of 281 seals.

In its 1 August 1991 *Federal Register* notice estimating harvest levels and in a 26 August 1991 notice summarizing the 1991 harvest, the Service announced its intention to review and re-evaluate the methods used to determine subsistence needs and to measure waste as they apply to the subsistence harvest of fur seals on the Pribilof Islands. Towards this end, on 5 November 1991 the National Marine Fisheries Service held a working session, which included participation by Federal and state agencies, Pribilovians, other Alaska Native groups, and environmental and animal welfare groups.

The purpose of the working session was to gather information and recommendations to assist the Service in determining or implementing changes to the regime for managing the Native subsistence fur seal harvest on the Pribilof Islands. The participants considered, among other things: (1) the legal and regulatory basis for managing the harvest; (2) the need for a subsistence harvest by the Native population of the Pribilof Islands; (3) methods of determining annual subsistence demand for fur seals; (4) waste and wasteful use of fur seal meat or by-products; (5) managing and monitoring the harvest on St. Paul and St. George Islands; and (6) methods of establishing harvest levels. The report of the working session will be available in 1992. The Marine Mammal Commission expects to be consulted by the National Marine Fisheries Service during 1992 in that agency's efforts to determine what, if any, changes should be made to the current subsistence harvest regime.

International Actions

As discussed in previous Annual Reports, in 1989 the United States put forward, but later withdrew, a proposal to list the North Pacific fur seal on Appendix II to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (see Chapter IV of this Report). The proposal initially was made in order to prevent seal parts from animals taken in the Alaska Native subsistence harvest, which are indistinguishable from seal parts taken in commercial harvests outside the United States, from illegally entering international commerce. The proposal was withdrawn to give the National Marine Fisheries Service an opportunity to resolve questions regarding the status of the Pribilof Islands' fur seal population, the level of incidental take in high seas driftnet fisheries, and the possibility that the high seas take would expand existing markets for fur seal products.

On 5 October 1989, the Commission wrote to the National Marine Fisheries Service, recommending that the Service consider seeking an Appendix III listing for the species pending reassessment of the Appendix II listing proposal. On 4 December 1990, the Commission again wrote to the Service, requesting that the Service advise it as to whether the 1990 research season had provided information pertinent to the questions noted above and what steps the Service had

taken or planned to take to consider an Appendix III listing. On 25 April 1991, the Service responded to the Commission, stating that it was taking no further actions in pursuit of either an Appendix II or Appendix III listing. The Service noted that the annual subsistence harvest bans the commercial use of fur seal products, which accomplishes the intent of an Appendix III listing under the Convention.

North Pacific Fur Seal Research Program and Conservation Plan

The National Marine Fisheries Service's North Pacific fur seal research program is directed by the National Marine Mammal Laboratory. According to a prospectus prepared by the Laboratory for its 16-17 October 1991 program review, the goals and objectives of the fur seal research program are to monitor changes in population dynamics by: (1) determining pup production as an index to population change; (2) comparing historical, on-land habitat use of fur seals to present use by monitoring rookeries and counting harem and idle bulls; (3) identifying migration patterns and at-sea foraging areas; and (4) detecting signs of disease in sampled dead animals. According to the laboratory, the purpose of the research program is to implement the North Pacific Fur Seal Conservation Plan by studying fur seals throughout the eastern North Pacific Ocean. However, a conservation plan for fur seals has yet to be published by the Service, despite the obvious need based on the observed decline in fur seal numbers in the North Pacific and the fact that it is required by Federal law.

As discussed in previous Annual Reports, the Pribilof Islands fur seal population was designated as depleted under the Marine Mammal Protection Act by the National Marine Fisheries Service in June 1988. The Commission had recommended such a designation in 1984 and again in 1985 and 1986. By letter of 29 November 1985, the Commission also recommended that the Service prepare a conservation plan to provide a basis for identifying and directing priority research and management actions needed to restore the population. It was recommended that the plan be similar to the recovery plans required for endangered and threatened species under the Endangered Species Act, and an annotated outline was provided.

In the 1988 amendments to the Marine Mammal Protection Act, Congress required that conservation plans be developed for all species or populations of marine mammals listed as depleted under the Act. With respect to the North Pacific fur seal, the amendments explicitly directed the National Marine Fisheries Service to prepare a conservation plan by 31 December 1989. A draft plan was prepared by the National Marine Mammal Laboratory and forwarded to the Commission for comment on 27 March 1990.

On 23 April 1990, the Commission provided the Service with extensive comments on the draft plan. The Commission noted that the plan provided useful information on research concerning past exploitation, life history, population status and trends, and possible causes of decline. The Commission also noted, however, that the plan did not sufficiently develop recommendations for further research and management activities or indicate how such activities would contribute to the recovery and conservation of the fur seal population. The Commission made several specific recommendations to improve the plan by advising the Service to, among other things: (1) develop a clear statement of goals and objectives; (2) provide a clear description of the rationale, nature, and scope of recommended actions; (3) prepare a step-down outline to illustrate the relationships among research and management tasks needed to achieve the plan's objectives; and (4) prepare an implementation schedule setting priorities and estimating costs for undertaking the recommended actions.

Having received no reply to its 23 April 1990 letter, the Commission, on 4 December 1990 and on 13 March 1991, again wrote to the Service seeking a response to its questions and comments on the draft plan. On 25 April 1991, the Service replied that it had received substantial comments on the draft plan circulated in March 1990, and that it had forwarded all comments to the National Marine Mammal Laboratory for review. The Service also indicated that the emergency listing of the Steller sea lion as threatened under the Endangered Species Act in the fall of 1990 had caused the plan to be delayed, but that after the conclusion of the 1991 fur seal field season, the plan would be finalized and distributed for public comment. As of the end of 1991, the Commission had not received the conservation plan.

Pacific Walrus
(Odobenus rosmarus divergens)

Within historic times, walruses appear to have been grouped in at least seven population centers distributed around the Arctic Ocean and adjacent northern seas. All populations were exploited heavily for commercial purposes and one, in the Canadian Maritime Provinces from southern Newfoundland to southern Nova Scotia, was hunted to extinction more than 100 years ago. The remaining six populations occur: (1) from eastern Hudson Bay to western Greenland, (2) from Baffin Bay, northwest Canada, to northwest Greenland, (3) along the east coast of Greenland, (4) in the Barents, Kara, and White Seas north of Norway and the eastern Soviet Union; (5) in the Laptev Sea off the north-central Soviet Union; and (6) in the Bering and Chukchi Seas between the Soviet Union and the United States.

The walrus population in the Bering and Chukchi Seas, known as the Pacific walrus, is recognized as a separate sub-species. Animals occur year-round as far south as the Alaska Peninsula and the northern Kuril Islands. Most animals, however, follow the edge of the pack ice as it advances south into the Bering Sea in winter and recedes north into the Chukchi Sea in summer. At least three times since the late 1700s, the Pacific walrus appears to have been over-exploited to very low levels and to have subsequently recovered. It now represents perhaps 80 to 90 percent of the total world number and is the only walrus population that has substantially recovered from past hunting.

Estimates of the size of the Pacific walrus population are based on joint U.S.-U.S.S.R. aerial surveys conducted once every five years from 1975 to 1990. The 1980 and 1985 estimates of 246,360 and 234,020 walruses, respectively, are considered comparable to estimates of pre-exploitation population levels. Unusual ice conditions in 1990 made it impossible to compare results of that survey with those of previous surveys. Thus, results of the 1990 survey are not usable for assessing recent population trends. However, the 1990 survey indicates that the population numbers at least 201,039 animals.

Subsistence Harvests of Walruses

Pacific walruses are a traditional subsistence resource of great importance to the Native peoples of coastal Alaska and eastern Siberia. They provide food and raw materials essential for survival in the far north. They also provide ivory for traditional Native handicrafts that are important to the economies of Native villages. The Marine Mammal Protection Act includes an exemption from its moratorium on taking of marine mammals, including walruses, for Native subsistence and handicraft purposes, provided the take is done in a non-wasteful manner.

Results of annual Native harvests in Alaska and Siberia from 1970 to 1989 are shown in Table 5. The data do not include all animals killed in the harvest because some walruses that are shot sink before they can be retrieved and some escape mortally wounded. An estimate made in the 1960s suggests that perhaps 40 percent of the animals killed in the Alaskan harvest are not retrieved. Assessments of such losses since then have not been undertaken.

In 1990, the Fish and Wildlife Service suspended its harvest monitoring program because of funding constraints. The only data on harvest levels for 1990 and 1991 are from a program begun by the Service late in 1988 to mark and tag walrus tusks to help prevent illegal trade. In 1990, 1,483 walruses were reported through the marking program; in 1991, the number was 1,938 walruses. It is not clear whether all walruses harvested in 1990 and 1991 were reported. For example, calves and other animals without tusks need not be marked but are taken by hunters. In addition, some hunters may have been reluctant to participate in the new marking and tagging program. It also is not clear how the annual marking totals relate to previous estimates based on past harvest monitoring. Harvest figures for 1990 and 1991 in Siberia are not available.

Table 5. Estimated Annual Harvests of Pacific Walruses in Alaska and the Soviet Union, 1970 to 1989[1]

Year	Alaska Harvest	Soviet Harvest	Total Harvest
1970	1,422	988	2,410
1971	1,915	897	2,812
1972	1,325	1,518	2,843
1973	1,581	1,291	2,872
1974	1,410	1,205	2,615
1975	2,378	1,265	3,643
1976	2,989	1,253	4,242
1977	2,377	1,461	3,838
1978	2,224	2,120	4,344
1979	2,745	1,526	4,271
1980	2,625	2,653	5,278
1981	3,518	2,574	6,092
1982	2,557	3,569	6,126
1983	2,261	3,946	6,207
1984	4,930	4,424	9,354
1985	3,903	4,708	8,611
1986	3,205	3,884	7,089
1987	2,735	4,673	7,408
1988	2,567	3,974	6,541
1989	1,008	3,679	4,687

[1] This table is based on data collected through harvest monitoring programs carried out by the Alaska Department of Fish and Game from 1970 to 1979 and by the Fish and Wildlife Service from 1980 to 1989. Alaska harvest estimates for 1978-1989 are extrapolated from a subsample of catches at selected villages.

Interactions between Walruses and Commercial Fisheries

As the Pacific walrus recovered from over-exploitation in the first half of the 1900s, walruses reoccupied certain previously abandoned haulouts in Bristol Bay. Two of the largest haulouts in this area are at Round Island and Cape Peirce in northern Bristol Bay. In the early 1950s, walruses returned to Round Island, which appears to be the best-suited terrestrial walrus haulout in Bristol Bay. In 1960, the State of Alaska designated Round Island as part of the Walrus Islands State Game Sanctuary and, by 1978, counts at Round Island reached 15,000 animals.

Between 1978 and 1984, however, counts declined to about 6,000 animals. The decline was attributed to disturbance caused by the development of a herring fishery in nearshore waters around the island and an increasing number of people visiting the island to view the wildlife. The State of Alaska therefore expanded the restricted access area around the island from one-half mile to two miles. The measure appeared to be effective and the peak count increased to 12,378 in 1986.

In 1981, walruses began hauling out regularly in large numbers at Cape Peirce, which, with its adjacent waters, is within the Togiak National Wildlife Refuge. Although counts by refuge staff have fluctuated, the peak count at Cape Peirce in 1986 was 9,494. Reciprocal trends in counts at Round Island and Cape Peirce suggest that walruses move back and forth between the two sites, which are about 60 miles apart. Because peak counts at the two locations have been obtained on different days, they cannot be added to obtain a regional population estimate.

Between 1986 and 1988, walrus counts at Round Island and Cape Peirce declined significantly. By 1988, there were 4,424 animals at Round Island and 6,938 animals at Cape Peirce. The declines coincided with the introduction in 1987 of yellowfin sole fishing in northern parts of Bristol Bay, particularly around Round Island. Noise from trawlers and processing vessels was clearly heard on Round Island and this was thought to be the likely cause of the decline. At times, more than 180 fishing vessels were visible from the island. Also, several walruses were caught and killed in fishing nets.

In response, the Eskimo Walrus Commission and the Fish and Wildlife Service asked the North Pacific Fishery Management Council to consider actions to close areas around the walrus haulouts to yellowfin sole fishing. The Council did so and, in 1989, it recommended that the National Marine Fisheries Service adopt a two-year seasonal (April-September)

closure in Federal waters from 3 to 12 miles offshore of Cape Peirce and the Walrus Islands.

As noted in previous Annual Reports, the Commission commented to the Service on the Council's recommended action on 13 September 1989. In its comments, the Commission supported a larger closure alternative that included waters north of a line between Capes Peirce and Constantine. The alternative appeared preferable because it avoided the possible creation of a concentrated ring of noise from vessels fishing the perimeter a 12-mile closed area. In addition, fishery studies indicated northern Bristol Bay was a concentration area for spawning sole during the summer, and the larger closure could therefore enhance conservation of yellowfin sole stocks.

The Commission also noted that, while the proposed measure prohibited yellowfin sole fishing in waters beyond three miles from shore under Federal jurisdiction, it did not address fishing restrictions within three miles of shore in State waters. Therefore, the Commission noted the need to consider comparable regulatory action in State waters. Also, because of uncertainty as to the cause of the declines, the Commission recommended that research and monitoring studies be undertaken to assess the effects of vessel-related noise on walruses around the haulouts and to evaluate the effectiveness of the measure.

Late in 1989, the Service adopted the Council's recommendation and closed waters between 3 and 12 miles off Round Island, Cape Peirce, and the Twins Islands for the 1990 and 1991 fishing seasons. Also, the Alaska Department of Fish and Game again strengthened vessel access restrictions off Round Island by expanding the controlled access zone out to three miles. Comparable measures, however, were not taken for nearshore waters off Cape Peirce or the Twins Islands. Also in 1989, the Fish and Wildlife Service initiated a study to test the feasibility of assessing noise characteristics around walrus haulouts at Round Island and Cape Peirce.

In 1990, the Fish and Wildlife Service asked the Commission to review a draft fishery management plan for the Togiak National Wildlife Refuge, which includes Cape Peirce. While the refuge boundaries include waters within three miles of the Cape Peirce walrus haulouts, jurisdiction over that area remains under State management authority under an agreement reached when the refuge was established. To address management needs in coastal waters of the refuge, a Memorandum of Agreement between the Service and the State of Alaska calls for cooperative management and for the Service to recommend needed measures to the State. The draft fisheries management plan did not include provisions to close waters to yellowfin sole fishing within three miles of walrus haulouts in the refuge.

Therefore, on 20 February 1990, the Commission wrote to the Service noting the need to pursue measures in nearshore waters off Cape Peirce that would complement the protective measures adopted by the National Marine Fisheries Service for waters 3 to 12 miles off walrus haulouts. In its 27 July reply, the Service noted that it did not consider the matter a fishery management issue and that it had provided the recommendation to a refuge public use planning group. By letter of 22 August, the Commission asked the Service what actions had been or would be taken by that group.

The Service replied on 4 October 1990, noting that it would work with the State and others to support regulations on marine mammals. However, the Service did not indicate what actions would be taken to resolve inconsistencies between Federal and State provisions around walrus haulouts. The Service also noted that its preliminary research on noise levels near Round Island in 1989 did not produce useful results because of unreliable equipment, and that studies in 1990 would be limited to counts of walrus at haulouts because no fishing was planned in northern Bristol Bay that year.

On 8 March 1991, the Commission again asked the Service what actions had been or would be taken to address inconsistencies in Federal and State regulations. The Service's 20 March 1991 reply offered no further information on this point. As of the end of 1991, the Commission was aware of no actions taken by the Service to address the Commission's recommendations, and regulations within State waters around Cape Peirce and the Twins Islands remained inconsistent with Federal regulations throughout the two-year closure. The Service's 20 March letter did,

however, indicate that it was cooperating with the Alaska Department of Fish and Game and the North Pacific Fishery Management Council on an amendment to extend the closure in Federal waters for an additional five years.

When the North Pacific Council recommended a two-year closure around walrus haulouts in 1989, it planned to reexamine the measure at the end of the period to determine if it should be modified, extended, or terminated. Because the Service's research on noise characteristics near Round Island was suspended in 1989 without obtaining useful results, the only way to assess the effectiveness of the measure is by examining counts at walrus haulouts.

In 1990, the peak count at Round Island (6,891 animals) was substantially higher than in 1988 (4,424 animals), but at Cape Peirce it was substantially lower (1,474, as compared to 6,938 animals in 1988). The counts suggest the measures may have had a modest positive effect at Round Island. However, on several occasions, vessels fished illegally within the closed areas. It is not clear whether concentrations of fishing vessels occurred along the perimeter of the closure.

As a result of its assessment of the situation late in 1990, the North Pacific Fishery Management Council agreed to consider alternative actions either to extend the 3 to 12-mile closures permanently, or for five years, or to establish a larger closure as had been considered in 1989. The closure alternatives would require amending the Bering Sea and Aleutian Islands groundfish fishery management plan and preparing a supporting background document for public review (*i.e.*, an "environmental assessment/regulatory impact review/initial regulatory flexibility analysis"). Due to other demands, the Council's staff was unable to prepare the necessary background document. The Fish and Wildlife Service also was unable to provide staff or funds to contract for the required assessment. Therefore, the Commission contracted for the needed draft document early in 1991 (see Chapter IX).

The draft document was completed in time for review by the Council at its 23-26 April 1991 meeting. At that time, the document was approved for public review. The Council did not, however, indicate a preferred alternative. On 14 June 1991, the Commission provided comments to the Council. Because of the still unresolved relationship between walrus haulout patterns and yellowfin sole fishing, the Commission recommended that, regardless of the alternative selected, the document should be expanded to identify the need for studies to (1) continue monitoring walrus haulout patterns; (2) determine at-sea movement and habitat use patterns by tagging and tracking walruses in Bristol Bay; (3) characterize and monitor acoustics and the effects of sound near walrus haulouts; and (4) correlate data from the above studies with the distribution of fishing effort.

As a preferred alternative, the Commission again supported the expanded closure, including waters north of a line between Capes Constantine and Peirce. Also, because of uncertainty as to when information would be adequate to assess the effectiveness of the measure and because of the costs associated with extending the measure, the Commission recommended that any closure be made permanent, pending availability of data indicating that a change was justified. Finally, the Commission noted the need for steps to ensure that provisions in State waters shoreward of three miles are consistent with any closures outside three miles.

At its 24-29 June and 13-16 August 1991 meetings, the Council considered comments and recommendations on the matter and approved a recommendation that the National Marine Fisheries Service close waters between 3 to 12 miles of haulouts on Round Island, the Twins Islands, and Cape Peirce on a permanent basis. The National Marine Fisheries Service agreed with the Council's recommendation and, on 4 December 1991, published a notice of proposed rules to amend the Bering Sea and Aleutian Islands groundfish fishery management plan to provide for permanent fishing closures between 3 to 12 miles around the three walrus haulouts.

Effects of Offshore Oil and Gas Exploration

Noise and disturbance due to seismic profiling, drilling, and ice management associated with offshore oil and gas exploration may affect walrus and other marine mammals. Among other effects, it may alter the normal distribution and haulout patterns of walruses near exploration sites. Noise and disturbance also

may startle animals hauled out on ice, causing them to rush into the water. In doing so, stampeding adults may kill or injure calves, and calves, unable to fend for themselves, may become separated from their mothers.

Section 101(a)(5) of the Marine Mammal Protection Act authorizes the Secretary of the Interior and the Secretary of Commerce, depending on the species involved, to develop regulations upon request to allow incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens engaged in activities other than commercial fishing. Such authorization may be granted for periods of up to five years, provided the activities will have a negligible impact on the species and will not have an unmitigable adverse impact on the availability of that species for subsistence uses. The regulations must specify the permissible activities, the means of minimizing possible adverse impacts, and the monitoring requirements that will be followed to ensure that effects are indeed negligible.

At the request of representatives of Alaska's offshore oil and gas industry, the Fish and Wildlife Service prepared regulations in 1991 to allow the incidental take of walruses and polar bears during certain offshore oil and gas exploration activities in the Chukchi Sea. The Service subsequently reviewed several industry requests for letters of authorization to take walruses and polar bears pursuant to those regulations. The Marine Mammal Commission provided detailed comments to the Service on both the regulations and industry requests for letters authorization. These efforts are described in Chapter VIII.

Preparation of a Pacific Walrus Conservation Plan

In 1988, Congress amended the Marine Mammal Protection Act by adding a section authorizing the Secretaries of the Interior and Commerce to develop conservation plans for non-depleted marine mammals, such as Pacific walruses, if doing so would further conservation needs. Like recovery plans for endangered species, conservation plans provide a basis for identifying and coordinating research and management tasks necessary to assure species conservation. That same year, the Commission completed a series of species reports with research and management recommendations for several Alaska marine mammals (see Appendix B, Lentfer 1988). Among the species covered was the Pacific walrus.

When it transmitted the species reports to the Fish and Wildlife Service on 11 January 1989, the Commission expressed its belief that a conservation plan for walruses should be prepared and that most of the work necessary to do so had been done through development of its walrus species report. In its 3 March 1989 reply, the Service stated that it expected to complete a conservation plan in about 18 months. In this regard, the Service noted that a preliminary meeting between the Service, the State, and a Native group had taken place in November 1988 to help guide work on developing and implementing a walrus plan. However, because of other pressing needs, such as the response to the *Exxon Valdez* oil spill, Service staff was unable to make much progress on the plan.

On 25-27 April 1991, as part of a review of Alaska marine mammal issues conducted during its annual meeting in Bellevue, Washington, the Commission and its Committee of Scientific Advisors reviewed the status of walrus research and management work, including development of a conservation plan. During the meeting, representatives of the Service stated that, while they remained committed to preparing a plan, efforts to begin drafting a plan had been suspended because of other essential demands on the Service's limited staff and funding. Moreover, the Service indicated that this situation was not likely to change in the foreseeable future.

As a result, the Commission offered to contract for the development of an initial draft conservation plan which the Service could use to facilitate the plan development process and help overcome the problem of limited resources. By letter of 29 April, the Commission confirmed its offer. The Service indicated that it would use the initial draft conservation plan and other information previously prepared by the Commission in developing the walrus plan. As noted in Chapter IX, the Commission contracted for a project to develop a preliminary draft plan.

The draft plan, completed in December 1991, included a thorough review of the biology and conservation issues concerning walruses. It also identified specific tasks for monitoring the status and trends of the Pacific walrus population, defining the optimum sustainable population level, protecting and monitoring essential habitats, monitoring Native subsistence harvests to ensure that they are consistent with the provisions of the Marine Mammal Protection Act, and coordinating Federal, State, Native, industry, and international efforts to conserve the Pacific walrus population.

Based on its review of the draft plan, the Commission and its Committee of Scientific Advisors concluded that it provided a well-reasoned set of research and management actions and would provide a sound basis for charting and coordinating cooperative research and management efforts. The Commission therefore transmitted the plan to the Service on 23 December 1991. In doing so, the Commission recommended that: (1) the draft plan be circulated for review and comment by the Service's Walrus Management Plan Advisory Team; (2) the Service prepare a final draft conservation plan using the comments of the advisory team and the transmitted draft plan; and (3) the final draft plan be circulated to the Commission and others for agency and public review prior to adoption.

While noting that work to complete the walrus plan should proceed as quickly as possible, the Commission also noted that other important research and management tasks should be pursued without delay. To help ensure progress in these areas, the Commission offered recommendations on matters that it believed required immediate attention.

In view of the importance of discerning current population trends and the inability of the 1990 joint walrus survey to provide information useful in this U.S.-U.S.S.R. regard, the Commission recommended that the Service immediately begin planning for another census to be conducted by 1993 if at all possible. It recommended convening a small group of experts to describe alternative census approaches, and arranging for consultations with Soviet counterparts to discuss and agree on plans for a new joint census.

With respect to Native subsistence harvests, the Commission recommended that the Service immediately reinstitute the harvest monitoring system suspended in 1990. It also recommended that harvest and biological sampling needs be reviewed to determine how that monitoring system should be altered in the future. The Commission urged that, in cooperation with the Eskimo Walrus Commission and Native hunters, the Service carry out a study to identify and, as possible, suggest ways to minimize the number of walruses that are shot and either sink or escape without being retrieved.

To address possible interactions between walruses and commercial fishing in Bristol Bay, the Commission recommended in its 23 December letter that the Service consult with agencies and groups, including the Alaska Department of Fish and Game, the National Marine Fisheries Service, the North Pacific Fishery Management Council, and the Eskimo Walrus Commission, to ensure that fishery closures in Federal waters around Round Island, the Twins Islands, and Cape Peirce are continued after 1991. In addition, it recommended that steps be taken to ensure, insofar as possible, that comparable measures are considered and adopted expeditiously for State waters and that the need for protecting other Bristol Bay walrus haulouts also be considered.

To provide for optimal coordination with Soviet scientists and managers, the Commission recommended that, in developing the walrus conservation plan, the Service and other involved parties assess the scope and effectiveness of existing mechanisms for coordinating joint activities concerning walruses. In doing so, it suggested the Service consider whether and how a bilateral agreement with the Soviet Union might further facilitate work on priority research and management tasks identified in the walrus plan.

At the end of 1991, the Commission looked forward to the Service's reply to its letter and to continuing to help with the development and implementation of an effective walrus conservation plan.

Sea Otter
(*Enhydra lutris*)

Sea otters historically inhabited the coastal waters of the North Pacific Ocean from central Baja California, Mexico, north along the coasts of California, Oregon, Washington, British Columbia, and southern Alaska; west through the Aleutian, Pribilof, and Commander Islands; and south along the Kamchatka Peninsula, the Kuril Islands, and the islands of northern Japan. Commercial hunting of sea otters for their fur began in the mid-1700s, shortly after the discovery of the Commander Islands by Vitus Bering. Hunting continued, largely unregulated, until 1911 when the species was protected by the North Pacific Fur Seal Convention, an agreement signed by the United States, Great Britain, Russia, and Japan. Small groups of sea otters survived in remote areas in the Soviet Union, Alaska, and central California.

The Central California Population

The remnant sea otter population in California occupied a few miles of nearshore habitat along the rocky Point Sur coast and may have numbered fewer than 50 animals in 1911 when hunting was prohibited by the Fur Seal Convention. Protected by the Convention and later by the State of California, the population grew slowly until, by the mid-1970s, it numbered nearly 1,800 animals and inhabited nearshore areas along approximately 160 miles of the central California coast. At that time, the risk of oil spills along the central California coast was expected to increase, due largely to the expected increase in tanker traffic transporting oil from the Trans-Alaska pipeline, then nearing completion.

Because of its small size, its limited distribution, and the increasing threat of oil spills and other catastrophic events, the population was designated as threatened under the Endangered Species Act in January 1977. Recognizing that range expansion was the best way to minimize the risk posed by oil spills and that range expansion could impact commercial and recreational abalone and other shellfish fisheries that developed in the absence of sea otters, the Commission in December 1980 recommended that the Fish and Wildlife Service adopt and implement a "zonal" management strategy for sea otters and recreational and commercial shellfish fisheries in California. The Fish and Wildlife Service concurred with the Commission's recommendation and incorporated the zonal management concept into the Southern Sea Otter Recovery Plan adopted in February 1982.

The Fish and Wildlife Service initiated efforts in 1981 to identify possible sites for establishing one or more "reserve" sea otter colonies in California, develop a translocation plan, and assess the possible environmental and economic consequences of reestablishing sea otters in additional parts of their historic California range. In 1985, Congress directed that the Service develop a translocation plan. In the fall of 1986, Congress passed Public Law 99-625, which included provisions authorizing and encouraging the development and implementation of a plan to establish at least one sea otter colony outside the then existing sea otter range in California. The law required that the plan specify a translocation zone that would meet the habitat needs of the translocated animals and provide a buffer against possible adverse activities that may occur outside the zone. It also required that the area surrounding the translocation zone be designated a "management zone" from which sea otters are to be excluded by non-lethal means to prohibit range expansion and protect fishery resources south of Point Conception.

The Fish and Wildlife Service subsequently developed and adopted a plan to establish a reserve sea otter colony at San Nicolas Island, one of the California Channel Islands. Implementation of the plan required cooperative efforts by the Fish and Wildlife Service and the California Department of Fish and Game. To clarify their respective roles, the two agencies concluded a Memorandum of Understanding on 18 August 1987. Among other things, the Memorandum specified that:

- the Fish and Wildlife Service will be responsible for providing funds and personnel necessary to implement, enforce, and carry out the translocation program;
- if verified sightings of sea otters are made at any location within the designated management zone ("no-otter zone"), the Fish and Wildlife Service

will undertake recapture efforts, as soon as weather and sea conditions permit, and return the captured otters either to the mainland sea otter range or to the translocation zone;

- the Fish and Wildlife Service, in cooperation with the California Department of Fish and Game, will evaluate the safety, effectiveness, and cost of possible alternative techniques for limiting population growth, including but not limited to reduction of fecundity and, as part of a long-term management plan, the appropriateness of selective culling, recognizing that evaluations involving the lethal take of California sea otters could not be permitted;

- the California Department of Fish and Game will be responsible for designing and carrying out a research program, using funds provided by the Fish and Wildlife Service, to evaluate the feasibility of humane, non-lethal methods to experimentally maintain the southern boundary of the mainland sea otter range in an area between Point Arguello and Point Conception; and

- the California Department of Fish and Game will initiate and/or support State legislation to implement appropriate restrictions on the use of gill and trammel nets in the translocation zone.

Translocation Efforts — Capture of sea otters for translocation to San Nicolas Island began on 24 August 1987. As of June 1991, 252 sea otters had been caught along the central California coast for possible translocation to San Nicolas Island. Of these, 101 were released at the capture site, or were released before being translocated to San Nicolas Island, 8 died during the translocation process, and 139 were transported to and released at San Nicolas Island.

Since the translocation was initiated in August 1987, 13 pups are known to have been born at the island; 4 of these are known to have survived to weaning. As of June 1991, 14 of the 139 otters translocated to San Nicolas Island remained at the island; 10 were known to have died; 3 had been recaptured in the Management Zone; and 31 had been resighted back in the mainland range. The fate of the remaining 81 animals is unknown.

Containment — From September 1987 through June 1991, there were 103 reports and 67 verified sightings of sea otters within the designated Management Zone. Some of the reports were of seals and sea lions, rather than sea otters, while others were duplicate sightings of the same animals.

In previous years, sea otters sighted in the Management Zone appeared not to stay in one place for very long. In 1991, however, there were indications of animals taking up residence in the nearshore waters of San Miguel Island. A single sea otter was reported by a fisherman at the western end of the island on 30 March 1991. A dead sea otter was found on the island on 1 May. This otter was a male that had been translocated to San Nicolas Island on 4 October 1988 and sighted near Point Buchon on the mainland on 17 October 1989. During an aerial survey on 13 May, nine adults and one pup were sighted in waters around San Miguel Island. The Fish and Wildlife Service has attempted to capture and remove the animals, but to date has been able to capture only two.

There also are indications that the distribution of sea otters along the mainland California coast is moving south towards Point Conception. On 2 January 1991, three independent sea otters and a dependent pup were sighted near Purisima Point, about 12 miles north of Point Conception. During a shore-based count on 4 June 1991, eight independent sea otters and two pups were seen in this area. Although none of the animals had a complete set of flipper tags, the tags present suggested that 3 of the animals likely were animals that had been translocated to San Nicolas Island.

Incidental Take in Fisheries — When the California sea otter population was listed as threatened in January 1977, it was assumed that population size and range were increasing and would continue to increase at about five percent per year until all of the available habitat was reoccupied. As noted in previous Annual Reports, however, subsequent studies indicated that substantial numbers of sea otters were being caught and killed in coastal gill net fisheries and that the incidental take had stopped, and possibly reversed, the population increase. In addition to sea otters and other marine mammals, thousands of seabirds and

non-target fish species also were being caught and killed in the fisheries.

The State of California, recognizing the problems being caused by these non-selective fishing practices, enacted a series of regulations starting in 1982 to prohibit the use of gill and trammel nets in areas where seabirds, sea otters, and other marine mammals were likely to become entangled. The prohibitions have reduced the incidental take of sea otters and, as shown in Table 6, subsequent counts suggest that the population increase has resumed. The restrictions did not, however, eliminate the incidental entanglement of sea otters. Therefore, in 1990, the State of California enacted legislation prohibiting use of gill and trammel nets in waters shallower than 30 fathoms throughout most of the sea otter range in the State. There have been no reports of sea otters being taken in the closed area since the legislation went into effect.

Table 6. Sea Otter Population Counts by the Fish and Wildlife Service and the California Department of Fish and Game, 1982 - 1991

Year		Independent Otters	Pups	Total
1982	Spring	1,124	222	1,346
	Fall	1,194	144	1,338
1983	Spring	1,131	120	1,251
	Fall	1,062	164	1,226
1984	Spring	1,181	123	1,304
	Fall	—	—	—
1985	Spring	1,124	236	1,360
	Fall	1,066	155	1,221
1986	Spring	1,345	225	1,570
	Fall	1,088	113	1,201
1987	Spring	1,430	220	1,650
	Fall	1,263	104	1,367
1988	Spring	1,505	219	1,724
	Fall	—	—	—
1989	Spring	1,574	290	1,864
	Fall	1,484	115	1,599
1990	Spring	1,466	214	1,680
	Fall	1,516	120	1,636
1991	Spring	1,700	241	1,941
	Fall	1,523	138	1,661

The Southern Sea Otter Recovery Plan — As noted in the Commission's previous Annual Report, the Fish and Wildlife Service reconstituted the Southern Sea Otter Recovery Team in 1989 to review and recommend changes necessary to update the Southern Sea Otter Recovery Plan. This action was precipitated, in part, by the *Exxon Valdez* oil spill that occurred in Prince William Sound, Alaska, on 24 March 1989 (see Chapter VII for information on the spill).

The Recovery Team reviewed and subsequently recommended revision of the Recovery Plan. Taking into account the Recovery Team's recommendations, the Fish and Wildlife Service developed and, in August 1991, provided a draft revised Recovery Plan to the Commission and others for review and comment. The Commission, in consultation with its Committee of Scientific Advisors, reviewed and provided comments on the draft revision to the Service by letter of 8 November 1991. In its comments, the Commission noted that the draft Recovery Plan revision appeared to reflect four conclusions:

- the *Exxon Valdez* oil spill had demonstrated that (a) the entire southern sea otter range, including San Nicolas Island, could be contacted by a single large oil spill occurring in or near the population's California range, and (b) efforts to contain a large oil spill and to capture and rehabilitate oiled otters are likely to be unsuccessful;
- efforts to establish the reserve breeding colony at San Nicolas Island have thus far been unsuccessful and, if successful, will not provide an adequate basis for removing the southern sea otter from the List of Endangered and Threatened Species;
- the only effective way to eliminate the risk of an oil spill endangering the southern sea otter popula-

tion is to substantially increase the population's range and size; and

- the risk of endangerment as a result of oil spills will not be eliminated (*i.e.*, become insignificant) until the population's range has expanded north to the Oregon border and the population numbers at least 5,400 animals (60 percent of the estimated carrying capacity of the species' potential range in California, excluding San Francisco Bay and the area south of Point Conception).

The Commission noted that, while these conclusions seem intuitively reasonable, they were not adequately supported by the information and analyses in the draft revised recovery plan. The draft revision did not, for example, indicate why the Fish and Wildlife Service and/or the Recovery Team believed that the threat posed by oil spills could not be effectively eliminated by altering tanker routes or taking other steps to reduce the risk of an oil spill occurring in or near the California sea otter range, or by developing a more effective oil spill response plan and prepositioning containment and clean-up equipment to reduce the possibility of sea otters' being impacted if an oil spill does occur. Further, the draft revision provided no explanation for the apparent determinations that (1) nothing can or should be done to expedite natural range expansion, and (2) only the present California sea otter range and coastal areas north to the Oregon border (excluding San Francisco Bay) should be considered in determining the optimum sustainable sea otter population. On a related matter, the Commission noted that the draft revision appeared to be proposing or recommending, but did not explain the rationale for, repeal of Public Law 99-625 and the related regulations and agreements that allowed establishment of the reserve breeding colony at San Nicolas Island, and maintaining the southern boundary of the sea otter population at Point Conception to prevent adverse effects on shellfish and other fisheries in the Channel Islands and the California Bight.

In light of these uncertainties, the Commission recommended that a second draft of the proposed Recovery Plan revision be done and be provided to the Commission and others for review and comment before it is considered for adoption by the Service.

The Alaska Sea Otter Population

Available information suggests that small groups of sea otters survived the era of commercial exploitation in several remote areas of Alaska (*e.g.*, Rat Islands, Delarof Island, False Pass, Sandman Reefs, Shumigan Islands, Kodiak Island, and Prince William Sound). Since then, sea otters have repopulated most of their former range in Alaska although they have not yet reached historic levels in some areas. No sea otters survived in southeast Alaska and repopulation of this area was initiated by translocating otters from Amchitka Island and Prince William Sound in the late 1960s and early 1970s.

The most recent surveys indicate that there are 100,000 to 150,000 sea otters in Alaska. Although the population currently is healthy and growing, there are a number of existing and foreseeable threats and conservation issues. These include (1) conflicts with commercial, subsistence and recreational shellfish fisheries that have developed in the absence of sea otters; (2) incidental take in gill net and other fisheries; (3) oil and gas development and transportation; (4) logging, mariculture, and other coastal development; (5) Native subsistence hunting; and (6) the increasing tourist industry in Alaska. The reality of these threats is illustrated by the *Exxon Valdez* oil spill, which is estimated to have killed 3,500 to 5,500 sea otters in Prince William Sound and adjacent areas (see Chapter VII).

Recognizing the threats and possible conflicts being generated by increasing human populations and development in Alaska, the Commission in 1984 initiated efforts to assess the state of knowledge and identify conservation issues regarding sea otters and nine other species of marine mammals that occur commonly in State waters. This effort led to the publication in 1988 of species accounts, with research and management recommendations, for each of the ten species (see Appendix B, Lentfer 1988).

As noted in Chapter VII and previous Commission reports, the Marine Mammal Protection Act, as amended in 1988, directs that the Secretaries of the Interior and Commerce develop conservation plans for depleted and, when appropriate, for non-depleted marine mammal species and populations. Also as

noted in previous Annual Reports, the Commission wrote to the Fish and Wildlife Service on 11 January 1989 suggesting that the Service prepare conservation plans for walruses, polar bears, and sea otters. The Commission pointed out that much of the needed background work had been done and was published in the Commission-sponsored species reports mentioned above.

The Service advised the Commission on 3 March 1989 that it had begun developing a walrus conservation plan and intended to begin development of conservation plans for polar bears and sea otters in the near future. Efforts to develop the conservation plans were delayed by the *Exxon Valdez* oil spill. Because of limited staff and other constraints, the Service has been unable to complete conservation plans for any of the three species.

This and related matters were discussed with representatives of the Fish and Wildlife Service during the annual meeting of the Commission and its Committee of Scientific Advisors in Bellevue, Washington, on 25-27 April 1991. At that time, the Commission offered to provide assistance in developing draft plans that could be used to expedite the planning process, and the Service accepted the offer.

With regard to sea otters, the Commission, as indicated in Chapter IX, organized and held a meeting in Anchorage, Alaska, on 25-26 September 1991 to identify conservation issues from the perspective of different organizations. The meeting involved representatives of the Fish and Wildlife Service, the Native community, the fishing industry, and the environmental community. Following the meeting, the Commission prepared a draft conservation plan and provided it to the meeting participants for review and comment. At the end of the year, the draft conservation plan was being revised to take account of reviewers' comments.

The Commission anticipates that the draft plan will be completed and provided to the Fish and Wildlife Service in February 1992. At that time, the Commission expects to recommend actions necessary to accomplish priority research and management tasks.

Polar Bear
(*Ursus maritimus*)

The polar bear is one of three species of the genus *Ursus*, which also includes the North American black bear (*U. americanus*) and the brown or grizzly bear (*U. arctos*). Polar bears inhabit most ice-covered seas of the northern hemisphere and are circumpolar in distribution. The species occurs throughout most of the Arctic basin; animals have been seen as far north as 88 degrees north latitude and as far south in the eastern Bering Sea as St. Matthew Island. Available information indicates that parts of two relatively discrete polar bear populations occur in Alaska — a western population shared with the former Soviet Union and an eastern population shared with Canada.

International Agreement on the Conservation of Polar Bears

Increased hunting of polar bears in the 1950s and 1960s and concerns about the effects of industrial activities on polar bears and their habitat led to an international dialogue on the need to conserve polar bears throughout the Arctic. In 1973, the Governments of Canada, Denmark (for Greenland), Norway, the Soviet Union, and the United States concluded the International Agreement on the Conservation of Polar Bears. The Agreement, which entered into force in 1976, allows the taking of polar bears under certain conditions (*e.g.*, for scienteific research and Native subsistence), but prohibits the use of aircraft and large motorized vessels for the purpose of taking polar bears. It also prohibits the sale of skins and other polar bear parts for commercial purposes.

Article II of the Agreement requires that each of the contracting parties "take appropriate action to protect the ecosystems of which polar bears are a part, with special attention to habitat components such as denning and feeding sites and migration patterns... ." It is not clear whether the Marine Mammal Protection Act provides sufficient legal authority for assuring U.S. compliance with this provision. Therefore, as noted in Chapter VIII, the Fish and Wildlife Service, acting on advice from the Commission, is undertaking a review to determine whether additional regulations or implementing legislaiton is needed to ensure that

the United States meets its obligations under the Agreement.

Native Subsistence Hunting

Prior to passage of the Marine Mammal Protection Act in 1972, hunting of polar bears in Alaska was managed by the State. The Act gave management authority to the Fish and Wildlife Service, and exempted coastal Alaska Natives from its prohibitions on taking when the taking is non-wasteful and for subsistence or handicraft purposes. The Act authorizes the Fish and Wildlife Service to prescribe regulations necessary to monitor the numbers, ages, and sexes of polar bears taken by Alaska Natives, but prohibits limiting the take unless the affected population is depleted.

The Beaufort Sea polar bear population is hunted by Natives from western Canada as well as Alaska. If not regulated effectively, such hunting, by itself and in combination with other activities, could jeopardize the continued existence of the population. Recognizing this, the Fish and Game Management Committee of Alaska's North Slope Borough and the Inuvialuit Game Council of Canada's Northwest Territories entered into an agreement in January 1988 to govern cooperatively the hunting of polar bears in the area between Icy Cape, Alaska, and the Baillie Islands, Canada.

Among other things, the Agreement calls for protection of cubs, females with cubs, and all bears inhabiting or constructing dens, and for prohibiting hunting at certain times of the year. It also provides that a harvest quota, based upon the best available scientific evidence, be established annually; the quota be allocated equitably between Alaska and Canadian Natives; and data be collected and shared on the number, location, age, and sex of bears killed.

The agreement has no legal status in Alaska or Canada and does not provide for enforcement and penalties in Alaska. Thus, its success depends upon voluntary compliance. Also, it does not apply to Native subsistence hunting of polar bears in Alaska west of Icy Cape.

Oil and Gas Exploration and Development

As noted in the Commission's previous Annual Report, the increasing level of human activity in the Arctic, particularly those activities related to oil and gas exploration and development, poses risks to polar bears and other wildlife. In recognition of this, the Marine Mammal Commission, in January 1989, sponsored a workshop to determine ways to assess and minimize the possible adverse effects of oil and gas exploration and development on polar bears. Participants included representatives of Native groups and relevant U.S. and Canadian federal, provincial, and state agencies. The workshop report was forwarded to the Fish and Wildlife Service and others on 28 December 1990 (see Appendix B, Lentfer 1990).

The workshop report notes that polar bears and their habitat could be affected in several ways by activities and events associated with Arctic oil and gas exploration and development. These include: (1) shooting or harassment of polar bears to protect workers carrying out exploration and development activities; (2) damage or destruction of polar bear denning or other essential habitats; (3) contact with and ingestion of oil from acute and chronic oil spills; (4) contact with and ingestion of other contaminants; (5) disturbance by aircraft, ship, drilling, and other operations; (6) increased hunting pressure; (7) indirect, food chain effects; and (8) mortality, injury, and stress resulting from scientific research done to assess the possible effects of oil, gas, and other activities on polar bears and other species. The report noted that the probability of interactions between polar bears and people, and the risk of death or injury of both bears and people, will increase as the level of exploration, development, and other activities increases in the Arctic. It concluded that the likelihood of harmful interactions resulting from oil and gas activities could be reduced substantially by requiring development of site-specific polar bear interaction plans.

In its 28 December 1990 letter forwarding the workshop report to the Fish and Wildlife Service, the Commission recommended that the Service: (1) work with the Minerals Management Service and the corresponding State agency to identify and agree upon information that should be contained in, and procedures that should be used to review and approve, site-

specific polar bear interaction plans; (2) encourage an appropriate industry group to seek an exemption, pursuant to section 101(a)(5) of the Marine Mammal Protection Act, to allow the incidental take of small numbers of polar bears in the process of implementing approved interaction plans; (3) identify and, with the Minerals Management Service and the Alaska Department of Fish and Game, cooperatively carry out or support such additional research and monitoring programs as necessary to evaluate the relative merits of possible detection and deterrence systems, and to better determine important polar bear denning areas and how such areas and the bears denning in them may be affected by construction and operation of facilities nearby; and (4) if it had not already been done, work with the Minerals Management Service, the National Marine Fisheries Service, the Coast Guard, the Environmental Protection Agency, and relevant State agencies to (a) include in oil spill contingency plans specific measures for assessing and minimizing the impact of possible oil spills on polar bears, and (b) develop a program to assess and monitor the levels of anthropogenic hydrocarbons and other possible contaminants present in polar bears and other components of the ecosystem of which they are a part.

The Commission also recommended that the Fish and Wildlife Service take such steps as necessary, including promulgating regulations or seeking domestic implementing legislation, to give full effect to the provisions of the International Agreement on the Conservation of Polar Bears described above. In this regard, the Commission noted that, in some cases, oil and gas development and other activities in Alaska may be inconsistent with Article II of the Agreement which, as noted above, specifies that the Parties "shall take appropriate actions to protect the ecosystems of which polar bears are a part, with special attention to habitat components such as denning and feeding sites...."

On 11 June 1991, the Fish and Wildlife Service responded to the Commission's 28 December 1990 letter. The Service noted that it anticipated that the regulations being developed to give effect to section 101(a)(5) of the Marine Mammal Protection Act (see the discussion in Chapter VIII) would require development and approval of site-specific interaction plans as one of the requirements for obtaining letters of authorization allowing the take of polar bears incidental to oil and gas activities. The Service also noted that the oil and gas industry had been very cooperative in responding to recommendations concerning development and implementation of polar bear interaction plans.

The Service indicated that it shared the Commission's view that regulations or implementing legislation were required to give full effect to the International Agreement on the Conservation of Polar Bears.

Development of a Polar Bear Conservation Plan

As discussed in Chapter VII, the 1988 amendments to the Marine Mammal Protection Act directed the Secretaries of the Interior and Commerce to develop conservation plans for depleted and, when appropriate, non-depleted marine mammal species and populations. As noted in the previous Annual Report, the Commission wrote to the Fish and Wildlife Service on 11 January 1989 suggesting that the Service prepare conservation plans for walruses, polar bears, and sea otters. The Commission pointed out that much of the needed background work had been done and was published in *Marine Mammals in Alaska: Species Accounts with Research and Management Recommendations* (see Appendix B, Lentfer 1988).

The Service's 3 March 1989 response to the Commission's letter indicated that it concurred and had initiated development of a walrus management plan, and intended to begin work on plans for polar bears and sea otters in the near future. As noted in Chapter VII, however, the *Exxon Valdez* oil spill caused personnel and funding to be diverted to assessing and attempting to mitigate the impacts of the spill.

As noted in Chapter VII, this and related matters were discussed with representatives of the Fish and Wildlife Service during the meeting of the Commission and its Committee of Scientific Advisors in Bellevue, Washington, on 25-27 April 1991. At that meeting, the Commission offered to provide assistance in developing draft plans that then could be used by

the Service to expedite completion and adoption of conservation plans for each of the three species. The Service accepted and the Commission subsequently initiated efforts to develop draft conservation plans. The draft polar bear plan is expected to be completed and forwarded to the Service early in 1992.

Proposed Oil and Gas Development in the Arctic National Wildlife Refuge

By letter of 3 September 1991, the American Institute of Biological Sciences and the Defenders of Wildlife requested that the Commission undertake a review to determine whether proposed oil and gas development in the Arctic National Wildlife Refuge is in conflict with (1) protection of the Beaufort Sea polar bear population, and (2) U.S. obligations to protect polar bear denning habitat under the International Agreement on the Conservation of Polar Bears. The letter cited recent studies indicating that the coastal plain of the Arctic National Wildlife Refuge constitutes important polar bear denning habitat and pointed out that the United States is obligated, under the 1973 polar bear agreement, to protect such areas.

On 17 September 1991, the Commission advised the Fish and Wildlife Service of the request. In its letter, the Commission noted that the Arctic National Wildlife Refuge is the only remaining relatively undisturbed on-land polar bear denning area in Alaska. It also noted that reproductive success appears to be greater in on-land dens than in pack ice dens, and that it is not clear how oil and gas development and other activities in the Refuge, and other areas along the coast and offshore Alaska and Canada, would affect the Beaufort Sea polar bear population. In this regard, the Commission noted that, while activities in any one area might not have significant adverse impacts, it is reasonable to presume that activities in certain areas, such as the Arctic National Wildlife Refuge, might have effects greater than activities in other areas, and that the cumulative effects of activities in many areas could disadvantage polar bear populations throughout the Arctic.

The Commission noted that it previously had advised the Fish and Wildlife Service and the Minerals Management Service of actions necessary to assess and avoid or minimize the possible adverse impacts of Alaska oil and gas development on polar bears and other marine mammals. To allow it to respond fully to the request from the American Institute of Biological Sciences and the Defenders of Wildlife, the Commission requested that the Service advise it as to: (1) what the Service had done, in addition to the actions described in its 11 June 1991 letter mentioned previously, to respond to the recommendations in the Commission's letter of 28 December 1990; (2) what the Service was doing, or had advised the Minerals Management Service that it should be doing, to identify important polar bear denning areas and how oil and gas development in the Arctic might affect those areas and the bears that use them; and (3) what the Service has done or is considering doing to ensure that oil and gas development and other activities in Alaska are not inconsistent with the International Agreement on the Conservation of Polar Bears.

The Service responded to the Commission's letter on 16 October 1991. In its response, the Service noted that it had placed highest priority on developing and implementing regulations allowing the take of polar bears and other marine mammals incidental to oil and gas operations as directed by section 101(a)(5) of the Marine Mammal Protection Act (see Chapter VIII for additional discussion of this issue). As regards the Arctic National Wildlife Refuge, the Service noted that it has conducted research since 1981 to identify and evaluate the importance of the Refuge and adjacent areas in the Beaufort Sea for polar bear denning, and has sought and received support from the Minerals Management Service to expand those studies. The Service described efforts that it and the Minerals Management Service have undertaken to assess and ensure that oil and gas activities do not adversely affect polar bears or their habitat.

With regard to the Commission's question as to what was being done to ensure that oil and gas activities and other activities in Alaska are not inconsistent with the International Agreement on the Conservation of Polar Bears, the Service indicated that letters of authorization issued pursuant to the previously mentioned regulations would require monitoring programs to further evaluate the predicted effects of

the authorized activities on polar bears. The Service also indicated that extensive measures would be implemented to protect polar bears if Congress authorizes oil and gas development within the Arctic National Wildlife Refuge and that, in its view, it was presumptuous to speculate about potential exploration or development scenarios before Congress acted.

At the end of 1991, the Commission was considering the issues described above and in Chapters VII and VIII to decide what if any additional actions are necessary to conserve polar bears and their habitat in Alaska and to ensure that the United States is meeting its obligations under the International Agreement on Conservation of Polar Bears.

Northern Right Whale (*Eubalaena glacialis*)

The northern right whale is the most endangered large whale in the world. Remnant stocks survive in both the North Atlantic and North Pacific Oceans. Worldwide, northern right whales may number fewer than 400 animals. The closely related southern right whale (*Eubalaena australis*), which occurs only in the Southern Hemisphere and numbers a few thousand individuals, is probably the second most endangered of the great whales.

The largest known stock of northern right whales occurs seasonally in coastal waters off the eastern United States and Canada. Photo-identification studies suggest that the northwest Atlantic stock numbers perhaps 300-350 animals. In spring and summer, right whales are found regularly in certain waters from less than a mile to a few tens of miles off Cape Cod, Massachusetts, northern Maine, and southern Nova Scotia. In winter, pregnant females and females with young of the year occur in waters within a few miles of the Georgia and northern Florida shores. Whether these are all of the pregnant females about to give birth and all females with young of the year and where the remainder of the population over-winters are unknown. No such concentrations of right whales are known to exist in the eastern North Atlantic.

Sightings of right whales in the North Pacific over the past 50 years are so few and so widely scattered that there is no basis for assessing how many animals remain in that ocean or where they are likely to occur. They may well number no more than a few tens of animals. In addition, there have been virtually no reports of calves from the North Pacific for the past several decades, and the population very well could disappear before the end of this century.

Right whales were brought to their precarious state by commercial whaling. In fact, the species' common name derives from the combination of factors that made it the "right" whale to kill. It was prized for the large quantity and high quality of its oil and baleen; it occurred conveniently close to shore; it swam slowly; and when killed, it tended to float. Northern right whales were taken by Basque whalers along the coast of southern Europe in the 11th century and were probably the first whale to be hunted regularly by a whaling industry. By the mid-1800s, they were taken throughout their range in both the Atlantic and Pacific Oceans; by the early 1900s, all known stocks were commercially extinct and close to biological extinction.

Although done belatedly, right whales were the first species to receive international protection from commercial whalers. Through the first International Convention for the Regulation of Whaling, which entered into force in 1935, a ban on the harvest of right whales was accepted by most whaling nations. The hunting ban was later carried forward by the International Whaling Commission under the 1946 International Convention for the Regulation of Whaling and has been accepted by all whaling nations for several decades. Right whales also receive protection through their listing on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, their listing as endangered under the U.S. Endangered Species Act, and their consideration as depleted under the U.S. Marine Mammal Protection Act.

Despite protection over the past 50 years, the number of right whales remains perilously low and it is not clear whether or at what rate their numbers may have increased (or decreased) in recent decades. The absence of any apparent signs of recovery may be due, at least in part, to the very low levels to which stocks were reduced and the species' inherently low

reproductive capacity. Mature females typically bear only a single calf every two to four years.

Recovery of at least some stocks probably has been retarded by human activities that have caused the death and injury of individual animals and the degradation of essential habitats. Because of the extremely small population levels, the premature loss of even a single animal can have a major effect on population recovery. In this context, data from right whale strandings along the northwest Atlantic indicate that at least ten animals have been killed over the past 20 years by collisions with large vessels or by entanglement in commercial fishing gear. Additional animals killed by these causes may have gone unrecorded. There also is evidence that many other right whales have been injured. During 1991, an animal was killed and washed ashore near the Florida-Georgia border. Although the whale was apparently killed by a collision with a vessel, wrapped around its tail was a large piece of gillnet that had been photographed on the animal a year earlier.

Right whales also may be affected by vessel traffic (including whale-watching trips) in ways that may not cause direct physical harm. That is, vessel-related noise and disturbance could alter normal behavior, cause stress, and perhaps cause abandonment of preferred habitat. Right whales and their habitat also may be affected adversely by dredging and dredge spoil disposal, exploration and development of offshore petroleum and hard mineral resources, oil spills, municipal outfalls, whale research, and perhaps other human activities.

The Commission has supported several studies to improve understanding of the status of right whales (see, for example, Appendix C, Winn 1984, Winn *et al.* 1985, and Brownell *et al.* 1985) and to help identify needed research and management activities (see, for example, Appendix B, Kraus 1985 and the Georgia Conservancy 1986). In 1991, the Commission continued its efforts in this regard. As noted in Chapter IX, the Commission provided partial support for a study of right whale behavior, including reaction to vessel traffic, using airships as observation platforms. Other recent activities are discussed below.

Preparation of a Right Whale Recovery Plan

Section 4 of the Endangered Species Act directs the Secretaries of Commerce and the Interior to prepare recovery plans identifying priority research and management needs for listed endangered species that would benefit from such planning. On several occasions, the Commission has recommended that the National Marine Fisheries Service prepare recovery plans for endangered whales, including right whales, that occur regularly in U.S. coastal waters. As a part of a favorable response in 1987, the Service constituted a Northern Right Whale Recovery Team and began work on drafting a recovery plan.

Although funding was not available to convene the team before December 1988, the Service prepared a preliminary draft plan and provided it to team members for review in advance of its first meeting. At its initial meeting, the team concluded that the draft should be substantially modified and offered to draft a recommended plan for Service consideration. The Service agreed. By early 1990, the team completed a recommended draft plan, which it provided to the Service. On 6 February 1990, the Service published a *Federal Register* notice requesting public and agency comments on the team's recommended draft plan.

The Commission, in consultation with its Committee of Scientific Advisors, provided comments to the Service by letter of 22 March 1990. The Commission noted that a number of statements, conclusions, and recommended actions in the draft plan appeared inappropriate or unjustified. For example, the plan concluded that the number of right whales had not changed in the past 50 years even though a reliable basis for estimating the size or trends of the population prior to 1970 did not exist.

In addition, the goals and task statements in the recommended draft plan were not developed in a way that offered clear guidance concerning needed actions. For example, the plan suggested that $5,000 per year could usefully be spent to ensure that the ban on commercial taking of right whales is maintained despite the fact that the ban has been universally accepted by all whaling nations for several decades. No explanation was provided regarding work that the team thought needed to be done. The Commission

therefore recommended that the draft plan be reformatted and substantially revised. In this regard, the Commission developed and attached to its comments a revised outline of research and management tasks.

In light of comments by the Commission and others, the Service decided that the recommended draft plan should be revised. The Commission subsequently offered to assist the Service in this effort, and the Service agreed. The Commission completed a suggested revised draft plan in the fall of 1990, taking into account its earlier comments as well as those of others. The Commission and its Committee of Scientific Advisors reviewed the revised draft plan and, by letter of 21 November 1990, forwarded it to the Service. In its letter, the Commission noted that the revision addressed most of the comments on the recommended plan. Because it included a number of substantive changes, however, the Commission suggested that, if the Service were to put forward the revised draft plan, it should be circulated for agency and public review as the Service's proposed plan.

Among other points, the revision identified steps to monitor right whale occurrence and habitat use patterns in known high-use areas; improve the salvage and necropsy program for right whales; develop and implement area, season, gear, and/or other fishing restrictions in important right whale habitat areas; establish public awareness programs to advise vessel operators of ways to reduce the likelihood of vessel-whale collisions in areas where right whales occur most frequently; consider vessel speed restrictions in areas where right whales occur frequently; establish interim whale-watching regulations setting forth allowable approach distances for right whales; limit approval of research permit applications involving right whales to studies that would further the objectives and provisions of the approved right whale recovery plan or involve other essential research whose expected results would outweigh likely adverse effects on the whales; and designate critical habitat for right whales.

The Service did not respond to the Commission's suggestions and, on 13 March 1991, the Commission asked to be advised of the steps and schedule that the Service would follow to complete, adopt, and implement a final recovery plan. The Service replied on 25 April, noting that it believed the November 1990 revision placed too much emphasis on research and that information was sufficient to begin management actions. The Service advised the Commission that it was drafting another version that would be sent to the Recovery Team in the first week of May for a ten-day review. It also stated that it did not believe another public comment period was warranted.

By July, the Commission had not been advised of any further efforts to complete or adopt the recovery plan. On 12 July 1991, the Commission requested information on the status of efforts to complete the plan and what the Service proposed to include in it. The Service's 18 October 1991 reply noted that it was sending the plan to its regional offices and science centers for review, after which it would be submitted to the Service's Director for approval. The letter did not indicate what actions were called for in the plan or when it would be submitted for approval.

Inasmuch as the Service provided no comments on the provisions recommended by the Recovery Team when it circulated the initial recommended plan and it has not announced publicly its views as to appropriate research and management measures, it is not clear what the Service contemplates including in the right whale recovery plan.

Critical Habitat for Right Whales in the Northwest Atlantic

Certain coastal waters off the eastern United States and Canada are used seasonally by a significant portion of the right whale stock in the western North Atlantic Ocean. Five key areas have been documented over the past ten years, three of which occur in U.S. waters: (1) nearshore waters within 10 to 15 miles of the coast of southern Georgia and northern Florida (a calving ground and nursery area used between January and March); (2) Cape Cod Bay and Massachusetts Bay (a feeding area often used by cow-calf pairs as well as others in March and April); and (3) the Great South Channel, 40 to 60 miles east of Cape Cod (a feeding and migratory corridor for a substantial number of right whales in May and June).

The two areas in Canadian waters are in the lower Bay of Fundy near the U.S.-Canadian border (a feeding and nursing area for cow-calf pairs from July to November) and near Browns Bank, 25 miles southeast of southern Nova Scotia (a feeding and mating area for adult and juvenile animals between July and November).

On 12 July 1990, the National Marine Fisheries Service published a *Federal Register* notice announcing receipt of a petition from the Right Whale Recovery Team asking that three right whale habitats in U.S. waters be designated as critical habitat under section 4 of the Endangered Species Act. The petition identified proposed boundaries and briefly discussed why each area was important. The Service's notice stated that, within 12 months, it would conduct a review to determine if the requested action was warranted. To help with the review, the Service asked for comments on the petitioned action and other relevant information or publications.

Based on a review of the notice and petition, the Commission concluded that there appeared to be sufficient grounds for designating critical habitat in each area. However, a synthesis and analysis of information on right whale sighting data and special management considerations had not been developed to properly evaluate the merits of designating the three areas as critical habitat. The Commission, therefore, contracted for a study to synthesize and evaluate relevant information according to criteria established by the Service for designating critical habitat. On 26 September 1990, the Commission wrote to the Service noting its views on the petitioned action and advising that it had contracted for a synthesis of relevant information to help evaluate the petition. The Commission also provided the Service with copies of relevant reports prepared for the Commission.

In May 1991, the Commission and its Committee of Scientific Advisors accepted a final contract report entitled "Information on Right Whales (*Eubalaena glacialis*) in Three Proposed Critical Habitats in U.S. Waters of the Western North Atlantic Ocean" (see Appendix B, Kraus and Kenney 1991). By letter of 31 May 1991, the Commission forwarded the report to the Service. In its letter, the Commission noted that the analysis indicated that all three areas are used seasonally each year by a substantial percentage of the remaining right whale population and/or by a vital stock component (*e.g.*, cow-calf pairs). It also noted that each area appeared to meet established criteria for designating critical habitat.

The Commission, therefore, recommended that the Service proceed with actions to propose and designate as critical habitat all three areas identified in the petition. The Commission also noted, however, that the Commission-sponsored study did not fully evaluate data on right whale sighting effort and that such analyses might justify designating additional areas adjacent to the petitioned boundaries. Therefore, the Commission also recommended that the Service evaluate effort data associated with right whale sightings to determine if additional adjacent areas also merit designation. In recommending the additional analysis, the Commission noted that it should in no way delay action to designate the areas already identified.

On 18 October 1991, the Service advised the Commission that an environmental assessment was being written to accompany a proposed rule to designate critical habitat and that it expected to publish the proposed rule in January 1992.

Right Whale Status Review

Section 4(c)(2) of the Endangered Species Act requires that, at least once every five years, a review of listed species be conducted to determine whether changes in their listing status are warranted. In June 1991, the Service completed a status review of endangered whales, including right whales and, on 27 June, it published a *Federal Register* notice requesting comments.

The Service's review concluded that right whales were the most severely depleted and least abundant of all large whale species. In the eastern North Pacific, the review noted, no more than seven animals had been sighted over the past 25 years in spite of considerable effort to locate them in areas where they once were common. Regarding right whales in the western North Atlantic, the Service cited two recent population estimates that were in close agreement with each other. One placed the population size at 71-333

animals (with a coefficient of variation of 0.26 to 0.32); the other estimated a population of 350 animals. In the eastern North Atlantic, only five right whale sightings have been reported in the past 30 years. If the animals sighted are remnants of the former eastern stock, the stock would appear to be nearing extinction. If they are stragglers from the western stock, the eastern stock may already be extinct.

Regarding right whales in the Southern Hemisphere, the review reported that separate southern right whale stocks off South Africa, western Australia, and Argentina have been estimated to have increased over the past two decades at annual rates of 6.8 percent, 11.7 to 13 percent, and 7.6 percent, respectively.

On 31 July 1991, the Commission provided comments on the status review. Among other points, the Commission noted that the regulations listing right whales as endangered did not recognize northern right whales and southern right whales as separate species. It therefore recommended that a technical amendment be made to correct the listing. The Service agreed and, by letter of 14 November 1991, it advised the Commission that, in cooperation with the Fish and Wildlife Service, it was proceeding to amend the regulations to list both species as endangered.

Humpback Whale (*Megaptera novaeangliae*)

Humpback whales occur in all the world's oceans. They range seasonally from the tropics to the polar ice caps and may be found in both coastal and open ocean areas. All populations were so severely reduced by commercial whaling that the International Whaling Commission (IWC) banned exploitation of the species in 1966. In 1970, humpback whales were designated as endangered under the U.S. Endangered Species Preservation Act, a designation that was carried forward under the Endangered Species Act of 1973. The only direct take of humpback whales presently authorized is a few animals taken for subsistence purposes by residents of St. Vincent and the Grenadines. Present quotas adopted by the IWC allow the take of up to three animals annually by residents of those islands (see Chapter IV).

At least three of thirteen recognized humpback whale stocks are found seasonally in U.S. waters. These are the western North Atlantic, the eastern North Pacific, and the central North Pacific stocks. The primary threats to the species differ among the regions, but they generally are related to noise, disturbance, and collisions associated with vessel traffic, offshore oil and gas development, whale-watching activities, water sports, coastal development, and commercial fishing. Other effects associated with commercial fishing may include entanglement in fishing gear and depletion of prey resources.

Preparation of a Humpback Whale Recovery Plan

In 1984 and again in 1986, the Marine Mammal Commission recommended that the National Marine Fisheries Service prepare recovery plans for humpback whales, right whales, and other endangered whales that occur in U.S. waters. In response to these recommendations, the Service constituted a Humpback Whale Recovery Team in July 1987 to assist in preparing a recovery plan. In 1989, work on the draft plan was completed and, on 16 October 1989, the Service circulated the draft for agency and public review.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the draft plan and provided comments to the Service on 30 November 1989. The Commission noted that the document did not identify needed research and management tasks in sufficient detail to effectively guide development of recovery activities and that problems were sufficiently different among the regions in which the populations occur to merit independent recovery programs for each region. Therefore, it recommended that the plan outline and narrative be restructured and expanded to provide a clearer indication of the specific research and management actions necessary to rebuild each of the separate stocks in U.S. waters and that detailed implementation plans be developed for each stock.

On 18 May 1990, the National Marine Fisheries Service acknowledged receipt of the Commission's comments and noted that a revised draft recovery plan, incorporating reviewers' comments, had been distributed to the Recovery Team in preparation for its 23-24 May 1990 meeting in Seattle, Washington. Following the meeting, an implementation schedule with cost estimates and task priorities was completed and circulated for public and agency review. By early 1991, it was not clear what was being done to complete, adopt, and begin implementing the recovery plan and the Commission asked to be advised of the status of the recovery plan and implementation schedule. The Service replied on 25 April 1991, noting that the Recovery Team had reviewed all the comments submitted on the draft plan, incorporated those comments as appropriate, and submitted a recommended final plan that was awaiting clearance by the directors of the Service's regional offices.

On 16 September 1991, the Commission sent the Service the final report of the contract study on the conservation and protection of humpback whales in Hawaii (see Appendix B, Townsend 1991). The purpose of the study was to help develop specific recommendations for protecting humpback whales in Hawaiian waters. The study report, which examined conservation issues and management actions related to a number of activities including whale watching, water sports, scientific research, and military activities, illustrated the importance of addressing recovery actions on a regional basis. Therefore, in its letter sending the report to the Service, the Commission recommended that, when the humpback whale recovery plan is completed, the Service immediately take steps to develop area-specific implementation plans to address implementation needs peculiar to each regional population.

The final recovery plan was approved and adopted by the National Marine Fisheries Service on 14 November 1991; it is to be distributed to agencies and interested organizations in 1992. The Marine Mammal Commission will review the final plan to determine what further steps should be taken to develop cooperative regional implementation programs.

Humpback Whales in Alaska

During summer, part of the central North Pacific stock of humpback whales feeds in the coastal waters of southeastern Alaska, including Glacier Bay. The bay lies entirely within the Glacier Bay National Park and Preserve, an area administered by the National Park Service. In 1978 and 1979, the occurrence of humpback whales in Glacier Bay declined significantly from previous years, and it was believed that increased tour boat and other vessel traffic may have caused or contributed to their reduced numbers.

As described in previous Annual Reports, the Commission, in cooperation with the National Park Service and the National Marine Fisheries Service, convened a meeting of scientists in October 1979 to review available data related to whale use of the bay, identify possible causes of the regional shift in whale distribution, and identify research needed to better assess and determine possible causes. In addition, the National Park Service undertook consultations with the National Marine Fisheries Service pursuant to section 7 of the Endangered Species Act to identify measures necessary to protect humpback whales and their habitat in Glacier Bay.

As a result of the meeting and consultations, the National Park Service initiated a multi-year research program in 1980 to assess factors affecting humpback whale distribution in Glacier Bay and adjacent waters. It also promulgated temporary regulations to reduce the number of large commercial tour ships and smaller recreational vessels that could enter the bay. The regulations established entry limits at levels permitted in 1976, which was the last year before humpback whale use of the bay declined significantly. These regulations were modified and reissued annually until 1985, when the National Park Service adopted permanent regulations. The permanent regulations established a permit system for vessel entries, prohibited fishing for certain humpback whale prey species in the bay, and provided for the designation of "whale waters" where special vessel operating procedures apply to minimize possible disturbance of whales.

During consultation with the National Park Service in 1983, pursuant to section 7 of the Endangered Species Act, the National Marine Fisheries Service advised that an increase in vessel traffic in Glacier Bay above the 1976 level could jeopardize the southeast Alaska stock of humpback whales. It therefore recommended that, if cruise ship entries were to exceed more than 20 percent of the 1976 level, section 7 consultation should be re-initiated.

Since promulgation of its temporary regulations in 1980, the National Park Service has gradually increased the number of vessels permitted to enter the bay during the summer whale season. In 1988, the number of permitted entries for cruise ships reached 107 entries, which was 20 percent above the 1976 level and the maximum level allowed without re-initiating consultation and amending existing National Park Service regulations. In 1989, the National Park Service considered authorizing more than 107 entries but, decided not to do so, and maintained the cruise ship entry level at 107.

In 1990, however, the National Park Service authorized 109 vessel entries, which exceeded the maximum level recommended by the National Marine Fisheries Service and authorized under National Park Service regulations. In response, the Alaska Wildlife Alliance filed a complaint alleging that the National Park Service had not followed applicable procedures in authorizing the additional entries, that it had exceeded the maximum allowable number of entries established by regulations, and that it had violated the National Environmental Policy Act by not preparing a supplemental environmental assessment (see Chapter VII). The plaintiffs also alleged that the National Park Service was impermissibly allowing commercial fishing operations in the Glacier Bay National Park and Preserve. Parties to this lawsuit met early in 1991 to begin negotiating a settlement. At the end of 1991, the parties had, with judicial consent, suspended proceedings pending completion of negotiations.

In 1991, the National Park Service again limited cruise ships to 107 vessel entries. However, the Service also initiated steps to consider a new system for regulating vessel entries. By letter of 15 February 1991, the National Park Service forwarded to the Commission copies of the "Glacier Bay National Park and Preserve Humpback Whale Population Monitoring Data — 1990." The Service's letter advised the Commission that it planned to consider modifying its regulations in ways that could result in an increase in cruise ship entries above the current limit of 107 entries. In this regard, the Service stated that it had determined that the best approach for managing vessel use in the bay would be to develop a vessel management plan and establish a citizen's steering group to provide input to its development.

The Commission subsequently received a copy of the "Glacier Bay National Park and Preserve Vessel Management Plan — Workbook 1" and the "Environmental Assessment on Regulations Regarding Fisheries in Glacier Bay National Park," both dated May 1991. On 18 July 1991, the Commission wrote to the Service expressing its understanding that the Service planned to maintain vessel entry levels for the 1991 whale season in Glacier Bay at 107 entries. With regard to developing a vessel management plan, the Commission noted that, if new regulations are contemplated that could authorize an increase in vessel entries above current limits, consultations with the National Marine Fisheries Service pursuant to section 7 of the Endangered Species Act should be re-initiated. To ensure that such consultations are carried out effectively, the Commission recommended that the National Park Service informally consult with the National Marine Fisheries Service before circulating any draft vessel management plan for public review and append the results of those consultations to the draft plan circulated for review.

By letter of 18 September 1991, the National Park Service responded, indicating that it agreed with the Commission's recommendations. It also noted that it would provide the Commission with copies of the draft vessel management plan and the results of consultations with the National Marine Fisheries Service when they were completed. At the end of 1991, the Commission had not yet received a draft plan.

Also during 1991, the National Park Service published a proposed rule in the *Federal Register* to amend its regulations regarding commercial fishing in Glacier Bay. The action was taken to allow commercial fishing to continue to be exempt from a current

nationwide prohibition of such activities within national parks. The proposed rule, published on 5 August, would allow commercial fishing to continue in the bay until 31 December 1997 to allow existing fishermen time to amortize their investments by phasing out or relocating elsewhere. In support of its proposed rule, the Service noted that commercial fishing had occurred in Glacier Bay since before it was designated a national monument in 1925.

On 8 November 1991, the Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, provided comments to the Service on the proposed rule and associated environmental assessment. It noted that, notwithstanding the nationwide prohibition on commercial fishing in national parks, the proposed rule leaves open the possibility of an indefinite extension of authorization to permit commercial fishing in the Park if the Service determines that the fisheries are compatible with objectives for conserving park resources. In this regard, the Commission noted that the Service did not explain why a seven-year period was chosen, how many vessels or what fisheries were involved, or why commercial fishermen could not shift their operations elsewhere in a shorter period of time. Without such information, the Commission noted that it was difficult to determine how either the proposed rule or alternative actions would affect park resources and commercial fishermen.

With respect to marine mammals, the Commission noted that eliminating commercial fishing within Glacier Bay could benefit humpback whales and other wildlife that utilize the bay. Doing so would reduce vessel noise and disturbance, the risk of vessel-whale collisions, the potential for whales to become entangled in fishing gear, and the possibility of further altering the Park's natural ecosystem. The Commission also noted that the proposed rule addressed subsistence fishing, which was prohibited by the 1980 Alaska National Interest Lands Conservation Act. Therefore, the Commission recommended that the Service: (1) reconsider its proposed rule to allow commercial fishing to continue within Glacier Bay National Park; (2) refrain from proceeding with a final rulemaking unless sufficient information became available to support a finding that commercial fishing will not conflict with the values and purposes for which the Park was established; and, (3) before publishing a final rule, circulate information on the anticipated level and possible effects of commercial fishing in the Park for public review and comment.

At the end of 1991, the National Park Service had not yet published a final rule on commercial fishing within Glacier Bay National Park.

Humpback Whales in Hawaii

Hawaii is the principal calving ground of the central North Pacific stock of humpback whales. During 1991, the Sanctuaries and Reserves Division of the National Oceanic and Atmospheric Administration's National Ocean Service considered a possible national marine sanctuary designation in Hawaii that could enhance protection of humpback whales as well as other marine resources in Hawaii. Title III of the Marine Protection, Research, and Sanctuaries Act of 1972 directs the Secretary of Commerce to designate marine sanctuaries to protect and manage areas of the marine environment that are of national significance.

The major goals of the National Marine Sanctuary Program, the group designated to carry out this directive, are to provide enhanced resource protection through comprehensive and coordinated conservation and management; support, promote, and coordinate scientific research and monitoring related to the specific marine resources that sanctuaries are designated to protect; enhance public awareness, understanding, appreciation, and wise use of the marine environment; and, facilitate multiple use, to the extent compatible, with the primary objective of sanctuary resource protection.

Proposals to designate a marine sanctuary to protect humpback whales in Hawaii also received extensive consideration in the 1970s and 1980s. However, actions to designate a sanctuary in Hawaii were not taken. In 1990, Congress directed that the Sanctuaries and Reserves Division study the feasibility of establishing a national marine sanctuary in the waters adjacent to Kahoolawe, the smallest of the main Hawaiian Islands. The purpose of the study was to assess the contribution sanctuary management of the area might make to protecting the population of

humpback whales that use the waters around the island.

The waters surrounding Kahoolawe also are used by a variety of other marine mammals. The island also is historically significant because of its use for cultural and religious practices by native Hawaiians and other Pacific islanders and as a seasonal camp for fishing activities. It has been protected from development and tourism by access restrictions imposed by the U.S. Navy, which, over the past 40 years has used the island for practice bombing. The waters around the island are reported to contain significant amounts of unexploded ordnance from past military use.

In response to the Congressional directive, the Sanctuary and Reserves Division examined marine resources within three nautical miles of Kahoolawe and consulted with Federal and State agencies, including the Commission, and the public during 1991. By letter of 16 October 1991, the Hawaii Governor's Office of State Planning informed the Sanctuaries and Reserves Division that the State favored, among other things, "reconsideration of a single-species humpback whale sanctuary, the boundaries of which would extend around all appropriate islands at a distance which is scientifically justifiable, provided that such a sanctuary is designated within three years," after which the term of the present Governor expires.

In December 1991, the Sanctuaries and Reserves Division released the results of its study. The study report concluded that, although there is evidence of biological as well as cultural and historical resources adjacent to Kahoolawe Island that merit further investigation, information does not conclusively support a finding of special national significance that warrants national marine sanctuary status. The Division also concluded that there are, however, additional marine areas within the Hawaiian archipelago that merit further consideration as possible components of a multiple-site, multiple-resource national marine sanctuary. The report noted that further investigation will be required to determine whether a finding of special national significance can be made regarding these resources, and that the Division will continue these investigations in 1992. With regard to the State's position, the report noted that a national marine sanctuary in Hawaiian waters would include the humpback whale as a component of a comprehensive sanctuary resource protection and management program design to complement other agency efforts.

As noted above, the Commission contracted for a study in 1990 to compile and evaluate information on the status of humpback whales in Hawaii and the steps being taken and needed to identify and avoid or mitigate threats to the whales and their habitats in Hawaiian waters. Among other things, the contractor noted that several research groups conduct similar humpback whale studies and that the studies could be duplicative and disturb the whales. In this regard, the report noted that research goals need to be clarified and it recommended that annual research coordination meetings be convened by the National Marine Fisheries Service.

By letter of 16 September 1991, the Commission transmitted the contract report to the National Marine Fisheries Service and involved researchers. In its letter, the Commission reiterated its earlier recommendation that, when the humpback whale recovery plan is completed, the Service immediately take steps to develop area-specific implementation plans. In this regard, the Hawaiian implementation plan should include research and related activities noted in the humpback whale recovery plan.

In response to the Commission's recommendations, the National Marine Fisheries Service, in consultation with the Commission, developed and circulated terms of reference for a two-day research coordination workshop. On 20 December 1991, the Commission wrote to the National Marine Fisheries Service offering to provide partial support for such a workshop and offering its views on the workshop's objectives. In the Commission's view, the purpose of the workshop would be to facilitate communication between researchers and management agencies, identify critical research needs, and better coordinate efforts among investigators to avoid conflicts and unnecessary duplication of effort.

The workshop is scheduled to be held in Wailuku, Maui, Hawaii, on 23-24 January 1992 and will be co-sponsored by the Marine Mammal Commission, the National Marine Fisheries Service, the University of

Hawaii Sea Grant College Program, and Hale Kohola/ Whaler's Village.

Also relevant to humpback whales in Hawaii are recent efforts to develop population models that would permit improved assessments of the status of the central North Pacific stock, as well as other North Pacific Ocean stocks of humpback whales. Such models require estimates of vital rates, including age at maturity, reproductive intervals, adult mortality, and calf/juvenile mortality. Of these parameters, estimates of calf and juvenile mortality are the least well documented. In this regard, the report of a 1989 International Whaling Commission workshop on photographic identification techniques for whale research noted that it might be possible to estimate humpback whale calf/juvenile mortality from photographs of individually recognizable mother-calf pairs and other whales taken in calving and feeding areas.

To pursue this idea, the National Marine Mammal Laboratory, in conjunction with researchers studying humpback whales in the North Pacific, began organizing a series of workshops to compare photographic records of humpback whale mother-calf pairs from the Hawaiian calving ground with records of female whales photographed on the feeding grounds in Alaska. The objectives of the workshops were to estimate calf/juvenile mortality and female humpback whale reproductive intervals using photographs.

The first workshop, supported in part by the Marine Mammal Commission, was held 20-23 November 1991 in Seattle, Washington (see Chapter IX). It focused on cataloguing photographs taken by researchers in Hawaii, Alaska, California, Mexico, Canada, and Japan, and identifying possible data biases. The workshop participants concluded that, while there was sufficient information to develop preliminary estimates of humpback whale calf/juvenile mortality and female reproductive intervals, such analyses could be biased. Possible sources of bias identified by the participants included, among other things, calves that died after they were photographed but were presumed to be alive during the season, and calves that were alive but were missed by researchers.

A second workshop is planned for April 1992 to compile lists of female humpback whales that were photographed with calves of the year during the 1991/1992 winter in Hawaii. Photographs of these females will be distributed to researchers in Alaska in order to estimate the numbers of females that were seen in Hawaii with calves and that visited the summer feeding range with their calves during 1992. To the extent possible, these results, along with previous photographs of known female whales with calves will be used to develop preliminary estimates of calf/ juvenile mortality and female reproductive intervals.

North Atlantic Humpback Whales

In 1983, Stellwagen Bank, located north of Cape Cod and east of Boston, Massachusetts, was added to the site evaluation list for the National Marine Sanctuary Program. To help assess the merits and options for designating the bank as a national marine sanctuary, a series of public meetings was held in 1990. On 8 February 1991, the Sanctuaries and Reserves Division published a *Federal Register* notice announcing a proposed rule for designating approximately 453 square miles of the bank and adjacent waters as the Stellwagen Bank National Marine Sanctuary. The notice also announced the availability of a draft management plan and a draft environmental impact statement and requested public and agency comments.

On 9 April 1991, the Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, responded. In its comments, the Commission noted that the proposed designation would affect a variety of fish, seabirds, and marine mammals, including five species of endangered whales (*i.e.*, humpback, right, fin, blue, and sei whales). Given the information on the importance of Stellwagen Bank as a feeding and nursing area for humpback, fin, and minke whales, and because right whales also migrate through the area seasonally, the Commission concurred with the Division's determination that this area is nationally significant and warrants designation as a national marine sanctuary. The Commission recommended that the Division proceed with efforts to draft and implement the associated sanctuary management program.

The Commission also noted, however, that the proposed action did not thoroughly identify or assess possible effects and management needs related to

commercial and recreational fishing. With respect to humpback whales and other whales, such activities could result in disturbance, possible area avoidance by whales, incidental taking, entanglement in lost or discarded fishing gear, and the depletion of available food for marine mammals and other species. Therefore, the Commission recommended that: (1) the environmental impact statement be expanded to include a more thorough description of the possible direct and indirect effects of commercial and recreational fishing on marine mammals and other species; and (2) the sanctuary designation document be expanded to include commercial and recreational fishing as an activity that could be subject to regulation if new information indicates that existing management authorities are not providing the necessary level of site-specific protection needed.

The Commission's comments and those of other reviewers were being considered by the Division at the end of 1991, and the final environmental impact statement and management plan is expected to be completed in 1992.

An additional effort initiated in 1991 bearing on humpback whales in the North Atlantic is the cooperative research program entitled "Years of the North Atlantic Humpback Whale" (Project YONAH). This three-year project was developed to address questions concerning the discreteness of humpback whale stocks in the North Atlantic Ocean, the extent to which whales move between feeding areas, reproduction and mortality rates, and the status of the various humpback whale stocks in the North Atlantic basin.

The project involves collaboration by researchers from seven nations to obtain and analyze photographs and biopsy samples from humpback whales throughout the North Atlantic. Sampling is scheduled to begin in January 1992 on breeding grounds (Silver Bank, Navidad Bank, Samana Bay, and Mona Passage) in the West Indies. Sampling is to continue in summer 1992 at all known North Atlantic feeding grounds (*i.e.*, the Gulf of Maine, Gulf of St. Lawrence, off the Atlantic coast of Newfoundland and Labrador, off southwestern Greenland, around Iceland, and off Norway). Sampling will be continued in 1993 and final analyses are expected to be completed sometime in 1994. The Marine Mammal Commission provided funds at the outset to help support project administration costs (see Chapter IX).

Bowhead Whale (*Balaena mysticetus*)

Bowhead whales historically occurred throughout the seasonally ice-covered areas of the arctic and subarctic region. Over-exploitation by commercial whalers between 1600 and 1900 severely depleted all four recognized populations. The species is listed as endangered under the Endangered Species Act and depleted under the Marine Mammal Protection Act. It also is classified as a protected stock by the International Whaling Commission (IWC).

The largest surviving population is the western Arctic population, which migrates seasonally between the Bering Sea and the Chukchi and Beaufort Seas. Recently bowhead whale calls were recorded in an area north of Scandinavia that was once populated by the Spitsbergen bowhead whale population. Although this population had been thought to be extinct, new evidence suggests it may still be extant. Populations exist in other areas as well, but information adequate to assess their status is not available.

Eskimo Whaling

The western Arctic bowhead whale population is important to Alaska Natives who continue to hunt the whales for subsistence and cultural purposes. In the mid-1970s, the number of whales struck and landed or lost by Eskimo whalers increased (Table 7). The increase was due to several factors, including an increase in the number of whaling crews and restrictions on the subsistence take of caribou. As jobs became available on the Alaska oil pipeline and as compensation claims on Native land rights were settled, more cash was available to purchase whaling equipment, which also contributed to the increased amount of whaling.

At its June 1977 meeting, the IWC reviewed information on the status of the western Arctic bowhead whale population and the increasing take by Alaska Eskimos. Concern that the increasing subsis-

tence take was jeopardizing the population prompted the IWC to eliminate its exemption under which Natives were allowed to take bowhead whales and other protected species for subsistence purposes. The United States subsequently sought and achieved reinstatement of the exemption, based largely on a pledge by the U.S. Commissioner to the IWC that the United States would undertake a comprehensive research program to monitor the western Arctic bowhead whale population's status and trends.

In 1982, the IWC adopted a new paragraph, 13(a), to its Schedule of Regulations setting forth principles and guidelines for establishing catch limits for aboriginal/subsistence whaling. The new measure formally recognized the distinction between commercial and aboriginal/subsistence whaling. It also codified the IWC's past practice of attempting to strike a balance between the subsistence, cultural, and nutritional needs of aboriginal people and the need to protect affected whale stocks. Specifically, the new paragraph states that "[F]or stocks below the maximum sustainable yield (MSY) level but above a certain minimum level, aboriginal/subsistence catches shall be permitted so long as they are set at a level which allows the whale stock to move to the MSY level." Allowable catch levels established by the IWC are based on advice from its Scientific Committee and are implemented by the member nations.

To help implement the new measure, the U.S. Department of the Interior began to develop a quantitative procedure for determining the nutritional, subsistence, and cultural needs of Alaska Eskimos for bowhead whales. The procedure multiplied the mean annual number of bowhead whales landed per capita during the period (1910-1969) by the current size of the Eskimo population in nine Alaska Native whaling villages. Based on data available in 1983, the cultural need for bowhead whales was established at 26 animals landed per year. This estimate was revised in 1988 to a take of 41 whales landed per year, based on new data from additional research on past cultural needs in the nine Alaska Native whaling villages.

The United States subsequently requested and received an annual quota of 41 whales landed or a maximum of 47 whales struck for the years 1989, 1990, and 1991. During that period the struck-and-landed rate was 66 percent. Based on this rate, at the 1991 meeting of the IWC, the United States asked for a quota of 54 strikes per year for the years 1992, 1993, and 1994 with no more than 41 whales landed in any year for the next three years (Table 7). The IWC adopted these proposed catch limits, along with a provision to allow Natives to carry over a combined total of up to 13 unused strikes during the 1989, 1990, and 1991 seasons.

The Alaska Eskimo bowhead whale hunt is regulated by the Alaska Eskimo Whaling Commission pursuant to a memorandum of understanding signed in 1981 by the Commission and the Department of Commerce. The memorandum has been renewed annually, and the number of whales struck, landed, and lost by Alaska Natives has been consistent with the quotas established by the IWC.

In August 1991, the Minister of Fisheries and Oceans of Canada approved a license for the take of one bowhead whale by the western Arctic Native community of Aklavik. Canada, which is not a member of the IWC, did so without consulting the IWC. The Inuvialuit Natives subsequently struck two bowhead whales, one of which was landed. Absent consultations with the IWC, Canada's action could be viewed as "diminishing the effectiveness" of the IWC's conservation program and grounds for certification under relevant U.S. laws — the Pelly Amendment to the Fishermen's Protective Act (22 U.S.C. § 1978) and Packwood-Magnuson Amendment to the Magnuson Fishery Conservation and Management Act (16 U.S.C. § 1821(e)(2)).

In response to U.S. concerns, the Canadian Ambassador wrote to the U.S. Secretary of Commerce on 30 September 1991 stating that a committee of officials from various Canadian Government departments would review the issues arising from the Inuvialuit bowhead whale hunt, including the Canadian Government's position *vis-a-vis* the IWC. Because of the implications of the Canadian hunt for the conservation of bowhead whales, the Marine Mammal Commission wrote to the U.S. IWC Commissioner on 5 December 1991. In its letter, the Marine Mammal Commission recommended that, notwithstanding the need for an investigation of the circumstances surrounding the issuing of the Canadian license, the Secretary certify

the Government of Canada under the Pelly Amendment for diminishing the effectiveness of the IWC's conservation program. At the end of 1991, the United States was continuing informal discussions with representatives of the Canadian Government, and no action had been taken on the recommendation.

Industry/Native Agreement

Seismic surveys and other activities associated with offshore oil and gas exploration and development may affect the movement and behavior of bowhead whales during their migrations. These in turn may affect the Alaska Eskimo spring and fall bowhead whale hunts as well as the whales themselves. Hunters may have to travel greater distances to find whales, thereby increasing the risk that they may be injured or killed or unable to bring the whales killed back to their villages. To avoid such possibilities, the Alaska Eskimo Whaling Commission and certain oil companies engaged in activities on Alaska's North Slope entered into a cooperative agreement in 1986 calling upon the industry to assist with towing whales killed by Native hunters to a suitable butchering site to prevent meat from spoiling; cache emergency supplies, such as gasoline and food, at selected sites for use by Native subsistence hunters; provide emergency assistance to hunters during adverse weather conditions; assist with the transport of whale meat and muktuk to prevent spoilage and maximize utilization; and specify actions that industry planes and vessels would take to avoid interfering with ongoing whaling activity. The agreement was approved by the National Oceanic and Atmospheric Administration and has been renewed annually.

Current Population Status

In May 1991, the IWC's Scientific Committee undertook a comprehensive assessment of the western Arctic bowhead whale population. The Committee reviewed the results of recent and ongoing photogrammetric studies, ice-based censuses, subsistence catches, and carbon isotope baleen aging studies. In combination, these results provided new information suggesting that: individual growth is slower, and age at first parturition (*i.e.*, female sexual maturity) is later, than previously thought (13-17 years instead of 9 years); age at recruitment into the exploitable population is from 1 to 7 years; the average calving interval is probablyb about 4 years; the proportion of immature animals in the population is 0.44 to 0.65, which is indicative of a recovering population; and the net rate of population increase for the period 1978 to 1988 was 3.1 percent per year.

The Scientific Committee estimated that, in 1988, the western Arctic bowhead whale population numbered approximately 7,500 animals (95 percent confidence interval of 6,400 to 9,200 animals). The initial pre-exploitation (1848) population was estimated to have numbered 12,400 to 18,200 animals. Although the Scientific Committee was unable to define the maximum sustainable yield (MSY) level, it concluded that the current depletion level (current/historic population size) is likely between 0.44 and 0.65 and that the stock, therefore, may be closer to its MSY level than previously thought. In addition, the Scientific Committee estimated that from 1978 to 1988, the population increased at an average of 3.1 percent per year (95 percent confidence interval 0.1 to 6.1 percent per year).

Assuming no dramatic changes in the environment or in the age composition of the catch, the Scientific Committee estimated that the annual replacement yield (*i.e.*, the number of animals that could be replaced by population growth if taken from this population) would be 254, with 92 whales being the lower bound of the estimate's 95 percent confidence interval. The Scientific Committee concluded that the expected Native subsistence kills of 41 to 54 whales per year, by themselves, should not prevent recovery of this stock. It noted, however, that other factors (*e.g.*, environmental change, pollution, noise disturbance from offshore oil and gas resource development, etc.), combined with the subsistence take, could have cumulative effects that might prevent or delay the stock's recovery.

The Scientific Committee noted that the distribution and known feeding areas of the western Arctic bowhead whale population include areas that have been, and are likely to be, leased for oil, gas, and other mineral resource exploration and development. Although a great deal of research has been undertaken to identify and assess the possible effects of such

Table 7. Quotas and Number of Bowhead Whales Taken by Alaska Eskimos, 1973 - 1991[1]

	IWC Quotas[2]		Number Taken			
Year	Landings	Strikes	Landed	Struck But Lost	Total Struck	Percent Struck Landed
1973	(No Quotas)		37	10	47	79
1974	(No Quotas)		20	31	51	39
1975	(No Quotas)		15	28	43	35
1976	(No Quotas)		48	43	91	53
1977	(No Quotas)		26	82	108	24
1978	14	20	12	6	18	67
1979	18	27	12	15	27	44
1980	18	26	16	18	34	47
1981	17	27	17	11	28	61
1982	17	27	8	11	19	42
1983	17	27	9	9	18	50
1984[3]	—	43	12	13	25	48
1985	—	26	11	6	17	65
1986	—	26	19	9	28	68
1987	—	32	22	9	31	71
1988	—	35	23	6	29	79
1989	41	44	18	8	26	69
1990	41	47	30	14	44	68
1991	41	44	27	17	44	61

1 Cited quotas provided by the International Whaling Commission, Cambridge, England; data on the number of whales taken provided by the National Marine Fisheries Service.

2 In establishing quotas for both landings and strikes, the International Whaling Commission stipulated that whaling should cease whenever the number of whales landed or the number of strikes reached the specified number, whichever came first.

3 For the years 1984 through 1988, quotas were set for strikes only.

activities, particularly the short-term response of bowhead whales to noise associated with resource development, the potential long-term effects on the whales and their habitat remain uncertain. The Scientific Committee, therefore, recommended that "[R]egulatory agencies in the USA should expand efforts to monitor the status of the Bering-Chukchi-Beaufort Seas stock of bowhead whales to detect possible adverse effects of industrial/petroleum activities."

Research Planning and Coordination

The Marine Mammal Commission has played a major role in planning and coordinating bowhead whale research. Following the June 1977 meeting of the International Whaling Commission mentioned earlier, the Marine Mammal Commission recommended that the National Marine Fisheries Service expand its bowhead whale research program. As noted in previous Annual Reports, the research plan subse-

quently developed by the Service was judged inadequate and, on 2 September 1977, the Commission convened a group of experts to critically review the plan. The Commission subsequently developed and, on 14 September 1977, transmitted a recommended research program to the Service. The Service modified and adopted this plan and presented it at the December 1977 meeting of the IWC in support of the U.S. pledge to undertake a comprehensive research and monitoring program. Also, the Bureau of Land Management (which later relinquished authority over offshore mineral resources to the Minerals Management Service) initiated a bowhead whale research program in 1978 in response to consultations with the National Marine Fisheries Service pursuant to section 7 of the Endangered Species Act. At issue were the possible effects of offshore oil and gas exploration and development on bowhead whales and how best to address the matters.

Between 1978 and 1981, the Marine Mammal Commission recommended and helped to organize research reviews and coordination meetings. The meetings were designed to avoid duplication and to coordinate research being planned or supported by Federal agencies (particularly the Bureau of Land Management and the National Marine Fisheries Service) and other groups. By letter of 11 January 1982, the Marine Mammal Commission recommended that the National Marine Fisheries Service's Alaska Regional Director assume responsibility for convening regular coordination meetings of all researchers and sponsors before the start of each spring bowhead whale research season.

In subsequent years, formal coordination meetings were not always held. It was not clear that everything necessary was being done to ensure that bowhead whale studies continued to be well-designed and properly coordinated. For example, a representative of Alaska's Native community raised questions during the Commission's 1989 annual meeting in Monterey, California, as to whether the objectives of a contract study being supported by the Minerals Management Service were realistic, given the described study design, and whether this study would interfere with other ongoing studies and adversely affect both the whales and the annual subsistence hunt by Alaska Eskimos.

In its 20 March 1989 letter commenting on the permit application for the Minerals Management Service contract study, the Commission recommended that the National Marine Fisheries Service issue the permit with the condition that the funding agency (the Minerals Management Service) constitute a quality review board to review the proposed study design and recommend needed modifications. A Scientific Review Board was subsequently constituted and now meets twice each year to review the results of the preceding season's research and plans for the forthcoming season. The board will meet in February 1992 to review the results of the 1991 season and the plans for the program's final season in 1992.

Although bowhead whale research planning and coordination meetings were not held before the 1990 and 1991 research seasons, representatives of the National Marine Fisheries Service and the Service's National Marine Mammal Laboratory met in early spring in Barrow, Alaska, with representatives of the Minerals Management Service's contractor hired to conduct bowhead whale studies and with representatives of the Native community to organize and coordinate the 1990 and 1991 research programs with the Native hunt and other planned research.

Research activities planned for spring 1992 include aerial photogrammetric surveys directed by the National Marine Mammal Laboratory staff, an ice-based census directed by the North Slope Borough staff, and continuation of sound playback studies supported by the Minerals Management Service. Disruptions resulting from these activities, by themselves and in conjunction with noise and other disturbances from industry exploration for oil and gas resources off Alaska (see Chapter VIII), could affect the bowhead whale's spring migration past Barrow, Alaska, and the availability of bowhead whales for the Native subsistence hunt. Also, these programs could result in mutual interference and inefficient use of logistic support if not coordinated effectively. Therefore, the National Marine Fisheries Service has proposed a formal program coordination meeting for January 1992 to discuss research plans and field requirements, aerial and ice safety procedures and communication, and geographic overlap between the aerial surveys, the ice census, and the Native subsistence hunt.

The National Marine Fisheries Service has lead U.S. responsibility for identifying, encouraging, and coordinating research necessary to ensure that human activities do not adversely affect bowhead whales or their habitat. Therefore, in its 5 December 1991 letter to the U.S. IWC Commissioner (see Chapter IV), the Marine Mammal Commission recommended that the Service undertake or cause to be undertaken research called for by the IWC to monitor the status of this population and the effect of the subsistence harvest on its continuing recovery. The Marine Mammal Commission also recommended that the National Marine Fisheries Service develop a recovery plan to guide research and recovery efforts for the western Arctic bowhead whale population.

Small-Take Exemption

On 18 July 1990, the National Marine Fisheries Service published in the *Federal Register* a final rule authorizing the incidental, non-lethal take of six species of marine mammals, including the bowhead whale, with no specified limit on the numbers of animals that can be taken, incidental to oil and gas exploration activities in the Beaufort and Chukchi Seas from 1990 to 1995. The Commission's comments on this rule and subsequent requests by industry groups for letters of authorization to take bowhead whales are described in Chapter VIII.

In 1992, the Marine Mammal Commission will continue to review matters related to bowhead whales and advise the National Marine Fisheries Service, the Minerals Management Service, and other involved agencies and groups on further actions that may be necessary to protect and encourage the recovery of the western Arctic bowhead whale population.

Gray Whale
(*Eschrichtius robustus*)

The gray whale is the sole member of the family Eschrichtiidae. It breeds, feeds, and migrates primarily in coastal waters of the continental shelf. Its presence in nearshore waters exposes the gray whale to industrial, recreational, and other human activities throughout most of its range.

There are two recognized stocks of gray whales — the western North Pacific (Korean) stock, which is severely depleted, and the eastern North Pacific (California) stock, which has recovered from severe depletion caused by over-exploitation. Although commercial hunting of both stocks is prohibited, the eastern North Pacific stock is subject to an annual subsistence harvest in the Chukchi Sea.

Each year, virtually the entire eastern North Pacific gray whale population migrates between major summer feeding grounds in the Bering and Chukchi Seas and winter breeding grounds in the nearshore waters, bays, and lagoons of southern California and Baja California, Mexico. Following discovery of the principal breeding lagoons along the Pacific coast of Baja California by commercial whalers, the population was severely depleted in the 1850s and 1860s. A second period of commercial whaling using factory ships further depleted the stock in the early 1900s.

By 1946, when the International Convention for the Regulation of Whaling afforded the stock protection from commercial whaling, gray whales were believed to number no more than a few thousand animals. In 1970, additional protection was provided when the species was designated as endangered under the Endangered Species Conservation Act of 1969, the predecessor to the Endangered Species Act of 1973. By virtue of this listing, the species is also considered depleted under the Marine Mammal Protection Act.

Since commercial whaling for gray whales was prohibited, the eastern North Pacific population has grown to approximately 21,000 animals and appears to be still increasing. Past analyses suggested the pre-exploitation population size was between 15,000 and 24,000 animals. However, a more recent analysis suggests that the pre-exploitation level could have been as high as 35,000 animals. In response to its continuing recovery, the International Whaling Commission (IWC) in 1978 reclassified the eastern North Pacific gray whale from a protected stock to a sustained management stock. Since 1986, under a subsistence quota set by the IWC, 179 gray whales have been taken annually by the Soviet Union on behalf of its Siberian Natives.

Despite its numerical recovery and evidence that the population may be approaching carrying capacity, the gray whale's nearshore presence exposes it to many threats from habitat degradation and direct physical harm resulting from human activities. Commercial fishing, offshore oil and gas exploration and development, commercial shipping, whale-watching, recreational boating, and military activity pose threats to feeding, breeding, and migratory habitats essential to the survival of the species and to individual whales.

Comprehensive Assessment of Gray Whales

As noted in the Commission's 1990 Annual Report, the IWC conducted a comprehensive assessment of the status of the two extant gray whale populations at a special meeting of its Scientific Committee on 23-27 April 1990. Participants at the meeting concluded that, although recent sightings of gray whales in the area suggest that the western North Pacific population may be recovering slowly, it remains severely depleted. They recommended that research be undertaken cooperatively by the Soviet Union, Japan, the Republic of Korea, the People's Democratic Republic of Korea, and the People's Republic of China to better determine the distribution, abundance, and possible increase of the western North Pacific population.

With regard to the eastern North Pacific (California) population, the participants concluded that the best estimate of population size was a 1988 estimate of 21,113 animals (standard error 688). They also estimated that, between 1968 and 1988, the population had increased at an average annual rate of 3.2 percent (standard error 0.5 percent), despite an average annual Soviet subsistence catch of 166 whales per year during this period. Recognizing the threats posed by coastal development and industrial activity, the participants recommended that the responsible governments continue population censuses and initiate other studies, as necessary, to detect and monitor changes in productivity and other key population parameters.

Endangered Species Status Review

Section 4(c)(2) of the Endangered Species Act requires that a status review of listed species be conducted at least once every five years to determine whether any species should be removed from the list or reclassified as endangered or threatened. The National Marine Fisheries Service conducted status reviews of endangered whales, including gray whales, in 1984 and in 1990. The Service's 1984 review concluded that a potential threat to the California gray whale population may be increasing industrial development and vessel traffic in the calving lagoons and in other vital habitats along the migration route and on the feeding grounds. After taking into account the considerable and continuing growth of the population, the Service concluded that, although the population was no longer endangered, threats to critical feeding and breeding areas and migratory corridors warranted its listing as threatened. The Service also concluded that the western North Pacific stock had not recovered and should remain listed as endangered.

The National Marine Fisheries Service's 1990 status review of endangered whales again noted the numerical recovery of gray whales. It concluded, however, that the California stock has recovered to near its original population size and is neither in danger of extinction throughout all or a significant portion of its range, nor likely to become endangered again within the foreseeable future.

Proposal To Remove the Eastern North Pacific Gray Whale Population from the Endangered Species List

In light of the National Marine Fisheries Service's 1990 status review, the Northwest Indian Fisheries Commission petitioned the Service on 1 March 1991 to remove the eastern North Pacific population of gray whales from the List of Endangered and Threatened Wildlife. The petitioners argued that the population's recovery to 21,113 animals and its continuing increase merited removal from the list. The petitioners claimed that leaving gray whales on the list subjected users of living marine resources to unwarranted restrictions and penalties and jeopardized the credibility of the Endangered Species Act.

On 15 July 1991, the Service sent the Commission a draft *Federal Register* notice proposing to remove the eastern North Pacific gray whale popula-

tion from the List of Endangered and Threatened Wildlife, while retaining the western North Pacific population on the list as endangered. The draft notice cited information indicating that the eastern population is equal to or greater than its historical stock size in 1846, and the population has been increasing at a rate of 3.2 percent per year since the early 1960s. It also noted that the western North Pacific population is geographically isolated from the eastern population and shows no signs of recovery.

On 21 August 1991, the Commission advised the National Marine Fisheries Service that it agreed that the eastern North Pacific gray whale population had recovered to near its estimated historic size. It noted, however, that the population occupies coastal waters of four nations — the Soviet Union, Canada, the United States, and Mexico — and that ongoing and foreseeable human development in all four countries must be considered to accurately assess the possible threats to the population and habitats critical to its survival. In this regard, the Commission pointed out that, if the eastern North Pacific gray whale population were removed from the endangered list, major Federal actions, such as oil and gas resource development and coastal development, that could adversely affect gray whales and their habitats would proceed without benefit of Endangered Species Act section 7 consultations, and that equivalent habitat protection could not be achieved under the Marine Mammal Protection Act.

The Commission therefore recommended that the Service: (1) identify and assess present and foreseeable threats to the principal breeding lagoons, feeding grounds, and other areas of special biological importance to the species; (2) explain why such threats are no longer considered justification for a threatened designation, as the Service concluded in 1984; (3) review all Biological Opinions issued pursuant to section 7 of the Endangered Species Act to determine how removal from the list or down-listing gray whales to threatened status might affect implementation of identified reasonable and prudent alternatives or other conservation measures described therein; and (4) describe the specific actions that the Service would take to ensure that human activities do not damage or degrade habitat essential to the population.

On 22 November 1991, the National Marine Fisheries Service published a proposed rule in the *Federal Register* to remove the eastern North Pacific (California) population of gray whales from the List of Endangered and Threatened Wildlife. In its notice, the Service noted that the eastern North Pacific gray whale population has recovered to near or above its estimated pre-exploitation population size, or approximately 88 percent of its carrying capacity, and is probably still increasing. In addition, the Service noted that a number of studies since 1984 suggest that, while cumulative impacts from oil and gas activities may affect the eastern North Pacific gray whale population, they are not likely to jeopardize the population's continued existence. It concluded that the population had recovered to near its estimated original population size and was neither in danger of extinction throughout all or a significant portion of its range, nor likely to become endangered again within the foreseeable future.

The proposed rule further noted that section 4(g) of the Endangered Species Act requires that, whenever a species has recovered to a point where protective measures provided under the Act are no longer necessary, the Secretary must implement a system to monitor the status of that species for five years. The proposed rule stated that, as part of its gray whale monitoring program, the National Marine Fisheries Service would create a panel of gray whale experts to monitor activities potentially affecting gray whales, serve as a quick-response advisory team in the event of a catastrophic event affecting gray whales, recommend actions to mitigate any unforeseen catastrophic events, including the reimposition of emergency protective measures, and, within six months following the conclusion of the first five-year monitoring program, conduct a comprehensive status review to determine whether the monitoring program should be continued and/or the gray whale population should be relisted under the Endangered Species Act.

On 25 November 1991, the National Marine Fisheries Service replied to the Commission's 21 August 1991 comments on the draft *Federal Register* notice. The Service reaffirmed its view that, while individual and cumulative impacts from human activities throughout the range of the eastern North Pacific gray whale population may have the potential to ad-

versely affect this population, such impacts were not likely to jeopardize its continued existence. The Service, therefore, believed that the population should be removed from the List of Endangered and Threatened Species, not merely down-listed to threatened.

At the end of 1991, the Marine Mammal Commission was reviewing and preparing comments on the proposed rule to be sent to the Service early in 1992. Based on its preliminary review, the Commission anticipates recommending that the eastern North Pacific gray whale population be down-listed to threatened rather than being removed from the list unless the National Marine Fisheries Service can (1) provide assurances that habitat degradation and destruction do not present significant threats to the survival of the population, (2) develop and undertake a program to effectively assess and monitor essential habitat, as well as the population's status and trends, throughout its range, or (3) have the Marine Mammal Protection Act amended to provide a mechanism for protecting essential habitats.

Killer Whale (*Orcinus orca*)

Killer whales are found in all the world's oceans and major seas from polar to equatorial latitudes. Although most common in colder waters, they occur in both coastal and pelagic areas and may be found in any area in all seasons. Two new killer whale species (*O. nanus* and *O. glacialis*) in Antarctic waters have been proposed based on size and color differences. However, the IWC has determined that these are probably different forms of a single, highly variable species, *O. orca*.

Killer whales are highly social. Individual whales form long-term associations along maternal lines. The basic social unit is the "pod." Most pods contain 5 to 20 animals, although some may have as few as two or three whales and others more than 100 animals. In the United States, killer whales are most common in Puget Sound, Washington, and the coastal waters of Alaska. While the species is not considered endangered or threatened in any ocean or region, its highly organized pod structure could make local groups vulnerable to adverse impacts.

In the past, commercial whalers took some killer whales; however, exploitation was typically opportunistic and never large-scale. The most recent commercial take of killer whales was by Soviet whalers in the Antarctic in 1979-1980.

Since the early 1960s, killer whales also have been taken live for public display in oceanaria and zoos. Killer whales were taken for this purpose from coastal waters of British Columbia and Puget Sound from 1962 to 1976. A permit to take killer whales in Alaska waters for public display was issued in 1983. In response to a lawsuit, however, the permit was ruled invalid in 1985 because it had not met requirements of the National Environmental Policy Act. As a result, no animals were taken. Since the mid-1970s, most animals taken for public display have been from waters off Iceland.

As a top-level predator, killer whales feed on other marine mammals, including large whales, dolphins, and seals, as well as seabirds, turtles, and fish. Their prey includes species of fish taken commercially. In some areas, killer whales are attracted to commercial fishing operations where they damage catch and gear. As a result, some fishermen consider killer whales as competitors and nuisance animals. In some regions, they have been the target of culling programs to reduce interference with fishing operations.

In the United States, killer whales are known to interact with the blackcod, or sablefish, longline fishery in waters off Alaska. In the 1960s, Japanese longline fishermen operating off the Aleutian Islands began noticing killer whales removing or damaging hooked fish as lines were retrieved. Beginning in 1985, longline fishermen in Prince William Sound reported similar interactions. Field surveys in Prince William Sound in 1986 suggested that fishermen lost more than 20 percent of their catch to killer whales.

A variety of techniques have since been tried to eliminate such interactions. Fishermen have tried acoustic harassment (*e.g.*, "bang pipes" and seal bombs) and working in teams with vessels alternately retrieving lines. None of the approaches, however, has been effective.

Fishermen also tried large explosive charges and shooting whales. Until the mid-1980s, such measures were permissible under the Marine Mammal Protection Act's incidental take permits for commercial fishermen to allow them to protect gear, catch, or human safety. The results were apparently mixed, providing fishermen only temporary relief at best. In this regard, studies of killer whale pods in Prince William Sound between 1985 and 1986 documented at least eight gunshot wounds and a high annual mortality (more than seven percent) in one pod known to interact with fishing operations. In response, in July 1986, the National Marine Fisheries Service amended incidental take permits to prohibit the use of explosives on or the shooting of any cetacean as a way to prevent interactions with fishing gear or catch.

Interactions between whales and longline fishing in Prince William Sound and along the Aleutian Islands have continued, and recent reports indicate that whales sometimes take halibut and Pacific cod from longlines in Alaska waters.

As noted in Chapter VII, killer whales also may have been affected by the *Exxon Valdez* oil spill. In one Prince William Sound pod, six animals, known to have been in the pod a few months before the spill, had disappeared when observers documented pod composition a few weeks after the spill. Another seven animals disappeared from the pod the following year.

Also, as noted in Chapter VII, populations of some marine mammals that serve as prey for killer whales have declined greatly in parts of Alaska. It is uncertain what effect this may be having on killer whale predator-prey relationships or population dynamics. However, recent shifts in killer whale distribution and behavior in some regions, such as Bristol Bay, have been noted and may be due, at least partially, to these changes.

In view of these issues and the need to consider what further actions, if any, should be taken to address research and management needs regarding killer whales in Alaska, the Commission contracted in 1991 for a study to develop a species account with research and management recommendations on killer whales. The report will be added to the series of Commission-sponsored species reports on Alaska marine mammals (see Appendix B, Lentfer 1988). The report on killer whales is expected to be completed in the spring of 1992, at which time the Commission, in consultation with its Committee of Scientific Advisors, will consider a range of recommendations that may be appropriate to make to the National Marine Fisheries Service or other Federal agencies.

Gulf of California Harbor Porpoise (*Phocoena sinus*)

The endangered Gulf of California harbor porpoise, or vaquita, is found only in the northern Gulf of California in northwest Mexico. It is one of the smallest, rarest, and least known of all cetaceans. The species was first described taxonomically in 1958. Prior to 1984, it was known from only 20 confirmed reports. Between 1986 and 1989, aerial and boat surveys by researchers from the University of California at Santa Cruz sighted 110 animals (although a number of these may have been resightings). To date, no reliable population estimates exist. Given so few sightings, the species may number no more than a few hundred individuals.

As noted in previous Annual Reports, the Commission has encouraged and supported vaquita research and conservation efforts. In 1976 and again in 1979, the Commission provided funding for surveys to determine the distribution of the species (see Appendix B, Wells *et al.* 1981). In the mid-1980s, the Commission provided support to locate the remains of dead animals along the shores of the northern Gulf of California and to train Mexican students to identify, collect, and prepare museum specimens of the species. In 1987, the Commission supported a study of environmental contaminants present in blubber samples of vaquitas incidentally caught and killed in fishing gear. The results of this study

suggested that, at that time, pollutants were not a significant threat to the vaquita.

The greatest known threat to the vaquita appears to be incidental catch in gillnets, especially large-mesh nets used in fisheries for the endangered totoaba (*Totoaba macdonaldi*), other finfish, sharks, and sea turtles. The totoaba fishery began in the mid-1920s and peaked in the 1940s. By the early 1970s, the totoaba catch had declined so dramatically that the Mexican Government closed the fishery in 1975 to allow the recovery of the stock. Nevertheless, illegal totoaba fishing continues, and vaquita mortality due to incidental take is still high. To assess the status of the totoaba stock, the Mexican Government began authorizing experimental gillnet fishing in 1985. Between 1985 and 1991, at least 121 vaquitas were reported killed in fishing nets, including at least 52 in the experimental totoaba fishery. Due to under-reporting by fishermen, however, the true number is probably much greater.

Several protective measures have been taken for both the vaquita and the totoaba. Both are listed under Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) — the totoaba in 1977 and the vaquita in 1979. In 1978, the Government of Mexico designated the vaquita as rare and in danger of extinction. That same year, the International Union for the Conservation of Nature and Natural Resources (now called the World Conservation Union) listed the species as vulnerable in its *Red Data Book*. It is presently listed as endangered. In 1979, the totoaba was listed as endangered under the U.S. Endangered Species Act; following a recommendation by the Marine Mammal Commission, the vaquita received the same designation in 1985.

In 1988, a study of fishermen's knowledge of and interactions with the vaquita in the northern Gulf of California was conducted by the Center for the Study of Deserts and Oceans in Tucson, Arizona, in cooperation with the Universidad Nacional Autonoma de Mexico. The study concluded, among other things, that all reported takes occurred in waters less than 160 feet deep and estimated the annual fishery-related mortality of vaquita at about 32 animals. The study report recommended: (1) closing certain areas to gillnet fishing; (2) explicitly prohibiting all sale of totoaba; and (3) developing (a) economic alternatives for gillnet fishermen, (b) public education programs focusing on conservation of marine resources in the northern Gulf of California, and (c) a management plan for the vaquita.

Also in 1988, the Cetacean Specialist Group of the World Conservation Union's Species Survival Commission published an action plan for conserving the biological diversity of cetaceans throughout the world. The plan proposed, among other things, a three-year project for research and conservation of the vaquita. The Cetacean Specialist Group considered the vaquita project among those deserving the very highest priority. The project would include: (1) a population monitoring program, including vessel-based censuses; (2) a program to monitor incidental take by fisheries; (3) examination of vaquita carcasses; (4) a public awareness program; and (5) a recovery plan for the species. In 1990, the Cetacean Specialist Group, with partial support from the Marine Mammal Commission, established an office at the National Marine Fisheries Service's Southwest Fisheries Science Center in La Jolla, California, to help implement action plans for the vaquita and other species. The office moved in 1991 to Texas A&M University in Galveston.

In October 1990, the Workshop on the Mortality of Cetaceans in Passive Fishing Nets and Traps was convened at the request of the International Whaling Commission. The Marine Mammal Commission gave partial support to the workshop, which reviewed the worldwide incidental take of cetaceans in fishing gear. Workshop participants noted that the vaquita's future is seriously threatened by illegal totoaba fishing and other gillnet fisheries and that inadequate enforcement and a lack of economic alternatives for gillnet fishermen were exacerbating the problems.

On 10-20 May 1991, the IWC's Scientific Committee met in Reykjavik, Iceland. At the meeting, the Scientific Committee endorsed several recommendations concerning the vaquita forwarded by its subcommittee on small cetaceans. Affording the vaquita the highest priority of any endangered cetacean species, the full Scientific Committee recommended that action be taken to fully enforce the closure of the totoaba fishery and immediately halt illegal shipments of

totoaba into the United States. The Committee also recommended that a management plan for the vaquita and its habitat be developed to include: (1) an evaluation of incidental take of vaquita in fisheries; (2) development of alternative fishing methods and other economically viable activities to reduce further vaquita mortality in the illegal totoaba fishery; (3) development of educational programs to increase awareness of the vaquita among fishermen and the general public; and (4) monitoring the status and improving knowledge of the population biology of the species.

Acting on the advice of its Scientific Committee, the International Whaling Commission adopted a resolution asking the Committee to collect information on small cetacean species, including the vaquita, that are subject to significant direct or incidental take in fisheries. The results of this work were forwarded to the United Nations for use in preparing for its Conference on Environment and Development scheduled to meet in Rio de Janeiro, Brazil, on 1-12 June 1992 (see Chapter IV).

On 11-14 September 1991, researchers at the Southwest Fisheries Science Center undertook a cooperative research program with the Instituto Nacional de Pesca, La Paz, Mexico, to conduct an experimental aerial survey of vaquita habitat. The survey covered 709 miles over three and one-half days during which one certain sighting of two vaquitas was made. Because of the low number of sightings, the survey methods, the turbidity of the water at the time of the survey, and the extent of vaquita habitat not covered by the survey, the survey did not result in a reliable estimate of the vaquita population. The researchers recommended that a much larger scale survey be conducted, either by air or, preferably, by ship, in order to develop a reliable population estimate for the vaquita.

On 1 November 1991, the Marine Mammal Commission wrote to the National Marine Fisheries Service and the Fish and Wildlife Service regarding the status and conservation needs of the vaquita and enforcement of the prohibition on the import of totoaba into the United States. The Commission noted that, since totoaba was listed both as endangered under the Endangered Species Act and on Appendix I of the Convention on International Trade in Endangered Species of Wild Flora and Fauna, its importation into the United States was illegal. The Commission also noted that totoaba imports apparently still occur, often disguised as sea bass, and are most often brought into the United States as fish fillets, a form in which it is difficult to identify the species. The Commission therefore recommended that the Southwest Fisheries Science Center and the Fish and Wildlife Service's Forensics Laboratory coordinate efforts to develop a test to identify totoaba imported into the United States. The Commission also recommended that, once this has been achieved, the Services: (1) establish a cooperative program with Mexico to coordinate enforcement activities for the longstanding Mexican prohibition on totoaba fishing and to stop entry of totoaba into the United States, and (2) establish programs to inform the public about the endangered status of the vaquita and the totoaba, the link between the two species, applicable prohibitions of the Endangered Species Act, and the consequences of violating the Act's provisions.

On 4 December 1991, the National Marine Fisheries Service published a notice in the *Federal Register* that it was issuing a permit to the Southwest Fisheries Science Center for the collection and importation of one whole frozen totoaba specimen. The notice stated that the specimen would be analyzed by the National Seafood Inspection Laboratory to determine distinguishing characteristics of totoaba muscle tissue that would enable the Service to identify totoaba fillets and take measures to stop illegal importation.

A review of all available information on the population biology and incidental mortality of the vaquita was presented at the Ninth Biennial Conference on the Biology of Marine Mammals in Chicago, Illinois, on 5-9 December 1991. The review, conducted at the Instituto Tecnológico y de Estudios Superiores de Monterrey, Mexico, concluded that, given the vaquita's low population size and high rate of incidental mortality and the difficulty in enforcing conservation measures for the species, the vaquita is in imminent danger of extinction.

At the end of 1991, the Commission was awaiting responses to its 1 November 1991 letters to the National Marine Fisheries Service and the Fish and

Wildlife Service and was looking forward to progress in protecting and encouraging recovery of the species.

Harbor Porpoise (*Phocoena phocoena*)

The harbor porpoise, one of the smallest cetaceans, occurs in coastal areas throughout most of the Northern Hemisphere, including Europe, West Africa, the Far East, and both coasts of North America. The species' preference for nearshore waters makes it particularly vulnerable to impacts from human activities, such as coastal fisheries and environmental pollution.

Substantial numbers of harbor porpoises are caught and killed incidentally in domestic fisheries. These include salmon gillnet fisheries off Alaska and Washington; groundfish fisheries in the Bering Sea and Gulf of Alaska; shark and swordfish driftnet fisheries off Washington, Oregon, and California; and set and driftnet fisheries for halibut and other finfish off central California. Harbor porpoises are also taken incidentally in Canadian fisheries operating in waters between Alaska and Washington, and these animals may be from populations being affected by fisheries in United States waters and *vice versa*. On the east coast of North America, harbor porpoises are taken in the groundfish gillnet fishery; in purse seine and weir fisheries for Atlantic herring and mackerel; in shad and sturgeon gillnet fisheries; and in trap and pot fisheries in both U.S. and Canadian waters.

Fisheries impacts on harbor porpoises occur throughout their range. A 1990 report of the subcommittee on small cetaceans of the International Whaling Commission's Scientific Committee noted that incidental take of harbor porpoises may be a problem wherever gillnet fisheries operate in close proximity to harbor porpoises. It further noted that the level of incidental take may be especially high in the North and Baltic Seas.

Until 1983, a large-scale Turkish commercial fishery for harbor porpoises existed in the Black Sea. Although no exact catch statistics exist, the International Whaling Commission estimates that between 1976 and 1983, when the fishery was suspended, the average annual take was between 34,000 and 44,000 animals. Fishermen claim that the Black Sea anchovy fishery is declining due to competition from cetaceans, and the Turkish Government is under great pressure from the fishermen to reopen the cetacean fishery. There are no reliable estimates of the number of harbor porpoises inhabiting the Black Sea.

As noted in the previous Annual Report, in July 1990 the Marine Mammal Commission contracted for a review of abundance estimates of small cetaceans in the Black Sea (see Appendix B, Buckland 1990). The Commission supported the review in response to a 1990 presentation by researchers from the Karadeniz Teknik University in Trapzon, Turkey, to the International Whaling Commission in support of harvesting small cetaceans in the Black Sea. The review, published by the Commission in October 1990, examined data on the abundance of three species of small cetaceans in the Black Sea: harbor porpoise, bottlenose dolphin (*Tursiops truncatus*), and common dolphin (*Delphinus delphis*). The report concluded that the most recent cetacean abundance estimates submitted by the Turkish researchers are unreliable for a number of reasons including, but not limited to, extrapolating the survey data to an estimate of total abundance based on invalid assumptions about the species' distributions. The report recommended, among other things, improving survey and analysis methodologies and conducting regular surveys of the entire sea. It further recommended that, until such improvements are made, current abundance estimates should not be used as a basis for a harvest of Black Sea cetaceans.

The only currently active direct fishery for harbor porpoises is a small fishery in Greenland, where the porpoises are taken for local human consumption. Annual catches since 1982 have been estimated at between 700 and 1,000 animals, from a total estimated population of 10,000-15,000 animals.

In North America, the impact of fisheries on harbor porpoises appears to be particularly severe in waters off the central coast of California and in the Gulf of Maine and the Bay of Fundy. Between 1983 and 1986, for example, an estimated 755 harbor porpoises were taken incidentally in the California set

net fisheries for halibut and other finfish. In the northwest Atlantic, an estimated 300 to 1,500 harbor porpoises are killed each year in the groundfish gillnet fishery. Until 1991, the total estimated harbor porpoise population in the northwest Atlantic was approximately 23,000 animals. A recent survey by the National Marine Fisheries Service's Northeast Fisheries Science Center, discussed below, has led to a revised estimate.

The number, size, discreteness, and productivity of harbor porpoise populations in U.S. waters has not been documented, and it is difficult to judge whether the level of take has caused or is causing one or more populations to be reduced below the maximum net productivity level. As noted in past Annual Reports, in 1986 and 1987 the Marine Mammal Commission provided funds to the University of California at Santa Cruz for a pilot project to radio-tag and track harbor porpoises. The purpose of the study was to obtain information on distribution and movement to help assess the relative discreteness of harbor porpoise populations off the west coast of the United States. The investigators were unable to catch animals, and the research objectives were not met (see Appendix B, Silber *et al.* 1990).

On 8 August 1990, a group of scientists and conservationists in New England wrote to the Marine Mammal Commission to express concern about the status of harbor porpoises in the Gulf of Maine. In the letter, the group noted that a 1981 survey carried out by the New England Aquarium with support from the National Marine Fisheries Service indicated that between 8,000 and 15,300 harbor porpoises were present in U.S. coastal waters in the Gulf of Maine. Based on mortality estimates from various sources, the group estimated that 1,000 harbor porpoises are caught and killed each year in the Gulf of Maine and Bay of Fundy fisheries. The group also noted that studies comparing animals caught in the late 1970s with those taken in 1987 and 1988 indicate a change in population age structure that is characteristic of a declining population.

Based on this information, the group concluded that the harbor porpoise population in the Gulf of Maine is in trouble. It sought the Commission's support for a number of recommended actions aimed at conserving the population. Among other things, the group recommended: (1) listing the harbor porpoise as threatened or endangered under the Endangered Species Act (the species is already listed as threatened by the Canadian Government's Committee on the Status of Endangered Wildlife); (2) repeating the 1982 Gulf of Maine harbor porpoise survey to determine current abundance; (3) analyzing harbor porpoise sighting data collected over the past decade to detect possible trends in relative abundance; (4) closing certain areas to gillnet fishing on a seasonal basis, if necessary, to protect and rebuild the harbor porpoise population; and (5) investigating ways to reduce the incidental take of harbor porpoises in fishing nets.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the letter and, on 10 October 1990, advised the National Marine Fisheries Service that it agreed that there is reason to believe that incidental taking may be having a significant adverse effect on harbor porpoise populations in the northwest Atlantic. The Commission further noted that incidental take in commercial fisheries also may be having a significant adverse effect on harbor porpoises off central California and possibly off Washington and Alaska.

In its letter, the Commission requested, among other things, that the Service advise it of the results of the fishery observer programs and population assessment programs conducted by the Service's Northeast and Southwest Fisheries Science Centers as they pertain to harbor porpoises, and what the Service was doing or planned to do to assess and monitor the status of affected harbor porpoise populations in the northwest Atlantic and along the west coast of the United States. The Commission also noted that effective conservation of harbor porpoise populations would require cooperative efforts with Canada. Therefore, the Commission recommended that, if the Service had not already done so, it consult with the responsible Canadian authorities to develop a coordinated harbor porpoise research and management program.

The National Marine Fisheries Service responded to the Commission's letter on 6 February 1991. In its letter, the Service agreed that more detailed informa-

tion on fishing effort and incidental take of harbor porpoises in the northwest Atlantic and better data analysis were needed to determine the appropriate action or actions to list the harbor porpoise either as depleted under the Marine Mammal Protection Act or as threatened or endangered under the Endangered Species Act. The Service advised the Commission that: (1) it intended to conduct a status review of the harbor porpoise, including local populations; (2) its Northeast Fisheries Science Center was working with Canadian scientists to obtain information on interactions between fisheries and harbor porpoises in the Bay of Fundy; (3) the Atlantic Ocean, Caribbean, and Gulf of Mexico gillnet fisheries for swordfish, tuna, and shark were to be designated as Category I fisheries, which would allow for placement of observers on fishing vessels to gain further information on interactions with harbor porpoises; (4) information from the Service's west coast regions indicates that the situation in the eastern Pacific is not as serious as in the northwest Atlantic; and (5) if a preliminary analysis of the information received indicates that action under section 114(g)(3) of the Marine Mammal Protection Act is warranted, the Service will request the appropriate Fishery Management Council(s) to take steps to mitigate any adverse impacts.

On 12 February 1991, the Service published a notice in the *Federal Register* announcing its review of the status of harbor porpoises to determine whether any distinct population should be listed under either the Marine Mammal Protection Act or the Endangered Species Act, and requesting information and data on the species' status. On 24 May 1991, the Service published a follow-up notice stating that it had determined that there is no information available to indicate that harbor porpoises off the west coast of the United States are below their optimum sustainable population level, and it was therefore terminating its review of the status of harbor porpoises off the west coast. The notice stated that the Service's review of harbor porpoise status in the northwest Atlantic would continue.

On 26-28 March 1991, the Service's Northeast Fisheries Science Center held a program review of its Marine Mammals Investigation program. The Marine Mammal Commission participated in the review. Regarding harbor porpoises in the northwest Atlantic Ocean, the reviewers recommended, among other things, that: (1) the highest priority be given to obtaining reliable estimates of the harbor porpoise population(s) affected by the groundfish gillnet fishery in the Gulf of Maine and Bay of Fundy, including the estimated number of porpoises taken annually; (2) the Service determine the most cost-effective survey design for obtaining the necessary information; and (3) if necessary, funds from lower priority programs be given over to the harbor porpoise program. The reviewers also noted that, in the near future, the Service should give priority to studies of harbor porpoise stock discreteness, abundance, and diet in the northwest Atlantic Ocean.

As a related matter, in June 1991, the National Marine Fisheries Service released a draft legislative environmental impact statement on its Proposed Regime to Govern Interactions Between Marine Mammals and Commercial Fishing Operations. The draft statement discusses the incidental take of harbor porpoises in the North Pacific and North Atlantic Oceans. It notes that the population of harbor porpoises off the west coast of North America may be at its optimum sustainable population level, but that the susceptibility of the species to incidental take in coastal gillnet fisheries is nonetheless a cause for concern. The Service therefore recommended that management actions be taken to protect local harbor porpoise populations.

The Service noted that no optimum sustainable population level has been estimated for the harbor porpoise in the western North Atlantic. Previous estimates of harbor porpoise abundance and estimates of incidental take in the Gulf of Maine, however, suggest that as much as 7.5 percent of the harbor porpoise population is taken incidental to commercial fisheries every year.

On 23 September 1991, the Marine Mammal Commission provided comments to the National Marine Fisheries Service on the draft legislative environmental impact statement. The Commission noted that: (1) the Service's proposed regime to manage marine mammal-fishery interactions was intended to ensure that no marine mammal population would be adversely affected by levels of take authorized under the regime, and (2) this premise appears

to be violated with respect to harbor porpoises because the best available data indicate that there is a relatively discrete population of harbor porpoises in central California that may have been depleted as a result of incidental take in set net fisheries. The Commission therefore recommended that the Service consider the possibility that lower localized harbor porpoise densities are the result of incidental taking (for further discussion of marine mammal-fisheries interactions, see Chapter III of this Report).

Since 1987, the Northeast Fisheries Science Center has been working to develop programs to determine harbor porpoise abundance and incidental take in commercial fisheries in the Gulf of Maine and Bay of Fundy. A program report, published by the Center in December 1991, indicated significantly greater numbers of harbor porpoises and greater relative levels of incidental take than previously estimated.

Two at-sea abundance surveys were conducted in the Gulf of Maine and Bay of Fundy in 1991: a primary survey between 22 July-30 August 1991 and a supplementary survey of inshore bays on the coast of Maine from 3-17 August 1991. The survey used a two-team approach to allow correction for animals not seen on the track line. There were uncertainties in determining the exact number of schools seen by both teams simultaneously and, hence, in determining an exact correction factor. Based on a lower and a higher estimate of duplicate sightings, two separate population estimates were derived: 66,000 and 45,000 animals, respectively.

From June 1989 through May 1991, under contract to the Northeast Fisheries Science Center, the Manomet Bird Observatory in Manomet, Massachusetts, placed observers on commercial groundfish gillnet fishing vessels in the Gulf of Maine to record incidental take of marine mammals, seabirds, sea turtles, and non-target fish species. With observers on just over one percent of commercial fishing trips during the period, 34 harbor porpoises were observed taken incidental to fishing activities. Extrapolation of these data result in preliminary estimates of approximately 1,250 animals per year being caught and killed. This number equals about 2.8 percent per year of the Northeast Fisheries Science Center's lower population abundance estimate and about 1.9 percent per year of the higher estimate.

On 13 December 1991, the National Marine Fisheries Service published a notice in the *Federal Register* announcing that on 18 September 1991 it had received a petition from the Sierra Club Legal Defense Fund on behalf of the International Wildlife Coalition and 12 co-petitioners to list the Gulf of Maine/Bay of Fundy harbor porpoise population as threatened under the Endangered Species Act.

At the end of 1991, the Marine Mammal Commission had not been informed of any further actions regarding the Service's status review of harbor porpoises in the northwest Atlantic. The Commission was also anticipating action by the Service on the petition for protective listing.

Bottlenose Dolphin
(*Tursiops truncatus*)

The bottlenose dolphin is found throughout temperate and tropical waters of the world, commonly in nearshore waters. It is the most common cetacean species in the coastal waters of the southeastern United States, and the cetacean species most frequently maintained in captivity for public display and scientific research. Capture of bottlenose dolphins for these purposes began in the 1900s in the United States. Considerable, though unknown, numbers of animals were taken prior to the enactment of the Marine Mammal Protection Act in 1972. Since that time, when a permit procedure for taking of marine mammals was implemented under the Act, more than 500 bottlenose dolphins have been collected.

Although the status of local or regional populations is often unclear, it is unlikely that captures and removals alone have caused significant declines in the affected dolphin populations. Unusually high numbers of bottlenose dolphins died and washed up on beaches from New Jersey to Florida along the U.S. Atlantic coast in 1987-1988. This happened again in 1990 along the coast of the Gulf of Mexico. (See Chapter V for further discussion of marine mammal strandings and mortality). In addition, unknown but perhaps

significant numbers of bottlenose dolphins are caught and killed in fisheries for menhaden, shrimp, and other species in the coastal waters of the southeastern United States. In some areas, bottlenose dolphins also may be affected by environmental pollution, coastal and offshore oil and gas development, dumping and dredging, and other human activities. The independent and collective effects of the mortality have not been determined. It is therefore possible that one or more local bottlenose dolphin populations have been depleted or that continued incidental taking or taking for purposes of public display or scientific research may have caused one or more local populations to be reduced or maintained below the maximum net productivity level.

Unusually High Mortality and Proposed Depleted Designation

According to population monitoring surveys conducted by the National Marine Fisheries Service, the 1987-1988 die-off of bottlenose dolphins along the east coast of the United States may have reduced the population by as much as 60 percent. As noted in previous Annual Reports, on 11 November 1988, the Center for Marine Conservation petitioned the Service to list the coastal mid-Atlantic migratory stock of bottlenose dolphins as depleted under the Marine Mammal Protection Act. The Service published an advance notice of proposed rulemaking and a request for comments on the proposal on 11 October 1989.

On 21 December 1989, the Commission commented to the Service on the notice. The Commission noted that, in its opinion, the Service would be ill-advised to list the coastal mid-Atlantic bottlenose dolphin population as depleted without, at the same time, describing the steps that would be taken to verify the assumptions upon which the designation was based and to determine when the population no longer was depleted. The Commission recommended also that, before promulgating such a rule, the Service develop and implement a conservation plan for bottlenose dolphins along the U.S. mid-Atlantic coast that, in part, would identify the monitoring programs needed to meet this objective.

On 13 March 1991, the Commission wrote to the National Marine Fisheries Service about a number of issues, including the Service's proposed rulemaking to list the nearshore mid-Atlantic stock of bottlenose dolphins as depleted under the Marine Mammal Protection Act. The Commission noted that the Service had not published a proposed rule and asked about its plans to do so. The Commission also requested that the Service advise it as to what actions it was taking or planning to take to develop and implement the conservation plan for bottlenose dolphins that the Commission had recommended in its 21 December 1989 letter.

In its 25 April 1991 response, the Service noted that: (1) it was completing its review of the status of the northwest Atlantic nearshore stock of bottlenose dolphins; (2) a status determination would be made soon; (3) if a determination were made to designate the stock as depleted, the Service would move quickly to develop a conservation plan; and (4) if a plan should be necessary, the Service would consult with the Commission before convening a team to draft it.

On 15 August 1991, the Service published a *Federal Register* notice proposing to designate the coastal migratory stock of bottlenose dolphins along the U.S. mid-Atlantic coast as depleted under the Marine Mammal Protection Act. On 4 November 1991, the Commission commented on the *Federal Register* notice, noting that the main concerns expressed in its 21 December 1989 letter regarding the proposed listing had not been addressed in the notice. The Commission therefore recommended that the final rule address, among other things, how the Service will determine when the affected population no longer is depleted.

As of the end of 1991, the final rule had not yet been promulgated by the Service.

Live Capture and Removal from the Wild

Bottlenose dolphins are most commonly taken for research or public display from populations in the Gulf of Mexico and the Indian River system along the central east coast of Florida. Because of uncertainties stemming from the previously noted mass mortalities, the Commission advised the National Marine Fisheries

Service on 12 April 1989 that it was suspending consideration of all applications to take bottlenose dolphins from the Gulf of Mexico and the east coast of Florida pending an assessment of the status of the affected populations and the effectiveness of research and management programs to ensure that the affected populations were not disadvantaged by such taking.

Subsequently, the Service provided the Commission with additional information on its research and management programs, including proposed revisions of quotas for Atlantic bottlenose dolphins in southeastern U.S. waters. In a 23 May 1989 letter to the Service on the additional information, the Commission recommended that the Service review available data on bottlenose dolphin surveys, incidental take in fisheries, and chase-and-capture records by age and sex. The Commission also recommended that the Service identify research and monitoring programs required to better define discrete stocks of bottlenose dolphins and the number of dolphins by age and sex being taken incidentally by fisheries.

In its 26 June 1989 reply, the Service noted that it would be desirable to conduct an independent review of survey data and, by letter of 24 November 1989, it addressed the remaining issues raised by the Commission. The Service noted, among other things, that it would develop new quotas to regulate the taking of bottlenose dolphins. In its 28 December 1989 response to the Service, the Commission remarked on a variety of matters, including the apparent inadequacy of planned monitoring efforts to verify that authorized removals, by themselves and in conjunction with other removals, such as incidental take in commercial fisheries, would not cause affected dolphin populations to be reduced below their maximum net productivity levels. The Commission therefore recommended that (1) the Service assess potential effects of cumulative human activities on bottlenose dolphin populations, including types and levels of commercial fishing and levels of incidental take, and (2) the Service provide information on steps being taken or planned to obtain more reliable information on incidental take.

On 16 March 1990, the Commission wrote to the National Marine Fisheries Service regarding the unusually high mortality of bottlenose dolphins in the Gulf of Mexico in January through March of that year. The Commission noted that the cause or causes of the mortality had not yet been determined. It recommended that, given the possibility that the high mortality could have been the result of a contagious disease, live captures and removals of bottlenose dolphins from the Gulf of Mexico be suspended. On 2 April 1990, the Service advised the Commission that all permit holders had voluntarily agreed to suspend capture of bottlenose dolphins in the Gulf for 90 days to allow time to evaluate the die-off.

On 31 May 1990, the Service published in the *Federal Register* a notice of proposed rulemaking to establish regulations and revise quotas for removal of bottlenose dolphins for purposes of public display and scientific research. The Service noted that it was preparing an environmental impact statement on the proposed regulations that would provide a comprehensive review of the population status of bottlenose dolphins off the southeastern coast of the United States. In the same issue of the *Federal Register*, the Service announced that, due to the high dolphin mortality in the Gulf of Mexico, it had adopted conservative interim quotas for the capture of bottlenose dolphins. The Service announced that it would reduce the quota from 91 animals in 1989 to 35 animals for 1990 (of which no more than 17 could be female).

Because information was not sufficient to allow definitive conclusions to be reached about the status of bottlenose dolphins in the Gulf of Mexico, the Service wrote to permit holders on 20 August 1990 asking them not to collect bottlenose dolphins until 1991 or 1992 except in situations where collection is absolutely necessary to maintain a public display. Permit holders agreed and no animals were taken under the interim quotas for 1990 and 1991.

Wild Dolphin Feeding Programs

Beginning in the late 1980s, public feeding of marine mammals in the wild, particularly bottlenose dolphins, and the potential adverse effects that this activity may have on the animals was addressed by the National Marine Fisheries Service. Under regulations issued by the Service in 1991, the feeding of marine mammals was prohibited. For further discussion of this issue, see Chapter X of this Report.

Chapter III

MARINE MAMMAL-FISHERIES INTERACTIONS

Marine mammals may interact with fisheries in a number of ways. They may be disturbed, harassed, injured, or killed either accidentally or deliberately during fishing operations; they may take or damage bait and fish caught on lines, in traps, and in nets; they may damage or destroy fishing gear or injure fishermen while trying to remove bait or caught fish or when they accidentally become entangled in fishing gear; and they may compete with commercial and recreational fishermen for the same fish and shellfish resources.

The Marine Mammal Protection Act directs the Secretaries of Commerce and the Interior, in consultation with the Marine Mammal Commission, to develop regulations governing the incidental taking of marine mammals by persons subject to the jurisdiction of the United States. In 1988, the Marine Mammal Protection Act was amended to establish a five-year interim exemption to govern the taking of marine mammals incidental to commercial fisheries other than the eastern tropical Pacific tuna fishery. Incidental taking of marine mammals in the tuna fishery continue to be regulated under a general permit issued in 1980 to the American Tunaboat Association and legislatively extended in 1984.

The interim exemption was designed to allow commercial fisheries to operate while information is collected on the extent and effects of marine mammal-fisheries interactions. The 1988 Marine Mammal Protection Act amendments also direct the Secretary of Commerce, based upon recommended guidelines provided by the Marine Mammal Commission, to suggest to Congress a new regime to govern incidental taking of marine mammals in fisheries other than the tuna purse seine fishery after the interim exemption expires in October 1993.

Actions with respect to the interim exemption and efforts to develop a system to govern incidental taking in fisheries after October 1993 are discussed below. Also discussed are recent actions regarding the take of dolphins and porpoises incidental to the eastern tropical Pacific tuna fishery. Fishery interactions affecting species of special concern are discussed in Chapter II. Activities concerning high seas driftnet fisheries, which pose serious threats to marine mammals and many other marine species, have been subject to international negotiations and are discussed in Chapter IV.

Interim Exemption for Commercial Fisheries

Subject to certain exceptions, the Marine Mammal Protection Act establishes a moratorium on the taking and importing of marine mammals. Recognizing that a total prohibition of taking could seriously affect certain fisheries, the Act authorizes the Secretaries of Commerce and the Interior, through formal rulemaking, to issue general permits allowing for the taking of marine mammals incidental to commercial fishing operations when such taking would not disadvantage the affected marine mammal species or stocks. The Act was amended in 1981 to allow use of streamlined procedures to authorize the accidental, but not intentional, taking of small numbers of non-depleted marine mammal species and stocks during commercial fishing operations conducted by citizens of the United States if, after notice and opportunity for public comment, the Secretary finds that the total of such taking would have a negligible impact on the affected species or stocks.

In May 1987, the Department of Commerce issued a general permit to the Federation of Japan Salmon

Fisheries Cooperative Association authorizing the take of Dall's porpoises (*Phocoenoides dalli*) in the Japanese North Pacific salmon driftnet fishery. Issuance of the permit was challenged in a lawsuit filed by the Kokechik Fishermen's Association, representing Alaska subsistence fishermen, and several environmental groups. As a result of that litigation, *Kokechik Fishermen's Association* v. *Secretary of Commerce*, the permit was invalidated. The Court ruled that issuance of the single-species permit violated the Marine Mammal Protection Act because other species (*e.g.*, North Pacific fur seals) not covered by the permit would inevitably be caught if the Japanese were allowed to fish as authorized by the permit.

The Court's decision overturned a longstanding National Marine Fisheries Service interpretation of the Marine Mammal Protection Act permit provisions and cast serious doubt on the Service's ability to issue incidental-take permits for other fisheries, including several domestic fisheries whose permits were to expire at the end of 1988. For some fisheries, there was insufficient information to determine which marine mammal species were likely to be incidentally taken. In other cases, it appeared likely that there were insufficient data to make the required showing that the affected marine mammal species and population stocks were within their optimum sustainable population range and would not be disadvantaged (*i.e.*, be reduced below their maximum net productivity level) as a result of the incidental taking. In addition, small numbers of depleted species, for which incidental-take permits could not be issued, were known to be taken incidental to some fisheries.

1988 Amendments to the Marine Mammal Protection Act

In response to uncertainties raised by the *Kokechik* decision, representatives of the fishing industry and environmental community jointly proposed that Congress enact a three-year exemption to the provisions of the Marine Mammal Protection Act to allow the take of marine mammals incidental to certain commercial fisheries. Based largely on that proposal, the Marine Mammal Protection Act was amended in 1988 to provide a limited five-year exemption from the Act's taking prohibition for most commercial fisheries. During the exemption period, which runs until 1 October 1993, the general permit and small-take provisions of the Act do not govern the incidental taking of marine mammals in the course of commercial fishing operations by domestic fishermen or by foreign fishermen fishing pursuant to valid permits issued under section 204 of the Magnuson Fishery Conservation and Management Act. Rather, the incidental take is authorized and regulated in accordance with the exemption provisions of new section 114. Foreign fisheries not regulated under the Magnuson Act, such as the Japanese high seas salmon fishery at issue in the *Kokechik* case, were not included in the exemption. An exception was also made for the yellowfin tuna purse seine fishery, which continues to operate under its present general permit. The goal of the exemption program is to enable commercial fisheries to continue to operate while information essential for long-term management of marine mammal-fishery interactions is developed.

Under the exemption provisions, owners of vessels operating in fisheries identified by the National Marine Fisheries Service as frequently or occasionally taking marine mammals must register with the Service and obtain an exemption certificate in order to engage lawfully in those fisheries. Vessel owners, masters, and crew members are not subject to penalties under the Marine Mammal Protection Act for the incidental take of marine mammals, except for the take of California sea otters or the intentional lethal take of Steller sea lions, cetaceans, or marine mammals from depleted populations, if the owners maintain a current exemption. Unauthorized taking of endangered or threatened marine mammals continues to be a violation of the Endangered Species Act. In addition, if the incidental taking is having an immediate and significant adverse impact on a marine mammal stock or if more than 1,350 Steller sea lions or 50 North Pacific fur seals will be killed during a calendar year, the Service, in consultation with the appropriate regional fishery management councils and state agencies, must prescribe emergency regulations to prevent, to the extent practicable, any further taking.

In order for an exemption to remain valid, the vessel owner must submit a report detailing any instances of incidental taking and providing other information prescribed by the National Marine Fisher-

ies Service. In addition, owners of vessels engaged in fisheries that frequently take marine mammals must, if requested, accept the placement of natural resources observers on board their vessels or face revocation of their exemptions.

Fishermen engaged in fisheries determined to have only a remote possibility of taking marine mammals need not register with the Service or obtain an exemption certificate. They must, however, report all marine mammal mortalities incidental to their operations to avoid being liable for penalties.

The 1988 amendments required the National Marine Fisheries Service to publish, by 22 January 1989, a proposed list of all U.S. fisheries, classifying them as Category I (those with frequent incidental takes), Category II (those with occasional incidental takes), or Category III (those with either a remote possibility of or no known incidental takes). After opportunity for public comment, the Service was to publish a final list by 23 March 1989, along with information advising vessel owners how to obtain exemptions and otherwise comply with the new provisions. Other Service responsibilities included establishing an observer program under which 20 to 35 percent of the operations by Category I vessels would be monitored; creating an alternative observation program if less than 20 percent of the operations in a Category I fishery would be observed; implementing an information management system capable of processing and analyzing observer data and reports required from vessel owners engaged in Category I and Category II fisheries; and consulting with the Fish and Wildlife Service before taking actions or making determinations involving marine mammal species under jurisdiction of the Department of the Interior.

As noted above, the interim exemption was intended to govern marine mammal-fishery interactions for a five-year period. It is expected that, before the interim exemption expires, Congress will re-examine the issue in light of the information gathered under the exemption program, and enact a permanent system for regulating incidental taking. Efforts to develop a new regime to govern the take of marine mammals incidental to commercial fishing operations after 1 October 1993 are discussed in the following section of this Chapter.

Implementation of the Interim Exemption

To implement the interim exemption for commercial fisheries, the National Marine Fisheries Service issued a series of regulations during 1989. Development of those regulations and other actions taken by the National Marine Fisheries Service and others during 1989 and 1990 to implement the interim exemption for commercial fisheries are discussed in the Annual Reports for 1989 and 1990.

One of the continuing responsibilities of the Service is to update, at least annually, the list of fisheries. The initial list of fisheries was published by the Service on 20 April 1989, placing each fishery in one of three categories depending on the frequency with which marine mammals are taken. Based on observer data, fishermen's reports, and other available information, the Service, on 17 July 1990, proposed certain revisions to the list.

The Service proposed to reclassify four fisheries (the Florida east coast shark gillnet fishery, the southern New England/mid-Atlantic inshore squid fishery, the Gulf of Alaska/Bering Sea longline/setline sablefish fishery, and the Oregon sea urchin fishery) from Category III to Category II. The Service also proposed to add the following four fisheries to the list: the Atlantic Ocean swordfish, tuna, and shark gillnet fishery to Category I; the Caribbean and Gulf of Mexico swordfish, tuna, and shark gillnet fishery to Category II; the Gulf of Maine squid trawl fishery to Category III; and the groundfish trawl fisheries in Alaska State-managed waters to Category III. In addition, the Service proposed to revise its listing of the Category I, Alaska Peninsula salmon drift gillnet fishery, keeping the South Unimak portion of the fishery in Category I while placing the remainder of the fishery in Category II.

By letter of 17 August 1990, the Commission commented on the proposed revisions. The Commission noted that it had not been consulted prior to publication of the proposed changes as required by section 114 of the Marine Mammal Protection Act and requested that such consultations be conducted as part of future re-examinations of the list.

Applicable regulations set forth two bases for placing a fishery in Category I — a specific directive from Congress or the existence of "documentary evidence" demonstrating a frequent take of marine mammals. The Commission had previously recommended that the Service use the best available information when categorizing a fishery, whether or not the level of take has been "documented." In its 17 August 1990 letter, the Commission again noted that, in some instances, the Service should place fisheries in Category I based on analogy to other Category I fisheries because of a similarity in gear type, fishery location, *etc.* By analogy to the Atlantic Ocean swordfish, tuna, and shark gillnet fishery, the Commission recommended a Category I listing for the Caribbean and Gulf of Mexico gillnet fishery for these species despite the absence of "documentary evidence" on the level of incidental take in those areas.

The Commission also noted that some Category III fisheries, such as the shrimp trawl and menhaden purse seine fisheries off the South Atlantic and Gulf states, may take marine mammals only rarely in individual fishery operations, but, because a large number of operations are conducted, may cumulatively have significant adverse effects on marine mammal populations. The Commission therefore recommended that, unless available information is sufficient to show that the take in these fisheries is negligible, they be upgraded to Category II fisheries so as to require registration and reporting to obtain needed information on fishing effort and incidental take rates. The Commission cautioned that, without such information, it may be difficult to justify authorizing a take under the new management regime being developed to govern the incidental take of marine mammals after 1 October 1993.

The revised list of fisheries was published by the Service on 7 February 1991. As proposed, the Florida east coast shark gillnet fishery, the southern New England/mid-Atlantic inshore squid fishery, and the Gulf of Alaska/Bering Sea longline/setline sablefish fishery were placed in Category II. Also as proposed, the groundfish trawl fishery in Alaska State-managed waters was added to the list as a Category III fishery.

The Service determined that the Atlantic Ocean swordfish, tuna, and shark gillnet fishery and the Caribbean and Gulf of Mexico swordfish, tuna, and shark gillnet fishery should be treated as a single fishery. The combined Atlantic Ocean, Caribbean, and Gulf of Mexico gillnet fishery for swordfish, tuna and shark was placed in Category I. The Alaska Peninsula salmon drift gillnet fishery, including the South Unimak portion of that fishery, was moved from Category I to Category II. However, the South Unimak fishery was listed separately to improve monitoring of incidental take in that fishery. The Prince William Sound set gillnet fishery was also downgraded from a Category I to a Category II fishery. In light of efforts undertaken by the State of Oregon to reduce the impact of the sea urchin fishery on Steller sea lions, including a public education program and adoption of a 1,000-foot buffer zone around Steller sea lion rookeries, the Service determined that placing the Oregon sea urchin fishery in Category II was not warranted. The Service also determined that squid landed in Gulf of Maine trawl fisheries were primarily caught as bycatch in the groundfish and shrimp trawl fisheries. As such, the Gulf of Maine squid fishery was determined not to warrant inclusion in the list of fisheries.

In August 1991, the Service consulted informally with the Commission regarding possible changes to the list of fisheries for the 1992 fishing season. By letter of 31 August 1991, the Commission provided recommendations to the Service. Among other things, the Commission recommended that, when possible, proposals to reclassify Category I fisheries be accompanied by data on observer effort and the numbers and species of marine mammals taken. The Commission also reiterated its recommendation that certain fisheries, such as the shrimp trawl and menhaden purse seine fisheries off the South Atlantic and Gulf states, which may be having more than a negligible impact on marine mammal stocks, be upgraded to Category II so that more reliable information on fishing effort and marine mammal take rates can be obtained. The Service had planned to have a revised list of fisheries in place by 1 January 1992; however, proposed revisions had yet to be published at the end of 1991.

Under the interim exemption, all vessels participating in Category I or Category II fisheries must

register with the National Marine Fisheries Service and obtain an exemption certificate. At the end of 1989, approximately 10,400 vessel owners had registered for and had been issued exemption certificates. Exemption certificates were renewed automatically by the Service in 1990 and, by the end of that year, nearly 16,000 vessels participating in Category I or Category II fisheries had registered and had obtained exemption certificates. Exemption certificates were renewed in 1991 only if the required reports had been received by the National Marine Fisheries Service. At the end of 1991, 12,194 vessels were registered as participating in Category I and/or Category II fisheries. With the exception of those fisheries added to the list of fisheries in February 1991, the number of vessels registered in nearly all Category I and Category II fisheries declined between 1990 and 1991. It is unknown whether the decline in registration reflects a decline in the number of vessels engaged in commercial fisheries or an increase in the number of vessels participating in fisheries without registering for an exemption.

Fishermen operating in Category I and Category II fisheries must maintain accurate daily logs of fishing effort, including gear type and target species; the number, species, and location of marine mammals taken; type of marine mammal interaction (*e.g.*, disturbance, injury, or mortality); any intentional takes and the methods used to deter marine mammals from gear or catch; and any loss of fish or gear caused by marine mammals. By the end of each year, an annual report, including a copy of the required logs, must be submitted to the Service. Category III fishermen are not required to submit annual reports, but must report all lethal incidental taking of marine mammals to the Service within 10 days after returning from the trip during which the taking occurred.

Regulations setting forth the reporting requirements under the interim exemption did not become effective until 16 January 1990. Even though the reporting regulations had yet to enter into force, some 3,500 annual reports for 1989 were voluntarily submitted, based upon the requirements set out in an earlier published proposed rule. For 1990, the first year of mandatory reporting, just over 10,000 reports were filed. That is, less than two-thirds of the vessels required to submit reports did so. Preliminary data from the 1990 reports indicate that, for the 571,000 fishing days covered, 250,000 marine mammal interactions with fishing gear occurred, 91,600 marine mammals were harassed by fishermen, almost 2,100 marine mammals were injured, and more than 2,600 marine mammals were killed. Some reported interactions may have been very minor and, in some cases, may constitute nothing more than observations of marine mammals in the vicinity of the fishing operation. Gillnet fisheries, which accounted for just over half of the reported fishing effort in terms of the number of days fished, accounted for 70 percent of the reported mortality. Troll fisheries, which accounted for 30 percent of the fishing effort, accounted for about one-half of the reported marine mammal injuries. Extrapolations based on data from the observer program suggest that fishermen's reports may underestimate marine mammal mortality occurring in at least some commercial fisheries. Figures on the number of reports filed by Category I and Category II fishermen for 1991 and on the reported level of incidental take are not yet available.

As discussed above, the 1988 amendments required establishment of an observer program to monitor between 20 and 35 percent of the fishing operations conducted by Category I vessels. Early in 1989, however, it became apparent that funding levels would be insufficient even for minimal (20 percent) coverage of all designated Category I fisheries. In response, the National Marine Fisheries Service established criteria for setting priorities for placing observers in Category I fisheries based upon (1) whether depleted species are taken; (2) the population trends of the species taken in the fishery; (3) the annual take rate of marine mammals, expressed in terms of population percentage; and (4) whether marine mammals for which a quota has been established (*i.e.*, Steller sea lions and North Pacific fur seals) are taken. The Service also decided that, rather than providing straight 20 percent coverage in the top priority fisheries until funds were exhausted, it would consider reduced coverage in some fisheries if reliable estimates of incidental taking could be made from less than 20 percent coverage.

For Fiscal Years 1990 and 1991 the annual authorization for the interim exemption observer program was $7.5 million. While this level of funding was

insufficient to enable the Service to provide 20 to 35-percent coverage for all Category I fisheries, observers were placed on board some vessels in all but one Category I fishery in 1990 and on board some vessels in all Category I fisheries during 1991. Coverage in certain fisheries, however, failed to meet targeted levels. Projected and estimated observer coverage of Category I fisheries under the interim exemption are shown on Table 8.

Development of a New Regime To Govern the Incidental Take of Marine Mammals after October 1993

The interim exemption for commercial fisheries was enacted in 1988 to govern marine mammal-fishery interactions for a five-year period. At the endof the five-year period, it is expected that the interim exemption will be replaced by a new regime with a firm scientific rationale for setting take limits based on sound principles of wildlife management. Congress is expected to begin consideration of the new incidental take regime during the first half of 1992.

The Commission's Recommended Guidelines

As a first step in developing the long-term regulatory regime, the Marine Mammal Commission was directed by the 1988 Marine Mammal Protection Act amendments to make available to the Secretary of Commerce and to the public recommended guidelines to govern the take of marine mammals incidental to commercial fishing operations after the interim exemption expires on 1 October 1993. The amendments required that the guidelines:

"(A) be designed to provide a scientific rationale and basis for determining how many marine mammals may be incidentally taken under a regime to be adopted to govern such taking after October 1, 1993;

"(B) be based on sound principles of wildlife management, and be consistent with and in furtherance of the purposes and policies set forth in this Act; and

"(C) to the maximum extent practicable, include as factors to be considered and utilized in determining permissible levels of such taking —

(i) the status and trends of the affected marine mammal population stocks;
(ii) the abundance and annual net recruitment of such stocks;
(iii) the level of confidence in the knowledge of the affected stocks; and

(iv) the extent to which incidental taking will likely cause or contribute to their decline or prevent their recovery to optimum sustainable population levels."

The Commission began developing proposed guidelines in July 1989, with the goal of transmitting final recommended guidelines to the National Marine Fisheries Service by 1 February 1990. However, when a possible new approach was suggested by members of the Commission's Committee of Scientific Advisors in late 1989, circulation of the draft guidelines for public review was delayed. On 26 January 1990, draft guidelines were circulated to interested parties, including fisheries managers, fisheries groups, and environmental organizations. A notice of availability was also published in the *Federal Register*, inviting public comment. Comments were accepted until 30 March 1990.

The Commission, in consultation with its Committee of Scientific Advisors, considered the numerous comments received on the draft guidelines, revised the guidelines, as appropriate, and, on 12 July 1990, transmitted its recommended guidelines to the National Marine Fisheries Service. Copies of the guidelines were also provided to other interested parties, including commercial fishing organizations and environmental groups. In addition to the recommended guidelines, the Commission prepared and provided to the Service and others a document summarizing all substantive comments it received on the draft guidelines, explaining how they were addressed.

The Commission, in its guidelines, recommended that the legislation to govern the taking of marine

Table 8. Estimated Percent Observer Coverage for Category I Fisheries during the Interim Exemption Period

Fishery	FY 1989 Target[1]	CY 1989 Estimate[2]	FY 1990 Target	CY 1990 Estimate	FY 1991 Target	CY 1991 Estimate	FY 1992 Target
Atlantic Mackerel Foreign Trawl	100	100	100	100	100	100	100
Gulf of Maine Groundfish/Mackerel	10	1.6	10	1.1	10	5[3]	10
Prince William Sound Drift Gillnet	20	0	5	3.9	5	5.0	0[4]
Prince William Sound Set Gillnet[5]	0	0	5	2.7	—	—	—
Alaska Peninsula Drift Gillnet[5]	20	0	5	4.1	—	—	—
Washington Marine Set Gillnet	20	26.9	35	47.1	35	62.4	35
Lower Columbia River Drift Gillnet	0	0	0	0	10	8	10
California Drift Gillnet (Thresher Shark/ Swordfish	10	0	20	4	20	10-11	20
California Set Gillnet (Halibut/Angel Shark)	15	0	20	5-6	20	12	20
Alaska Groundfish (Joint Venture)[6]	100	94	100	60	—	—	—
Alaska Groundfish (Domestic)	20	14	20	54	20	54-60	20
Atlantic Ocean, Caribbean, Gulf of Mexico Gillnet[7]	—	—	—	—	N/A	5-10	N/A

[1] Observer coverage is funded on a fiscal year basis and targeted coverage is for the period 1 October-30 September.
[2] Estimated observer coverage is recorded on a calendar year basis.
[3] Observer coverage for the first six months of 1991 was approximately one percent and approximately ten percent for the last six months of 1991.
[4] The National Marine Fisheries Service plans to propose reclassifying this fishery as Category II and does not plan to place observers in 1992.
[5] These fisheries were reclassified as Category II in 1991.
[6] No joint fishery operations occurred in 1991 and none are expected in 1992.
[7] This fishery was added to Category I in 1991. No specific observer coverage level was established. In FY 1991 and FY 1992, respectively, $168,000 and $75,000 was allocated for the observer program in this fishery.

mammals incidental to commercial fishing after 1 October 1993 do the following:

- re-affirm the Marine Mammal Protection Act's goal to reduce the incidental kill and serious injury of marine mammals in the course of commercial fishing to insignificant levels approaching a zero mortality and serious injury rate;
- reinstate the substantive, although not necessarily the procedural, requirements of the general permit and small-take provisions of the Marine Mammal

Protection Act for marine mammal populations known or reasonably believed to be at their optimum sustainable population levels;

- allow the incidental take of marine mammals listed as endangered or threatened under the Endangered Species Act or designated as depleted under the Marine Mammal Protection Act when: (1) a recovery plan or conservation plan, including an implementation plan, has been developed, adopted, and put in place; (2) the authorized level of take, by itself and in combination with other sources of mortality, is not likely to cause or contribute to a further population decline or cause more than a 10-percent increase in the estimated time it will take for the affected species or population to recover to its maximum net productivity level; (3) ongoing and planned monitoring and enforcement programs are adequate to ensure that the authorized levels of take are not exceeded and to detect any unforeseen effects on the size or productivity of the affected species or population; and (4) there is good reason to believe that the incidental take has been or will be reduced to as near zero as practicable;

- authorize, on an experimental basis, for periods of three to five years, the incidental take from species and population stocks whose status is uncertain when: (1) the authorized level of incidental take clearly would have a negligible effect on population size and productivity; and (2) ongoing or planned assessment, monitoring, and enforcement programs are adequate to ensure that the authorized level of take will not be exceeded, the status of the affected species or population stock will be determined with reasonable certainty within three to five years, and possible ways to avoid or reduce the level of incidental take will be identified and implemented;

- streamline and continue the vessel registration and reporting programs initiated under the 1988 Marine Mammal Protection Act amendments;

- grant explicit authority to the Secretary of Commerce to place observers aboard any commercial fishing vessel operating in U.S. waters; and

- provide necessary funding or authorize the collection of user fees sufficient for observer and other marine mammal monitoring programs.

The Commission noted that one assumption behind the establishment of the interim exemption was that, at the end of the five-year period, sufficient information would be available on the status of marine mammal stocks taken incidental to commercial fisheries and the impact of fisheries on those stocks to enable the Secretaries of Commerce and the Interior to authorize specific levels of take based upon sound principles of wildlife management. In developing its recommended guidelines, the Commission accepted that assumption. However, based on comments received on the draft guidelines, the Commission indicated that it was unlikely that, unless additional population assessments were undertaken by the National Marine Fisheries Service, the information needed to make required status determinations for many marine mammal stocks would be available by 1993. To address this problem, the Commission, in the guidelines, recommended that the Service hold a workshop or series of workshops by early 1991 to (1) review available information on the status of marine mammal stocks and the effects of fisheries and other activities on those stocks; (2) identify what additional information, if any, will be needed to make status-of-stocks and other determinations required to authorize the incidental take of marine mammals by fisheries in U.S. waters after 1 October 1993; and (3) describe the research programs necessary to obtain and analyze that information.

The recommended guidelines also noted that marine mammals may be affected indirectly, as well as directly, by commercial fisheries. To minimize adverse indirect effects, the Commission recommended that the Service promulgate regulations under the Fishery Conservation and Management Act requiring Fishery Management Councils to assess and take into account the food requirements (and uncertainties related thereto) of marine mammals and other non-target species when calculating the optimal yield of fishery resources. Towards this end, the Commission recommended that the Service organize and hold a workshop or series of workshops in 1991 or 1992 to identify and evaluate possible procedures for assessing interactions and ensuring that fisheries do not directly or indirectly disadvantage marine mammal popula-

tions. Among other things, the workshop(s) should consider the establishment of thresholds below which exploitation of fish stocks should be prohibited; guidelines and procedures for addressing uncertainty with respect to the status of and functional relationships among fisheries resources and other components of the ecosystems; and research and management programs needed to fill critical gaps in our knowledge of the structure and dynamics of marine ecosystems.

The National Marine Fisheries Service's Proposed Regime

The 1988 amendments to the Marine Mammal Protection Act directed the Secretary of Commerce, after consultation with the Marine Mammal Commission, Regional Fishery Management Councils, and other interested agencies and organizations, to publish by 1 February 1991 a suggested regime to govern incidental taking after 1 October 1993. The amendments mandated that the suggested regime include proposed scientific guidelines to be used in determining permissible levels of incidental taking, a description of the arrangements for consultations with other agencies and interested parties, and a summary of the regulations and legislation necessary to implement the suggested regime. After consultation with the Commission and consideration of public comment on the proposed regime, the Secretary is to provide to Congress, by 1 January 1992, the suggested regime, recommendations for legislation to implement the regime, and a proposed schedule for implementation.

The National Marine Fisheries Service, on 24 May 1991, published its proposed regime for public review and comment. In addition, a Draft Legislative Environmental Impact Statement on the Service's proposal was made available for public review and comment. In many respects, the Service's proposal closely followed the guidelines recommended by the Commission. Among other things, the Service's proposal would: (1) retain the Act's goal of reducing incidental kill and serious injury of marine mammals to insignificant levels approaching a rate of zero; (2) allow incidental taking from stocks designated as depleted only in compliance with approved conservation plans for such stocks; (3) require vessel owners operating in certain fisheries to register with the Service; (4) prohibit fishing as well as incidental taking absent required registration and incidental take authorization; (5) grant the Service authority to place observers aboard any vessel operating in any commercial fishery; (6) allow assessment of a user fee to cover administrative costs associated with the program; and (7) enable the Service to require fishermen to contribute funding for unusual monitoring requirements associated with some fisheries. The Service proposed that the new regime be implemented over a two-year period beginning in 1993.

The primary difference between the Service's proposed regime and that recommended in the Commission's guidelines was the addition of an allowable biological removal concept. The total removal of animals from a population from all sources, including subsistence takes, taking incidental to commercial fishing and other activities, and taking for public display and scientific research, for any year could not exceed the estimated allowable biological removal level.

Under the Service's proposal, an allowable biological removal would be calculated for each marine mammal stock by multiplying the estimated minimum abundance of the stock by the best estimate of the stock's maximum annual net productivity rate and by a recovery factor, which would vary depending on the status of the stock relative to its carrying capacity. In making these calculations, the Service proposed to use a conservative measure of minimum stock abundance such as the lower limit of the 95 percent confidence interval of the estimated stock size or an actual count of animals. Default values for maximum net productivity rates of six percent for pinnipeds and sea otters and two percent for cetaceans and manatees would be used when specific information on net productivity rates is unavailable. Recovery factors would depend upon a qualitative estimate of a stock's status and would be 0.9 for stocks believed to be above two-thirds of carrying capacity, 0.5 for stocks between one-third and two-thirds of carrying capacity, and 0.1 for stocks below one-third of carrying capacity or for which information necessary to make such a determination is unavailable.

To provide information necessary to calculate allowable biological removal levels, the Service would prepare a stock assessment report for each affected stock at least once every three years. Stock assessment reports would be evaluated by scientific review

groups and would be made available for public review and comment. The life history and population data contained in the final stock assessment reports would be used to calculate the allowable biological removal level.

The allowable biological removal level calculated for each stock would be allocated annually by the Service among the various user groups. The Service proposed to give priority to those takes that it could not control, such as subsistence harvests of non-depleted marine mammals, collisions with ships, and incidental takes by foreign fisheries outside the U.S. Exclusive Economic Zone. All or part of the remaining allowable biological removal would be allocated to "controllable" activities such as commercial fishing, public display, and scientific research. Allocations would be based on an assessment of need, economic impacts, historic take levels, and the ability of the user group to reduce its level of take.

Further division of the portion of the allowable biological removal allocated to commercial fisheries would be made for individual fisheries. The Service proposed to establish Regional Quota Boards comprised of representatives of the Service, the Fish and Wildlife Service, the Marine Mammal Commission, Regional Fishery Management Councils, state fishery agencies, and appropriate Indian tribes, to recommend incidental take quotas for each fishery. The Regional Quota Boards would seek the views of fishing industry representatives, environmental groups, and other interested parties before making recommendations to the Service. Based upon the advice of the Regional Quota Boards, the Service would issue final quotas for each fishery. In no case, however, could the sum of the fishery quotas exceed that portion of the allowable biological removal allocated to commercial fisheries.

By letter of 23 September 1991, the Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, provided the Service with detailed comments on the proposed regime and the associated Draft Legislative Environmental Impact Statement. The Commission noted that most parts of the proposal were conceptually sound, but that, in some cases, the proposal was not explained in sufficient detail to allow critical evaluation. For example, determining a stock's status relative to its carrying capacity level would be one of the key elements in calculating allowable biological removal levels, yet the criteria, minimum data, or procedures that would be used to make such determinations were not presented. These determinations would, in effect, constitute *de facto* judgments of the stock's status relative to its optimum sustainable population. As such, the Commission recommended that they be based upon clearly articulated criteria and be made using procedures that afford an opportunity for full scrutiny of the evidence before the agency, provide for independent review of the data, and require a complete explanation of the rationale for the determinations made.

The Commission also noted that it was not clear how the proposed regime would deal with situations in which marine mammal carrying capacity has been reduced by overharvesting of prey species or other types of habitat degradation or destruction caused by commercial fisheries, coastal development, offshore oil and gas development, or other activities. In addition, while the Service's proposal addressed mortalities and other removals of animals from wild populations, it did not indicate how noise disturbance and other forms of harassment, which may indirectly result in decreased survival and productivity, would be considered.

The Commission also noted problems with the proposed formula for calculating allowable biological removal levels. The Service, in calculating the allowable biological removal level, proposed to use the "best estimate of the stock's net production rate at the population level where net productivity is maximized" even in those situations when the population is known to be declining or the actual growth rate is known to be less than the estimated maximum growth rate and when there is uncertainty as to whether the decline or reduced growth rate is due to some factor other than incidental take by commercial fisheries. Another potential problem with the proposed regime noted by the Commission was its failure to account for the age and sex, as well as the number, of animals that may be taken, when calculating allowable biological removal levels.

Despite claims that the proposed regime was conservative, it would allow the Service to authorize incidental take for indefinite periods of time, even when there may be substantial uncertainties concern-

ing the possible adverse effects of the take on marine mammal stocks. The Commission explained that this was problematic inasmuch as the proposed monitoring programs probably could not detect population declines as great as five to ten percent per year in less than 10 to 20 years. The Commission therefore recommended that the length of time that incidental takes could be authorized without making formal status-of-stocks determinations or verifying that affected populations are increasing toward, or being maintained within, their optimum sustainable population ranges be limited to three to five years. Without such a limit, there would be little incentive to ensure that incidental take during commercial fishing operations, by itself and in combination with other forms of take, does not cause the affected populations to be reduced or to be maintained below their maximum net productivity levels.

Under the Service's proposal, recovery plans and conservation plans could establish allowable removal levels less than those calculated using the allowable biological removal formula. The proposal, however, did not identify those situations when such reductions would be appropriate or provide any criteria for making such determinations. Noting that such determinations were likely to be highly controversial and could impede necessary conservation measures, the Commission recommended that the Service expand its proposal to provide criteria for judging when it would be appropriate for recovery plans and conservation plans to establish take levels less than would be authorized using the general allowable biological removal formula.

The Draft Legislative Environmental Impact Statement that accompanied the Service's proposal assessed the economic impacts of four alternatives using the period before enactment of the Marine Mammal Protection Act as a baseline. This created the misimpression that adoption of any of the alternatives would adversely affect fisheries to one degree or another. The Commission noted that, absent additional legislation, the system for authorizing the take of marine mammals incidental to commercial fisheries would revert to that in existence prior to enactment of the interim exemption in 1988 and recommended that the economic analyses be redone using that as the baseline. Such analyses would show that three of the four alternatives, including the Service's proposal and the Commission's recommended guidelines, would benefit fisheries to various degrees, at the expense of marine mammals.

In addition, the Commission recommended that:

- the term "allowable biological removal" be changed to clarify that it represents the maximum number of animals that might be taken from a population with confidence that the removals would not cause the population to be reduced or to be maintained below its maximum net productivity level;

- the proposed regime be revised to include a streamlined procedure for authorizing "small takes" of marine mammals in fisheries that have few interacations similar to that for non-fisheries activities provided in section 101(a)(5) of the Marine Mammal Protection Act;

- the Service establish a threshold below which no incidental taking could be authorized unless it were reasonably demonstrated that the population is increasing at or near its maximum growth rate and the authorized level of take would not significantly reduce the recovery rate;

- the Service revise its approach for allocating allowable biological removals so that each requested authorization is judged on its own merits, taking into account: (1) other forms of taking; (2) measures that might be taken to reduce unnecessary taking and to allocate the allowable take equitably among foreign and U.S. fisheries and other users; and (3) the likelihood that ongoing or planned monitoring programs are adequate to ensure that the affected populations are increasing toward, or being maintained within, their optimum sustainable population ranges;

- the proposal be expanded to describe the program that would be undertaken to reduce marine mammal mortalities and injuries incidental to commercial fishing operations to as near zero as practicable; and

- the Service provide, as part of the proposal and Legislative Environmental Impact Statement, draft legislative language illustrating how the proposed

regime might be translated into law and an estimate of costs associated with implementing the proposed regime.

The National Marine Fisheries Service's Revised Proposed Regime

The National Marine Fisheries Service received a large number of comments on its proposed regime. While comments were received on all aspects of the proposal, many commenters focused on two points, the complexity of the Service's proposal and the broad applicability of the proposed regime. Several commenters also believed that more attention should be given to those fisheries with significant marine mammal incidental take problems. To address those concerns and other comments received on its original proposal, the Service, on 20 November 1991, made a revised proposal available for public review.

In the revised proposal, the Service replaced the term "allowable biological removal" with "potential biological removal" to clarify that it represented the total number of individuals that could potentially be removed from a population, not necessarily that that number of removals would be authorized. The Service also proposed revisions to the recovery factors to be used in calculating potential biological removal levels in response to comments that the original recovery factors were not necessary for effective conservation of marine mammal stocks. The recovery factor for severely depleted stocks (those below one-third of carrying capacity) and those of unknown status was revised upward from 0.1 to 0.5 (a five-fold increase) and the factor for stocks between one-third and two-thirds of carrying capacity was revised from 0.5 to 0.75. Under the revised proposal, no recovery factor would be used for stocks determined to be above two-thirds of carrying capacity. The Service noted that these changes would allow marine mammal stocks to attain optimum sustainable population levels within a reasonable period of time and would not appreciably increase recovery times.

The Service also proposed a new, and somewhat more complex, method for classifying fisheries. Historical data would be used to determine which commercial fisheries interact with marine mammals and which do not. All vessels operating in fisheries identified as interacting with marine mammals would be required to register with the Service. These fisheries would be further classified based on the status of the marine mammals taken and the level of total removals relative to the calculated potential biological removal. Class A fisheries would be those that interact with endangered, threatened, or depleted marine mammals or with marine mammal stocks with an estimated annual removal level (from all sources) which equals or exceeds the potential biological removal level. Class B would include those fisheries that do not interact with depleted marine mammals but that interact with stocks whose potential biological removal level, although not now exceeded by total annual removals, is expected to be exceeded within the next three to five years. Class C fisheries would be those that do not interact with marine mammals from depleted stocks or from stocks whose potential biological removal level is likely to be exceeded within the next five years.

Under the Service's revised proposal, only Class A fisheries would be subject to comprehensive monitoring on an annual basis. Only when the total fisheries removal is expected to exceed the portion of the potential biological removal level allocated to fisheries, however, would annual monitoring be required. Class B fisheries would, at the Service's discretion, be monitored every two to five years. Class C fisheries would be monitored every five to ten years, depending on the estimated level of incidental removals.

Fishery-specific quotas would be established only for Class A fisheries, and then only if the portion of the potential biological removal level allocated to fisheries would otherwise be exceeded. Removals in fisheries subject to quotas would be monitored sufficiently to enable the Service to implement additional restrictions on fishing activities if necessary to prevent the potential biological removal level from being exceeded.

Other major changes contained in the Service's revised proposal included: streamlining of the allocation process and elimination of the Regional Quota Boards proposed earlier; requiring development of annual research plans to identify and fill data gaps with respect to marine mammal stocks; recommending that the new regime be implemented under a "phased strategy" with a goal of reducing take to potential biological removal levels by the end of 1997.

The Commission provided comments on the Service's revised proposed regime by letter of 20 December 1991. While the revised proposal responded to some of the comments and recommendations provided by the Commission and others on the original proposal, it failed to address others. Moreover, some of the modifications instituted by the Service made the revised proposal, in the Commission's view, "even less adequate" than the earlier version. The Commission expressed its belief that the revised proposal could and should be improved and indicated a willingness to recommend that Congress postpone the deadline for transmitting the suggested regime to enable the identified deficiencies to be corrected.

The Commission noted that both the original and revised proposals were, in some respects, inconsistent with the Recommended Guidelines provided by the Commission and the fundamental purposes and policies of the Marine Mammal Protection Act. For example, the Service's revised regime would apparently allow takes from all sources to exceed the estimated sustainable removal levels, at least during the initial phases of implementation. Enactment of the Service's proposal could therefore allow certain marine mammal stocks to be reduced below their maximum net productivity levels and might significantly delay or prevent recovery of depleted species and stocks.

Further, the revised regime did not appear to recognize or consider situations in which marine mammal survival and productivity are being or may be reduced by habitat degradation or destruction, or by unusual disease outbreaks, natural catastrophe, etc. For example, it failed to address the adverse impacts that might result from such things as commercial exploitation of key marine mammal prey species, offshore oil and gas development, non-point source pollution, and unusual die-offs such as have occurred in several areas in recent years. That is, the revised proposal considered only direct mortality and serious injury from incidental fisheries take, subsistence hunting, and other known and quantifiable human sources. It also appeared that the Service was proposing to use current carrying capacity, without considering human-caused habitat degradation and destruction, as the basis for making status-of-stocks determinations.

Many of the apparent deficiencies in the Service's revised proposed regime may have been attributable to the lack of detail in the proposal. For example, the proposal purported to retain the Act's zero mortality rate goal, but neither described the programs needed to meet the goal nor estimated the cost of such programs. In addition, while the proposal indicated that recovery and conservation plans could establish removal levels more restrictive than the potential biological removal level, it did not describe those situations in which it would be appropriate to do so and did not provide any criteria for making such determinations. In light of these and other omissions, the Commission noted that it was impossible to assess the pros and cons of the revised proposal accurately.

To overcome the deficiencies, the Commission recommended, among other things, that the National Marine Fisheries Service revise and expand the legislative proposal to:

- include the specific statutory amendments and related report language that the Service will propose to establish the regime;
- specify what the Service means by the term "sound principles of wildlife management";
- prohibit taking from species or populations whose minimum estimated size is less than 3,000 individuals or 30 percent of the best available estimate of historic abundance, whichever is higher, unless it reasonably can be demonstrated that the population is increasing at its maximum potential rate and the authorized level of take will not cause a greater than 10 percent increase in the estimated time it will take the population to reach its maximum net productivity level;
- take account of situations where either marine mammal survival or productivity has been or may be affected by habitat degradation or destruction;
- identify situations and propose criteria for deciding when recovery plans and conservation plans for endangered, threatened, and depleted species should be used to establish removal levels less than the estimated potential biological removal levels;

- revise the definitions of Class A, B, and C stocks to make it clear that the burden of proof will remain, as presently is the case under the Marine Mammal Protection Act, on potential users to demonstrate that levels of taking do not disadvantage the affected marine mammal species and stocks;

- describe the program or programs the Service is planning or proposing to move toward the zero mortality rate goal;

- provide an estimate of the funding and special logistic requirements that would be required to implement the proposed assessment, monitoring, and mortality reduction programs; and

- if it has not already done so, revise the assessments of possible economic impacts in the Legislative Environmental Impact Statement to use the Marine Mammal Protection Act prior to 1988, to which the interim exemption will revert absent enactment of new legislation, as the baseline against which the various alternatives are compared.

The Commission also noted that, in the recommended guidelines forwarded to the Service in July 1990, it had recommended that the National Marine Fisheries Service and the Fish and Wildlife Service, in consultation with the Commission, the Fishery Management Councils, and other relevant organizations, hold a workshop or series of workshops in 1991 or 1992 to consider and provide advice on: (1) thresholds below which exploitation of fish stocks should be prohibited to ensure maintenance of target, dependent, and associated species at optimum sustainable levels (*i.e.*, to ensure the fullest possible range of management options for future generations); (2) guidelines and procedures for dealing with uncertainty concerning the status of and numerical and functional relationships among fish stocks and other components of the ecosystems of which they are a part; and (3) research and monitoring programs needed to fill critical gaps in our knowledge of the structure and dynamics of marine ecosystems and to verify the predicted effects and detect the possible unforeseen effects of fishery management programs. The Commission noted further that the Service had not responded to this or a number of the other recommendations made in the Commission's recommended guidelines and in its 23 September 1991 comments on the Service's initial proposed regime. The Commission reiterated its belief that failure to carry out the recommended actions could result in fisheries having significant adverse effects on marine mammals and the ecosystems of which they are a part. Thus, the Commission requested that, if the Service decides not to adopt one or more of these recommendations, the Service provide it with a detailed explanation as to the reasons why the recommendations were not followed or adopted, as required by section 202(7)(d) of the Marine Mammal Protection Act.

At the end of 1991, the Service was reviewing the comments received on its revised proposal. It is expected that the Service will complete and transmit to Congress its suggested regime to govern the taking of marine mammals incidental to commercial fishing operations, and issue a Final Legislative Environmental Impact Statement on the proposal, early in 1992.

The Tuna-Porpoise Issue

For reasons not fully understood, schools of large yellowfin tuna (>25 kg) tend to associate with dolphin schools in the eastern tropical Pacific Ocean, an area of more than five million square miles stretching from southern California to Chile and westward to Hawaii. In the late 1950s, U.S. fishermen began to exploit this association by deploying large purse seine nets around the more readily observed dolphin schools to catch the tuna swimming below. Despite efforts by the fishermen to release the encircled dolphins, some become trapped in the nets and drown. As discussed below, efforts to reduce the incidental mortality of dolphins in this fishery have been a central focus of the Marine Mammal Protection Act since its enactment in 1972. Early efforts under the Act focused almost exclusively on the operations of the U.S. purse seine fleet. Beginning in the mid-1980s, however, the focus shifted to reducing dolphin mortality from foreign tuna fishing activities in the eastern tropical Pacific.

Background

The eastern tropical Pacific tuna purse seine fishery was dominated by the United States fleet during the first two decades of its existence. At its peak in the

mid-1970s, a U.S. fleet of more than 150 vessels accounted for nearly 70 percent of the fishery capacity. In the late 1970s and 1980s, significant shifts in the fishery to overseas operations occurred. By the beginning of 1990, only 30 U.S. tuna vessels remained in the eastern tropical Pacific fishery, accounting for less than a third of the total fleet capacity. As discussed in the previous Annual Report, about 45 U.S. purse seiners have left the eastern tropical Pacific since the El Niño event of 1983-1984 and have relocated to the western Pacific.

On 12 April 1990, the three largest U.S. tuna canners announced that they would no longer purchase tuna caught in association with dolphins. In response, there has been a further exodus of U.S. purse seine vessels from the eastern tropical Pacific. During 1991, only 13 U.S. vessels fished for tuna in the eastern tropical Pacific and, of these, only two to six vessels fished for tuna by setting on porpoises.

Despite the decline of the U.S. fleet in the eastern tropical Pacific, the United States remains an important market for tuna caught in that area. Prior to the announcement by U.S. canners of their "dolphin safe" purchasing policy, about 44 percent of tuna caught in the eastern tropical Pacific was sold in the United States, about 30 percent in Latin America, about 20 percent in western Europe, and about 5 percent in Asia. Although the full extent of any market shift that may have resulted from the "dolphin safe" policy of U.S. canners is unknown, it is believed that the U.S. share of the market for eastern tropical Pacific tuna has declined since April 1990.

The decline of the U.S. fleet in the eastern tropical Pacific during the 1970s and 1980s has been offset in large part by a growth of foreign fleets in the area. The Mexican fleet, now with 44 vessels, increased by nearly 50 percent during the 1980s to displace the U.S. fleet as the primary participant in the fishery. The Venezuelan fleet more than tripled in size during the 1980s and now has 21 vessels participating in the fishery. The other major participants in the eastern tropical Pacific tuna fishery are Vanuatu and Ecuador, with ten vessels and nine vessels, respectively. Ecuador's vessels, however, are not currently fishing for tuna by setting on dolphins.

A parallel shift has also occurred in the tuna canning industry. During the early years of the purse seine tuna fishery, most of the tuna canning industry was controlled by U.S. interests. In the 1960s, 12 tuna canneries were in operation in southern California, others were located on both coasts of the United States, and two canneries were operating in American Samoa and two in Puerto Rico. Today only two canneries, both in southern California, remain in operation in the United States. Three canneries are operating in Puerto Rico and two remain open in American Samoa. The country with the most dramatic increase in canned tuna production during the past decade is Thailand, which began canning tuna in the early 1980s and now is one of the world's largest producers. Other nations that substantially increased canned tuna production during the 1980s are Italy, France, Mexico, the Philippines, and Côte d'Ivoire. More recently, Indonesia has experienced considerable growth in its tuna canning industry and is currently building more canneries.

As the eastern tropical Pacific tuna fishery shifted to foreign control, so did the problem of incidental dolphin mortality. Recognizing this trend, Congress amended the Marine Mammal Protection Act in 1984 to require foreign nations exporting yellowfin tuna to the United States to adopt dolphin-saving programs equivalent to the U.S. program and to achieve an incidental mortality rate comparable to that of the U.S. fleet. In 1988, the Act was further amended to provide more specific standards with respect to what would constitute acceptable foreign programs and comparable mortality rates.

As discussed below, the Marine Mammal Commission, the National Marine Fisheries Service, the U.S. Congress, the U.S. tuna industry, the Inter-American Tropical Tuna Commission, and others continued to devote substantial attention to the tuna-porpoise issue in 1991. Now that the U.S. fleet has largely left the fishery and is making very few sets on dolphin schools, most of this effort was directed towards seeking further reductions in dolphin mortality by foreign fishing fleets. Discussions of the Commission's past activities and a summary of earlier efforts to resolve the tuna-porpoise problem are presented in previous Annual Reports.

The 1991 Tuna Fishing Season

In 1980, the National Marine Fisheries Service promulgated final regulations establishing annual quotas for individual porpoise stocks and a total annual allowable take for U.S. fishermen of 20,500 porpoises for the years 1981-1985. A general permit to take porpoises in compliance with those regulations was also issued in 1980 to the American Tunaboat Association. In 1984, the Marine Mammal Protection Act was amended to extend the annual quotas, the regulations, and the general permit indefinitely and to add quotas for eastern spinner and coastal spotted dolphins. The U.S. fleet continues to operate under the 1980 general permit.

Estimates of the annual incidental kill of porpoises by the U.S. and foreign tuna purse seine fleets since passage of the Marine Mammal Protection Act are listed in Table 9. Although these are the best available mortality estimates, it should be noted that many of the estimates may not be accurate. Substantial observer coverage of the U.S fleet did not begin until 1976 and coverage remained below 50 percent until 1987. Observer data for estimating porpoise mortality in the non-U.S. fleet is very sparse for all years prior to 1986. The foreign observer program did not begin in earnest until 1986, when observer coverage was approximately 25 percent.

More detailed data for the last four fishing seasons are provided in Table 10. In addition to annual dolphin mortality data, information on mortality rates, fishing effort, and observer coverage are presented. The 1991 dataset for non-U.S. vessels is not yet complete, but estimates based on partial-year data are provided. Also, data for revised year 1991 are given for the U.S. fleet. (As discussed below, on 8 October 1991, the National Marine Fisheries Service changed the period it would use to make foreign comparability findings from the calendar year to the period from 1 October to 30 September. Revised year 1991 covers the period 1 October 1990 to 30 September 1991.)

Dolphin mortality resulting from U.S. tuna fishing operations in the eastern tropical Pacific during 1991 was the lowest since the purse seine fishery began. The single most important factor contributing to the reduced mortality was the 12 April 1990 announcement by major U.S. tuna canners that they would no longer trade in tuna caught by setting on dolphin and the resulting decrease in sets on dolphins by U.S. vessels. As shown in Table 10, there has been a steady decline in the number of marine mammal sets made by U.S. tuna fishermen over the past four years, with more than a 90 percent decline occurring in the past two years. The low mortality figure for 1991 was not solely attributable to abandonment of the practice of setting on porpoises, however. The average dolphin kill for the U.S. fleet was about 2.5 dolphins per set, its lowest mortality rate on record.

Table 9. Estimated Incidental Kill of Porpoises in the Tuna Purse Seine Fishery in the Eastern Tropical Pacific Ocean, 1972 - 1991[1]

Year	U.S. Vessels	Non-U.S. Vessels
1972	368,600	55,078
1973	206,697	58,276
1974	147,437	27,245
1975	166,645	27,812
1976	108,740	19,482
1977	25,452	25,901
1978	19,366	11,147
1979	17,938	3,488
1980	15,305	16,665
1981	18,780	17,199
1982	23,267	5,837
1983	8,513	4,980
1984	17,732	22,980
1985	19,205	39,642
1986	20,692	112,482
1987	13,992	85,185
1988	19,712	59,215
1989	12,643	84,336
1990	5,083	47,448
1991	812	—

[1] Estimates, based on kill per set and fishing effort data provided by the National Marine Fisheries Service and the Inter-American Tropical Tuna Commission, do not include deaths of seriously injured animals released alive.

Table 10. U.S. and Foreign Dolphin Mortality, Kills per Set, Sets on Dolphins, and Percent of Observer Coverage, 1988 - 1991[1]

	1988	1989	1990	1991[2]	Revised 1991[3]
Dolphin Mortality					
U.S.	19,712	12,643	5,083	812	891
Foreign	59,215	84,336	47,448	24-25,000	—
Total	78,927	96,979	52,531	25-26,000	—
Kills per Set					
U.S.	5.28	3.60	2.75	2.53	1.89
Foreign	10.87	10.87	6.35	3.0 - 3.2	—
Combined	5.34	3.69	2.81	2.49	—
Sets on Dolphins					
U.S.	3,766	3,435	1,845	321	471
Foreign	6,749	9,145	8,770	8-9,000	—
Total	10,515	12,580	10,615	8,300-9,300	—
Observer Coverage[4]					
U.S.	53.2%	99.0%	100.0%	100.0%	100.0%
Foreign	35.3%	35.5%	40.1%	56.4%	—
Combined	40.4%	48.2%	48.8%	59.7%	—

[1] Data provided by the National Marine Fisheries Service.
[2] Figures for 1991 for other than the U.S. fleet are preliminary estimates provided by the Inter-American Tropical Tuna Commission.
[3] On 8 October 1991, the National Marine Fisheries Service issued a final rule changing the period on which foreign comparability findings are based. Data for revised year 1991 cover the period from 1 October 1990 through 30 September 1991.
[4] Observer coverages are given for the percentage of trips observed.

Final incidental take data for 1991 for the foreign fleets are not yet available. Preliminary data suggest that the total dolphin mortality for the foreign fleets during 1991 will be about 25,000. This would constitute a reduction of nearly 50 percent in foreign fleet dolphin mortality since 1990 and a reduction of about 70 percent since 1989. These reductions have occurred without any appreciable reduction in the number of dolphin sets engaged in by foreign purse seiners and are primarily the result of improved performance rather than decreased fishing effort. Since 1988 and 1989, the mortality rate for the foreign fleet has been reduced by more than two-thirds, from more than ten dolphins killed per set to about three. The Vanuatu tuna fleet has improved its performance even more dramatically. For the first 10 months of 1991, it achieved a mortality rate (1.75 dolphins per set) well below that of the U.S. fleet. Also, observer coverage of foreign tuna fishing in the eastern tropical Pacific increased in 1991.

Implementation of the 1988 Amendments

In 1988, changes were enacted in the legislative program governing the take of marine mammals by the U.S. tuna fishery and the importation of yellowfin tuna taken by foreign fleets. These amendments and steps taken to implement them during 1991 are summarized below.

Domestic Program — Several modifications to the tuna-porpoise program for U.S. vessels were enacted in 1988. To address the problem of higher dolphin mortality in night sets, the 1988 amendments specified that, effective 1 January 1989, U.S. tuna fishermen setting on marine mammals must complete the process of backdown to remove porpoises from the net no later than 30 minutes after sundown. The restriction on sundown sets may be waived for individual vessel operators who, based on observer reports, have attained an incidental take rate for sundown sets that is no higher than the average daytime take rate for the fleet as a whole. No sundown sets were made by U.S. tuna fishermen in 1991.

The amendments also required the placement of an observer on every fishing trip made by U.S. vessels during 1989 and subsequent fishing seasons unless, for reasons beyond the control of the Secretary, an observer is not available. The 100 percent observer requirement may be waived after the 1991 fishing season if it is determined that a less extensive observer program would yield sufficiently reliable information. Full observer coverage was achieved for the U.S. fleet in 1991. There are no plans to decrease observer coverage in 1992.

Further, the amendments prohibited the use of explosives other than Class C pest control devices (large firecrackers) in the yellowfin tuna fishery by U.S. fishermen. They directed the Secretary to regulate the use of Class C explosives by 1 April 1990 based on a study to determine if such devices result in physical impairment or increased mortality of marine mammals. Inasmuch as the Service could not determine that Class C explosives do not result in injury, physical impairment, or increased mortality of dolphins, the Service issued an interim final rule on 29 March 1990 to prohibit the use of all explosives during sets on marine mammals. While the Service had expected to publish a final rule to replace the interim rule early in 1991, no such rule was published in 1991.

The amendments also directed the Secretary to develop and implement, by the beginning of the 1990 fishing season, a system of performance standards designed to maintain the diligence and proficiency of vessel operators. Those skippers whose incidental marine mammal mortality rate is consistently and substantially higher than the average rate for the fleet will be subject to supplemental training. Continued poor performance may result in suspension or revocation of a certificate of inclusion. The Service published an interim final rule on 17 May 1990 establishing operator performance standards. The Service indicated in the preamble to the interim rule that it would report on implementation of the performance system during the first quarter of 1991. Based on that report, the Service planned to propose revised standards or replace the interim rule with a final rule. Because of the changes to the U.S. tuna fishery in 1990, the report was never prepared and no final rule has been published.

In summary, all of the requirements of the 1988 amendments with respect to the U.S. tuna fleet have been implemented. All that remains to be done is issuing final rules to replace the interim rules now in effect regarding vessel operator performance standards, sundown sets, experimental fishing permits, and the use of explosive devices in the yellowfin tuna fishery.

National Academy of Sciences Study — The 1988 amendments also directed the Secretary of Commerce to contract with the National Academy of Sciences for an independent review of possible alternative tuna fishing methods that do not involve the incidental take of marine mammals. This review was to have been completed by 8 September 1989 and the results submitted to Congress by 5 December 1989, along with the Service's proposed plan for researching, developing, and implementing the identified alternatives.

Completion of the study is considerably behind schedule. A contract for the study was not concluded by the Service and the Academy until September 1989. Under the terms of that contract, the study was to have been completed by 10 September 1990. Repeated extensions of the performance period of the contract have been reluctantly agreed to by the Service, and the study had not yet been completed by the end of 1991.

Comparability of Foreign Programs — During reauthorization hearings on the Marine Mammal Protection Act in 1984, the Commission, the National Marine Fisheries Service, the tuna industry, and the

environmental community expressed concern that progress realized by the U.S. fleet in reducing incidental porpoise mortality was being offset by the high kill rates of foreign fleets. It was believed that, if further progress were to be made in achieving the Act's goal of reducing incidental mortality to insignificant levels approaching zero, foreign fleets would have to comply with porpoise-saving regulations similar to those applicable to the U.S. fleet. Therefore, Congress amended the Act to require that each nation exporting tuna to this country provide documentary evidence that, with respect to regulating the take of marine mammals, it has adopted a program comparable to that of the United States and that the average rate of incidental take by its fleet is comparable to that of the U.S. fleet. Failure to meet these requirements would result in a ban on the import of tuna and tuna products from the nation involved.

The National Marine Fisheries Service did not implement these requirements until 18 March 1988, when it published interim regulations. Dissatisfied with the Service's regulations and the pace at which they were developed, Congress amended the Act in 1988 to provide more specific guidance as to when foreign tuna-porpoise programs would be considered to be comparable to that of the United States and to force timely implementation. The amendments require that, to be found comparable to the U.S. program, a foreign program must include: (1) by the beginning of the 1990 fishing season, prohibitions on encircling pure schools of certain marine mammals, conducting sundown sets, and such other activities as are applicable to U.S. vessels; (2) monitoring by observers from the Inter-American Tropical Tuna Commission or an equivalent international program; and (3) observer coverage equal to that for U.S. vessels unless an alternative observer program with lesser coverage is determined to provide sufficiently reliable documentary evidence of the nation's incidental take rate. In addition, the average incidental take rate for a foreign fleet could be no more than twice that of the U.S. fleet by the end of the 1989 season and no more than 1.25 times the U.S. rate by the end of the 1990 and subsequent seasons.

Limitations were also placed on the take of coastal spotted and eastern spinner dolphins. Beginning in 1989, eastern spinner dolphins may not account for more than 15 percent of a nation's total incidental take and coastal spotted dolphins may not exceed two percent of the nation's total take. Harvesting nations are also required to comply with all reasonable requests from the United States to cooperate in conducting its porpoise stock assessment and monitoring program.

Final regulations implementing the 1988 amendments were published by the National Marine Fisheries Service on 30 March 1990. As discussed below, the comparability provisions and findings made thereunder were the subject of litigation during 1990 and 1991.

On 28 August 1990, the District Court issued a ruling with respect to the comparability provisions of the 1988 amendments. It required the Service to embargo yellowfin tuna harvested by foreign fleets in the eastern tropical Pacific until the Service determined that those fleets had achieved a marine mammal mortality rate, by the end of 1989, that was no more than twice that for the U.S. fleet. Pursuant to the Court's order, imports of yellowfin tuna and tuna products were prohibited on 6 September 1990. On 7 September 1990, affirmative findings were made for Venezuela, Vanuatu, Ecuador, and Mexico and the embargo of tuna from those countries was lifted.

The finding for Mexico was issued under a provision of the Service's regulations that allowed reconsideration of a negative finding based on at least six months of data from the following year. It was based on data from the first eight months of 1990. As noted below, the embargo of Mexican tuna was later reimposed by the District Court when it ruled that a finding with respect to the quota for eastern spinner dolphins must be based on data from an entire fishing year. That embargo was stayed by the Ninth Circuit Court of Appeals pending appeal of the lower Court's ruling but was reimposed on 22 February 1991, three days after the Court of Appeals lifted the stay.

In response to the April 1990 announcement by several U.S. canners that they would no longer purchase tuna caught in association with dolphins, Ecuador and Panama both passed legislation prohibiting their vessels from setting on marine mammals. The Service, on 16 November 1990, published an interim final rule enabling comparability determinations to be made based upon the passage and effective

implementation of such legislation. Under the interim rule, tuna from a foreign nation may be imported into the United States if (1) the laws of that nation prohibit the intentional setting of purse seine nets on marine mammals; (2) every fishing trip of the nation's fleet is observed by an Inter-American Tropical Tuna Commission or other acceptable observer; and (3) the observer certifies that no intentional sets on marine mammals were in fact made. The Service issued a finding of comparability for Panama under this new provision on 15 November 1990, and one for Ecuador on 15 March 1991.

The Service issued another interim rule on 27 December 1990 revising the schedule for submitting mortality data and other information upon which comparability findings are based. The rule changed the date by which required information for the preceding fishing season must be provided to the Service from 31 July to 15 March and required the Service to issue a finding by 31 May. An affirmative finding from the previous year would remain in effect until then. The District Court found this schedule to be inconsistent with the provisions of the Marine Mammal Protection Act and on 26 March 1991 invalidated the rule. The Court directed the Service to revoke all findings of comparability and ban tuna imports from all foreign nations fishing in the eastern tropical Pacific until such time as it determined that the nation has achieved a dolphin mortality rate that is no more than 1.25 times the U.S. rate. The ruling left intact the provision that allowed tuna imports from nation's such as Ecuador and Panama that had enacted and were enforcing legislation prohibiting fishing for tuna by setting on dolphins.

On 7 May 1991, the Service published a notice in the *Federal Register* revoking its 27 December 1990 rule and announcing that, effective 3 April 1991, tuna from Mexico, Venezuela, and Vanuatu had been embargoed. Vanuatu and Venezuela submitted mortality data for the 1990 fishing season. While both nations satisfied the Marine Mammal Protection Act's requirements with respect to the take of eastern spinner and coastal spotted dolphins, neither met the mortality rate comparability requirement. The mortality rate for Vanuatu, which was 1.27 times the U.S. rate, just barely failed to meet the 1.25 limit set forth in the Act. Mexico did not submit any data for 1990.

Under the 1988 amendments to the Marine Mammal Protection Act, the Secretary of Commerce is required to certify to the President when an embargo of any nation's tuna has been in place for six months. Such a certification is deemed to be a certification for purposes of the Pelly Amendment of the Fishermen's Protective Act and may result in import bans against other fish products from the offending nation. On 22 August 1991, six months after the embargo of Mexican tuna became effective, the Secretary issued a certification finding against Mexico. On 22 October, the President transmitted a message advising Congress of his finding. His message indicated that, in light of the tuna embargo already in effect and ongoing negotiations with Mexico regarding an international dolphin conservation program, further sanctions would not be imposed against Mexico at that time.

On 15 November 1991, Venezuela and Vanuatu were certified by the Secretary. As with Mexico, the President has thus far declined to impose additional sanctions against fish products from those nations under the Pelly Amendment.

On 8 October 1991, the Service published an interim final rule setting forth a new schedule for issuing comparability findings. The action was taken in response to Court rulings in *Earth Island Institute* v. *Mosbacher*, discussed below. The rulings required the Service to embargo tuna from nations that purse seine in the eastern tropical Pacific unless mortality rate comparability findings have been made by the end of each year. Under the Service's interim rule, the period from 1 October to 30 September will constitute a fishing year for purposes of comparing foreign dolphin mortality rates with that of the U.S. fleet. In this way, comparisons will be made using data from at least a full year, yet the Service will be able to issue its findings before 31 December. Findings regarding the percentage take of eastern spinner and coastal spotted dolphins will continue to be made on a calendar year basis.

Data for the U.S. fleet for revised fishing year 1991 are presented in Table 10. By switching to the new schedule, U.S. dolphin mortality for 1991, against which foreign performance will be compared, decreased from 2.53 dolphins per set to 1.89 dolphins per set. It is unlikely that any of the nations fishing for tuna by setting on dolphins except Vanuatu will

meet the comparability test based upon data for the revised 1991 fishing year.

The 8 October rule also revised the method used to calculate mortality rates. Previously, the Service weighted data according to three fishing areas and for two species groupings. The weighting process was adopted to treat the various fishing nation more equitably, since incidental take rates vary depending on fishing location and the stock of dolphins set upon. Under the revised approach, the Service will continue to use weighted data when sample sizes for an area and species grouping are sufficient to do so. However, with only two to six U.S. vessels fishing for tuna by setting on dolphins, the statistical variability of the samples would make such comparisons inappropriate in some circumstances. Under the revised approach, comparability determinations will be based on overall, unweighted mortality rates when there are fewer than five sets by the U.S. fleet in an area and for a species grouping if the foreign nation has any fishing effort for that species grouping in that area.

As noted above, the 1988 amendments require that, before a foreign program may be found comparable to the U.S. program, the Secretary must determine that its tuna fishing operations are monitored by Inter-American Tropical Tuna Commission observers, or an equivalent international program in which the United States participates, and is based upon observer coverage that is equal to that for U.S. vessels. Since January 1989, the United States has achieved 100 percent observer coverage. Under an exception to the general comparability requirement, however, comparable foreign programs may have lesser observer coverage if the Secretary determines that such a program will provide sufficiently reliable documentary evidence of the average rate of incidental taking by the harvesting nation.

The National Marine Fisheries Service determined that, for 1990, 33 percent coverage would provide sufficiently reliable data for fleets of 10 or more vessels but that 50 percent observer coverage was necessary for fleets consisting of five to nine vessels. Although the Service found these levels to be statistically acceptable, it noted several benefits that would result from higher observer coverage and committed itself to seek 100 percent coverage under the international observer program.

The Service sought and obtained agreement at the 17-20 September 1990 meeting of the Inter-American Tropical Tuna Commission that observer coverage should be increased to levels approaching 100 percent. Consistent with this international agreement, the Service, on 18 October 1990, proposed to accept 75 percent observer coverage for all fleets in 1991 and 90 percent coverage for the 1992 and subsequent fishing seasons.

Observer coverage provided by the Inter-American Tropical Tuna Commission since 1987 for the five major foreign fleets operating in the eastern tropical Pacific are provided in Table 11. With the exception of Mexico, those nations have increased observer coverage substantially over the past five years. As required to guarantee compliance with their prohibitions on setting on dolphins, Panama and Ecuador achieved 100 percent observer coverage in 1991. Observer coverage for Vanuatu exceeded 90 percent in 1991.

Mexico has announced that it intends to increase observer coverage of its fleet to 100 percent. However, only about one-third of the observers on Mexican vessels will be provided by the Inter-American Tropical Tuna Commission. The remainder will be provided by the Government of Mexico under a separate observer program. With the assistance of the National Marine Fisheries Service, Mexico began training and certifying its own observers in 1991. While increased observer coverage for Mexico should be encouraged, it is not clear whether the planned program will satisfy the comparability requirements of the Marine Mammal Protection Act. As noted above, the Act requires observers to be provided by the Inter-American Tropical Tuna Commission or an equivalent international program in which the United States participates.

Intermediary Nations — The 1988 amendments also restricted tuna imports from third-party nations seeking to export yellowfin tuna to the United States. An intermediary nation must certify and provide reasonable proof that it has acted to prohibit the importation of tuna from any country banned from directly exporting tuna to the United States. Intermediary nations have 60 days following the imposition of a U.S. import ban to implement a similar prohibition on tuna imports from the embargoed harvesting

Table 11. Percent of Foreign Tuna Fleets with Observers Aboard[1]

	1987	1988	1989	1990	1991
Ecuador	9.5	35.9	34.6	48.3	100.0
Mexico	26.8	38.4	35.4	37.6	35.2
Panama	12.3	30.0	43.5	47.6	100.0
Vanuatu	31.0	30.0	35.4	52.2	94.4
Venezuela	21.8	31.3	35.2	37.1	47.9

[1] Data provided by the National Marine Fisheries Service.

nation. Failure to adopt a parallel import ban within six months of U.S. action will prompt certification of the intermediary nation under the Pelly Amendment to the Fishermen's Protective Act and may result in restrictions on imports of all or some fish products from that nation.

These requirements were implemented through an interim rule issued by the National Marine Fisheries Service on 7 March 1989 and a final rule issued on 30 March 1990. Under those regulations, intermediary nations are not required to implement a ban on tuna imports from a country embargoed by the United States if the Service is satisfied that the intermediary nation imports tuna products only from sources other than the embargoed country. The regulations also specify that an intermediary nation embargo will only apply to yellowfin tuna and tuna products harvested in the eastern tropical Pacific by a fishing nation that is subject to a primary embargo.

On 12 June 1991, the Service published a notice to importers in the *Federal Register* requiring importers to certify that yellowfin tuna shipments to the United States do not contain any yellowfin tuna or tuna products harvested with purse seines in the eastern tropical Pacific Ocean by vessels from Mexico. This requirement became effective on 24 May 1991. On 2 July 1991, a notice with respect to yellowfin tuna harvested by Venezuela and Vanuatu was published by the Service. In accordance with that notice, shipments of yellowfin tuna being imported from only three countries (Costa Rica, France, and Italy) believed to have recently imported yellowfin tuna from Venezuela and Vanuatu must be accompanied by a certification that no yellowfin tuna or tuna products harvested by purse seine vessels of Venezuela or Vanuatu in the eastern tropical Pacific Ocean are included in the shipment. By *Federal Register* notice of 7 August 1991, the Service limited the certification requirement regarding yellowfin tuna from Mexico to Costa Rica, France, Italy, Japan, and Panama, the five countries believed to have recently imported yellowfin tuna from Mexico.

As discussed in the Litigation section below, Earth Island Institute challenged the Service's interpretation of the breadth of the tuna embargoes required under the Marine Mammal Protection Act's intermediary nation provision. It contended that intermediary nation embargoes apply to all yellowfin tuna from the intermediary nation regardless of where or how the tuna were harvested.

As with harvesting nations, intermediary nations from which tuna has been embargoed for six months are to be certified by the Secretary of Commerce and may face additional sanctions under the Pelly Amendment. Costa Rica, France, Italy, Japan, and Panama were certified on 25 November 1991; however, no sanctions on other fish products have been imposed.

Report to Congress — The 1988 amendments to the Marine Mammal Protection Act require the National Marine Fisheries Service to convene annual meetings with representatives of conservation groups, the tuna fishing industry, and other interested parties to discuss the results of efforts to reduce the incidental

mortality of dolphins in the eastern tropical Pacific tuna fishery and to develop plans for such efforts during the subsequent year. The Service is also required to submit a comprehensive report to Congress by 1 April 1992 setting forth the results of the efforts to reduce dolphin mortality and recommendations for actions that should be taken to reduce incidental mortality further.

The Service held the second annual review of its tuna program on 21-22 January 1991. To meet the 1 April 1992 deadline for submitting its report to Congress, the Service convened the third, and last, of the annual reviews on 13-14 November 1991. In addition to representatives of conservation groups, U.S. tuna fishermen, U.S. tuna canners, the Marine Mammal Commission, and other Federal agencies, participants included the Inter-American Tropical Tuna Commission and representatives of several tuna fishing nations. Data and trends for the 1990 and 1991 fishing seasons were presented at the meetings. Research underway to develop tuna fishing methods that do not involve setting on dolphins was also discussed.

In conjunction with the November meeting, Commission representatives held a one-day meeting with the staff of the National Marine Fisheries Service to review the scientific and other aspects of the Service's tuna-porpoise program. Based on information presented at the reviews, at the end of 1991, the Commission was preparing a letter to the Service recommending ways the program might be improved.

Status of Dolphin Stocks

As noted above, the incidental take permit issued to the American Tunaboat Association in 1980 was legislatively extended, and quotas for eastern spinner and coastal spotted dolphins were added, during the 1984 reauthorization of the Marine Mammal Protection Act. The 1984 amendments also directed the Secretary of Commerce to undertake a scientific research program to monitor indices of abundance and trends of dolphin stocks taken incidental to the eastern tropical Pacific tuna fishery. If, based upon data collected under the monitoring program and other information, the Secretary determines that the fishery is having a significant adverse effect on any dolphin stock, the Secretary is required to modify the incidental take quotas and/or gear requirements of the American Tunaboat Association's permit to the extent necessary to protect the affected stock.

The Service initiated its monitoring program in 1986 and has completed five of the six planned survey cruises. In light of the decreased participation of the U.S. fleet in the fishery beginning in 1990 and the corresponding reduction in dolphin mortality, survey cruises were not conducted in 1991. The monitoring program was designed to detect changes in the abundance of northern offshore spotted dolphins (on the order of 6 to 10 percent per year), the stock most frequently taken in the fishery. No significant trends in the abundance of northern offshore spotted, eastern spinner, or other dolphin stocks were detected from data collected during the five-year monitoring program. However, for such trends to be detected over the five-year survey period, stock sizes would have had to increase or decrease by roughly 40 to 50 percent. Analyses based on data collected by observers onboard tuna fishing vessels also indicate no significant trend, suggesting that most dolphin stocks in the eastern tropical Pacific remained stable during the last half of the 1980s.

The National Marine Fisheries Service convened a workshop in November 1991 to assess the status of dolphin stocks in the eastern tropical Pacific. Representatives of the Marine Mammal Commission, the Inter-American Tropical Tuna Commission, and the U.S. tuna industry participated. The findings of the workshop will be presented in a report to Congress early in 1991 prior to hearings on reauthorization of the Marine Mammal Protection Act.

When the monitoring program requirement was enacted in 1984, Congress noted the shortcomings of the system then in place to regulate incidental taking (*i.e.*, determining the status of stocks by comparing estimates of current and historic population abundance). Congress intended the new program to be the "primary...source of information for monitoring and assessment of the health and status of affected porpoise stocks." Contrary to Congressional expectations, however, the monitoring program has not proven to be an effective means for determining if marine mammal stocks are being adversely affected by the tuna fishery. In this regard, a draft paper pre-

pared by National Marine Fisheries Service scientists stated:

> "If the recent level of mortality continues and given the level of precision in monitoring trends and abundance, it is unlikely that significant changes in abundance will be detected in the near future. Therefore, managing mortality levels so that they do not exceed some fraction of the expected net production should be considered as a more reasonable management strategy than managing levels based on trends in relative abundance."

Concerned that dolphin stocks had been and continue to be adversely affected by the tuna fishery, environmental groups petitioned to have two stocks designated as depleted under the Marine Mammal Protection Act and listed as threatened under the Endangered Species Act in 1991. Under the Marine Mammal Protection Act, any population that is below its maximum net productivity level, the lower bound of the optimum sustainable population range, is considered to be depleted. The National Marine Fisheries Service has determined that maximum net productivity in small cetaceans, such as those dolphin species taken incidental to the eastern tropical Pacific tuna fishery, occurs at about 60 percent of carrying capacity. A threatened species is one "which is likely to become endangered in the foreseeable future throughout all or a significant portion of its range."

On 2 August 1991, the Committee for Humane Legislation and 23 other groups petitioned the Secretary of Commerce to designate the eastern spinner dolphin (*Stenella longirostris orientalis*) as a depleted stock. The petition asserted that a depletion finding was warranted because "[i]ncidental catches of this population in the tuna purse-seine fishery have reduced it to about 20 percent of its original size over the last two decades — declining from about 2,000,000 to 400,000." The petitioners also noted a recent report published by the National Marine Fisheries Service's Southwest Fisheries Science Center that estimated mortality incidental to the tuna fishery to have resulted in a 56 to 74 percent decline in eastern spinner dolphin abundance since the 1950s.

On 30 August 1991, the Center for Marine Conservation, the Committee for Humane Legislation, and 19 other groups petitioned the Secretary of Commerce to list the eastern spinner dolphin as threatened. The petition indicated that more than 1.5 million eastern spinner dolphins had been killed incidental to the eastern tropical Pacific tuna fishery since 1959, reducing the population to approximately 20 percent of its original size. The petitioners also noted that, between 1986 and 1990, fishery-related mortality of this stock averaged 13,860 animals per year. The annual mortality during this period constituted about 2.4 percent of the population and exceeded the population's estimated net productivity rate of two percent. The petition also called upon the Secretary to enter into bilateral or multilateral agreements to conserve the species and to eliminate tuna fishing by setting purse seine nets on dolphins.

A petition seeking designation of the northern offshore stock of spotted dolphins (*Stenella attenuata*) as depleted was submitted to the Secretary of Commerce by Environmental Solutions International, Greenpeace U.S.A., and seven other groups on 28 October 1991. Comparing the historic abundance estimate for this stock adopted by the Service in its 1980 quota-setting rulemaking (5,030,000) with the "best available" current population estimate (658,300-2,205,500), the petitioners assert that the northern offshore spotted dolphin is well below 60 percent of carrying capacity and is therefore depleted.

The Center for Marine Conservation petitioned the Secretary of Commerce on 30 October 1991 to list the northern offshore spotted dolphin under the Endangered Species Act as threatened. Based on data published by the National Marine Fisheries Service, the petitioners maintained that the stock had been reduced by mortality in the tuna fishery to about 30 percent of its original size. In addition, the petitioners noted that annual incidental mortality during 1986-1990 averaged 48,040 animals, for an annual mortality of about 3.2 percent. In the absence of evidence to the contrary, mortality rates in excess of two percent per year are assumed to be unsustainable by Service scientists.

The National Marine Fisheries Service published a notice in the *Federal Register* on 5 November 1991 finding that the petitions presented substantial information indicating that designating the eastern spinner dolphin as depleted and listing the stock as threatened

may be warranted. On 18 December 1991, the Service published a notice that the petitions concerning the northern offshore spotted dolphin also presented substantial information indicating that the petitioned actions may be warranted. Public comment on all four petitions was invited. The Commission expects to comment on the proposals early in 1992.

On 28 October 1991, Earth Island Institute wrote to the Secretary of Commerce seeking to have the U.S. quota for incidental dolphin mortality reduced to zero. In its letter, Earth Island Institute maintained that the success of U.S. purse seiners that were catching only "dolphin safe" tuna had demonstrated that it was economically and technologically feasible to fish for tuna without setting on dolphin. The letter also noted that the current level of incidental taking was adversely affecting the eastern spinner dolphin stock and should be reduced. The Service had not yet responded to the letter at the end of 1991.

Inter-American Tropical Tuna Commission

The Inter-American Tropical Tuna Commission is an international body established in 1949 to study the tuna resources of the eastern Pacific Ocean and make recommendations for the management and conservation of those resources. As the foreign share of the purse seine fishery grew, and the associated marine mammal mortality increased, the role of the Tuna Commission was expanded. Beginning in 1977, the Tuna Commission was charged with monitoring incidental mortality of porpoises throughout the fishery, assessing the impact of that mortality on porpoise stocks, and introducing measures to reduce the level of take to the maximum extent possible.

At the Tuna Commission's 26-28 June 1990 annual meeting, the United States proposed that the Commission's porpoise conservation program be expanded to (1) enhance research into ways to avoid killing porpoises incidental to purse seine operations; (2) provide 100 percent observer coverage on all tuna vessels in the eastern tropical Pacific; and (3) include international marine mammal quotas that would be progressively reduced over time to levels as close to zero as possible. The U.S. proposal was discussed in greater detail at a special meeting of the Tuna Commission on 17-20 September 1990 in Costa Rica. During that meeting, an intergovernmental meeting with participants from all nations with a significant interest in the fishery, whether members of the Commission or not, was convened and a resolution calling for an expanded porpoise conservation program was adopted.

The nations participating in the intergovernmental meeting agreed to establish an international program to reduce dolphin mortality in the eastern tropical Pacific tuna fishery. The program has a short-term goal of significantly reducing dolphin mortality and a long-term goal of reducing dolphin mortality to insignificant levels approaching zero. Under the agreement, these goals are not paramount, but are to be pursued in concert with the goal of maintaining optimal utilization and conservation of the tuna resource. Among other things, the international program calls for (1) limits on dolphin mortality; (2) 100 percent observer coverage; (3) research programs to improve existing fishing gear and techniques and to investigate possible alternative fishing methods that may eliminate dolphin mortality; and (4) a training program to improve operator performance throughout the international fleet.

The parties to the intergovernmental agreement further agreed to convene a follow-up meeting by February 1991 to elaborate on the technical and economic aspects of the international program. That meeting was held in La Jolla, California, on 16-18 January 1991. At that meeting, U.S. representatives agreed to set forth requirements which, if met, would allow a nation's tuna to be imported into the United States. Noting that commitment, the parties to the intergovernmental agreement expressed their willingness to make their best efforts to: (1) achieve 100 percent observer coverage; (2) contribute to the funding of the Inter-American Tropical Tuna Commission's observer program; (3) support research programs to identify and develop alternative fishing techniques to catch large yellowfin tuna without setting on dolphins; (4) reduce dolphin mortality in 1991 by 50 percent as compared with 1989; and (5) continue to develop and implement a dolphin conservation program in 1992 and subsequent years.

Legislation

Since enactment of amendments to the Marine Mammal Protection Act in 1988, various legislative proposals have been introduced that would modify

certain requirements regarding the U.S. tuna-porpoise program. The only one of these to be enacted is the Dolphin Protection Consumer Information Act, which was enacted on 28 November 1990 as section 901 of the Fishery Conservation Amendments of 1990.

The Dolphin Protection Consumer Information Act establishes criteria for when tuna and tuna products may be labeled "dolphin safe." Contrary to earlier proposals, however, it does not require negative labeling for tuna caught in ways that may harm marine mammals. To qualify as dolphin safe, tuna caught in the eastern tropical Pacific must have been caught by a vessel too small to deploy its nets on dolphins or must be accompanied by a certification from a qualified observer that no dolphin sets were made for the entire trip on which the tuna was caught. In addition, the Act specifies that tuna harvested on the high seas by any vessel engaged in large-scale driftnet fishing may not be labeled as dolphin safe. A knowing violation of the labeling requirements is punishable by a fine of up to $100,000.

Under the Dolphin Protection Consumer Information Act, the National Marine Fisheries Service was required to publish implementing regulations by 28 May 1991. Interim regulations were published on 12 September 1991.

On 3 January 1991, Representative Barbara Boxer (Democrat-California) introduced H.R. 261, the Dolphin Protection and Fair Fishing Act of 1991. That bill, if enacted, would revoke the American Tunaboat Association's general permit on 31 December 1992 and thereafter prohibit the Secretary of Commerce from authorizing U.S. fishermen to fish for yellowfin tuna by intentionally setting purse seine nets on marine mammals. During 1992, the U.S. quota would be reduced to 2,500 dolphins. To ensure compliance with these provisions, all U.S. tuna vessels operating in the eastern tropical Pacific would be required to carry observers.

The bill also would modify the foreign comparability provisions of the Marine Mammal Protection Act by requiring foreign fleets to achieve an incidental dolphin mortality rate no greater than 1.0 times the U.S. rate by the end of the 1991 fishing season and thereafter. In addition, the bill would require comparable foreign tuna-porpoise programs to have 100 percent observer coverage and to prohibit their vessels from intentionally setting on dolphins after 1992.

H.R. 261 had not been considered by the House of Representatives at the close of the 1991 Congressional session.

As indicated above, the Department of State committed itself at the January 1991 intergovernmental meeting in La Jolla to seek amendments to the tuna embargo provisions of the Marine Mammal Protection Act. Proposed legislation was transmitted to Congress in June 1991. Under the proposal, tuna would not be subject to embargo if the harvesting nation (1) participates in an international dolphin conservation program in which the United States participates; (2) participates in research designed to find alternative ways to catch yellowfin tuna without setting on dolphins; (3) has 100 percent observer coverage; (4) achieved a 50 percent reduction in dolphin mortality in 1991 as compared to 1989; and (5) achieved a 60 percent reduction in dolphin mortality in 1992 as compared to 1989. Legislation to give effect to the State Department proposal has yet to be introduced.

Litigation Related to the Tuna-Porpoise Issue

A lawsuit originally filed by Earth Island Institute on 12 April 1988 (*Earth Island Institute* v. *Mosbacher*), before enactment of the 1988 amendments to the Marine Mammal Protection Act, amendments, continued to be an important factor in shaping the U.S. tuna-porpoise program during 1991. Earlier rulings in the case focused on the observer requirements for both the U.S. and foreign fleets. These are discussed in the previous Annual Report.

Beginning in mid-1990, the focus of the case shifted to the Act's comparability requirements with respect to dolphin mortality rates. As noted above, the 1988 amendments specified that, for a foreign tuna-porpoise program to be found comparable to the U.S. program, the average incidental take rate of that nation's fleet must be no more than 2.0 times that of the U.S. fleet by the end of the 1989 season and no more than 1.25 times the U.S. rate by the end of the 1990 and subsequent seasons. In addition, a foreign program would not be considered comparable to the U.S. program if the incidental take of eastern spinner dolphins exceeded 15 percent, or if the incidental take

of coastal spotted dolphins exceeded 2 percent, of the nation's total incidental take.

On 22 June 1990, plaintiffs filed a motion for a preliminary injunction, asking the District Court to enjoin tuna imports from those foreign nations whose vessels purse seine for tuna in the eastern tropical Pacific until such time as the required mortality rate findings had been made by the National Marine Fisheries Service. Plaintiffs argued that, as of 1 January 1990, only tuna from countries whose dolphin kill rate was no more than twice that of the U.S. fleet and whose take of eastern spinner and coastal spotted dolphins during 1989 did not exceed the established quotas could be imported. The National Marine Fisheries Service contended that the comparability findings must be based on data from the entire 1989 fishing season and therefore could not be made until after 31 July 1990, when data from all 1989 trips were available and had been analyzed.

On 28 August 1990, the Court issued a preliminary injunction partially granting and partially denying Earth Island Institute's motion. The Court ruled that the 1988 amendments to the Marine Mammal Protection Act clearly prohibited, as of the end of 1989, a positive comparability finding, and tuna imports pursuant to such a finding, for any nation whose vessels had an average incidental take rate that exceeded 2.0 times that of U.S. vessels. The Court therefore ordered the Secretary of the Treasury to embargo yellowfin tuna harvested in the eastern tropical Pacific Ocean by foreign fishermen until the required determinations had been made. The Court's opinion indicated that the Act does not require the comparison between foreign and U.S. dolphin mortality rates to be based upon data for an entire calendar year, but merely for "the same period." Thus, while the Service could have based its mortality rate comparisons on data for the entirety of 1989, it could also have made findings based upon data from the first six or eight months of that year.

In contrast to the ruling regarding total dolphin mortality rates, the Court ruled that findings based on the take of eastern spinner and coastal spotted dolphins by foreign fleets must be based on data from an entire fishing year although they need not be made by the end of a fishing season. As such, the Court left intact the Service's regulations that gave foreign nations until 31 July to provide stock-specific data for the preceding fishing year. The Court cautioned, however, that, once the necessary reports are filed, the Service should make prompt decisions as to whether the eastern spinner dolphin and coastal spotted dolphin limits have been exceeded.

As required by the Court, the U.S. Customs Service, on 6 September 1990, prohibited imports of yellowfin tuna and yellowfin tuna products into the United States unless a declaration that the fish were not caught using purse seine nets in the eastern tropical Pacific was provided. The embargo applied to tuna imports from the five nations fishing for tuna in the eastern tropical Pacific: Mexico, Venezuela, Vanuatu, Panama, and Ecuador. The following day, however, the National Marine Fisheries Service completed its review of the 1989 dolphin mortality data submitted by Venezuela, Vanuatu, and Mexico and, based on those data, issued positive comparability findings for Venezuela and Vanuatu. The embargo of tuna from these two countries was immediately lifted. Data submitted by Mexico revealed a 1989 dolphin mortality rate that was 2.39 times that of the U.S. fleet. In addition, eastern spinner dolphins accounted for approximately 24 percent of the Mexican fleet's 1989 incidental mortality. Thus, Mexico failed to meet either the mortality rate comparability test or the eastern spinner quota.

Anticipating that its program would not be found comparable based on 1989 data, Mexico also submitted data for the first eight months of 1990, seeking reconsideration of the finding based on the more recent performance of its fleet. Based on the partial 1990 data, which indicated a mortality rate that was 1.58 times the U.S. rate and an acceptable reduction in the percentage of eastern spinner dolphins taken, the National Marine Fisheries Service also issued a positive finding of comparability for Mexico on 7 September 1990. A positive finding was made for Ecuador on 11 September, based upon its enactment of legislation banning its nationals from fishing for tuna by setting on dolphins. This left Panama as the only nation affected by the Court-imposed tuna embargo.

In response to the Service's finding of comparability for Mexico, Earth Island Institute, on 17 September 1990, sought a temporary restraining order to reim-

pose the import ban against tuna from that country. Plaintiffs argued that, under the Court's 28 August ruling, a foreign incidental mortality rate based on 1990 data must be no more than 1.25 times the U.S. rate before the embargo could be lifted. Plaintiffs also contended that Mexico's failure to meet the eastern spinner quota for 1989 could be corrected only by meeting the standard for the entirety of 1990.

The Court issued a temporary restraining order on 4 October 1991, again prohibiting the importation of Mexican tuna. That order was based on a determination that the Marine Mammal Protection Act does not permit reconsideration of the eastern spinner finding based on data for less than a full fishing season. The Court also ruled that foreign fleets were not required to achieve a mortality rate that is no more than 1.25 times the U.S. mortality rate until the end of 1990. Thus, had it not been for the unacceptably high mortality of eastern spinner dolphins in 1989, the showing by Mexico that its mortality rate for the first eight months of 1990 was less than twice the U.S. rate for the same period would have been sufficient to overcome the import ban.

At defendants' request, the Court converted the temporary restraining order to a preliminary injunction on 19 October 1990, clearing the way for an immediate appeal. Federal defendants appealed the District Court ruling to the U.S. Court of Appeals for the Ninth Circuit on 22 October 1990, seeking expedited review. On 14 November 1990, the Court of Appeals granted the Government's motion to stay the ban on tuna imports from Mexico pending resolution of the appeal. Pursuant to that stay, the import prohibition on Mexican tuna was lifted on 16 November 1990. Oral argument of the appeal was heard on 14 February 1991 and, five days later, the Court of Appeals vacated its stay of the District Court's injunction, reimposing the embargo of Mexican tuna.

The Court of Appeals issued its decision on 11 April 1991, affirming the lower Court's ruling. The Court of Appeals, like the District Court, found the statutory language to be clear. Contrary to the Service's regulations, which allowed for reconsideration on data from part of a year, the statute required findings with respect to eastern spinner and coastal spotted dolphins to be based on a full year's data. The Court also rejected the Service's policy-based argument that the reconsideration provision offers foreign nations an incentive to speed up efforts to comply with Marine Mammal Protection Act standards. The Court noted that, contrary to this contention, the reconsideration provision allowed nations to continually exceed the Act's limits for part of each year, yet never be subject to an import ban. The Court illustrated this point by noting that Mexico, which had exceeded Marine Mammal Protection Act standards for the entirety of 1990, had been subject to an embargo for less than one day. Further, the Court found the Government's contention that it sought only to provide additional incentives to further dolphin protection was belied by the Service's record of non-enforcement of the Act's provisions prior to enactment of the 1988 amendments.

On 15 February 1991, Earth Island Institute filed another motion in the District Court seeking to enjoin tuna imports from all foreign nations fishing in the eastern tropical Pacific until the National Marine Fisheries Service determined that those nations had achieved a dolphin mortality rate no more than 1.25 times the U.S. rate by the end of 1990. Despite the Court's earlier rulings, the Service, on 27 December 1990, had issued an interim rule giving tuna fishing nations until 15 March 1991 to submit mortality data for the 1990 fishing season and extending the 1989 comparability findings until 31 May 1991, by which time new findings would have been issued. A hearing on the motion was held on 18 March 1991.

As expected, the Court ruled in plaintiff's favor and, on 26 March 1991, ordered a prohibition on tuna imports from each nation fishing in the eastern tropical Pacific until such time as the Service made a positive finding that the nation has achieved an average incidental taking rate that is no more than 1.25 times the U.S. rate for the same period or until the Service determined that the government of the exporting nation has taken sufficient steps to prohibit its vessels from setting on porpoises in the course of fishing for tuna. In accordance with this ruling, tuna harvested by Venezuela and Vanuatu in the eastern tropical Pacific, in addition to tuna harvested by Mexico, which already had been embargoed, were embargoed on 3 April 1991.

On 8 August 1991, Earth Island Institute moved to convert four preliminary injunctions into permanent

injunctions. Those preliminary injunctions concerned domestic observer coverage (issued on 18 January 1989), 1989 foreign comparability findings (issued 28 August 1990), the 1990 reconsideration of the comparability finding for Mexico (issued 19 October 1990), and the 1990 foreign comparability findings (issued 26 March 1991). On 26 August 1991, plaintiffs filed another motion seeking (1) to compel the National Marine Fisheries Service to issue regulations to implement the Dolphin Protection Consumer Information Act's ban on importing tuna and other fish products harvested with large-scale driftnets and (2) to broaden the scope of the intermediary nation tuna embargoes that had been implemented by the Service under the Marine Mammal Protection Act.

The Court ruled on the motion to convert the preliminary injunctions to permanent injunctions and on the motion to compel issuance of regulations in a 13 November 1991 order. All of the preliminary injunctions were converted into permanent injunctions. Under the Dolphin Protection Consumer Information Act, the Service was required to issue implementing regulations by 28 May 1991. While these regulations had not been issued when the plaintiff's filed their motion on 26 August 1991, the Service issued final interim regulations on 12 September 1991. The Court found the interim regulations sufficient to satisfy the requirements of the Act and denied plaintiff's motion.

Other than the matter of attorneys' fees, the only issue in the case pending at the end of 1991 was the breadth of the secondary embargoes required under the intermediary nation provision of the Marine Mammal Protection Act. Section 101(a)(2)(C) of the Act requires that tuna imports from intermediary nations be embargoed unless the government of the intermediary nation that exports yellowfin tuna or tuna products to the United States certifies that it has acted, within 60 days of a U.S. embargo, to prohibit the importation of such tuna from those nations that are banned from directly exporting tuna to the United States. Plaintiffs assert that a secondary embargo under section 101(a)(2)(C) is broader than the underlying primary embargo and applies to *all* yellowfin tuna and tuna products. Plaintiffs also maintain that the Secretary of the Treasury is not obtaining the required certifications from all intermediary nations before allowing tuna from those nations to be imported into the United States. The Service contends that the scope of the secondary embargo is the same as the scope of the primary import ban. That is, a secondary embargo applies only to yellowfin tuna harvested by embargoed fishing nations with purse seine nets in the eastern tropical Pacific. Oral argument on this issue was heard on 23 September 1991. A decision is expected early in 1992.

General Agreement on Tariffs and Trade

The General Agreement on Tariffs and Trade (GATT) is an international agreement that sets forth limitations on the use of international trade restrictions, such as taxes, duties, quotas, or unnecessarily restrictive standards. The agreement was originally drafted in 1947 and currently has over 100 contracting parties, including the United States. Trade disputes that may arise between contracting parties are settled either by consultations between the parties or, if consultations prove unsuccessful, by referral to a formal dispute panel.

On 5 November 1990, Mexico requested consultations with the United States concerning the imposition of tuna import restrictions under the Marine Mammal Protection Act. Consultations were held on 19 December, but failed to resolve the dispute. On 25 January 1991, Mexico requested that a panel be established under the General Agreement to resolve the dispute.

The panel met three times in May and June 1991 to hear arguments from Mexico and the United States, as well as from other interested parties. Mexico asserted not only that the Marine Mammal Protection Act's embargo provisions were inconsistent with the General Agreement, but also challenged the possible broadening of trade sanctions under the Pelly Amendment, the intermediary nation tuna embargoes, and the tuna labeling provisions of the Dolphin Protection Consumer Information Act.

The panel delivered its decision to the GATT contracting parties on 3 September 1991. The panel found the U.S. embargo of Mexican tuna to be inconsistent with the General Agreement. The panel rejected the U.S. position that the embargo was consistent with General Agreement Article III because the Marine Mammal Protection Act constituted an internal measure that treated foreign caught tuna no

less favorably that tuna caught by the U.S. fleet. The panel found that Article III was not applicable in this instance because the trade measure was not applied to tuna as a product, but rather to the method of production. Having found that Article III did not apply, the panel determined that the Act's embargo provision violated General Agreement Article XI, which prohibits quantitative restrictions on imports.

The panel then considered arguments made by the United States that the embargo provision fits within exceptions under Article XX(b) and XX(g) that allow contracting parties to adopt trade measures "necessary to protect human, animal or plant life or health" or "relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption." The panel found that Article XX(b) did not apply to measures taken to protect the life or health of animals beyond the jurisdiction of the country applying the measures. Similarly, the panel found that the Article XX(g) exception did not apply extrajurisdictionally. To interpret the provision more broadly, the panel stated, would allow contracting parties to dictate unilaterally the environmental policies from which other countries could not deviate without jeopardizing their rights under the General Agreement.

The panel also determined that, even if the Article XX exceptions could be applied extrajurisdictionally, they would not be available in the case of the tuna embargoes. In the panel's view, the United States had not demonstrated that the embargoes were "necessary" within the meaning of Article XX(b) or "primarily aimed at conservation" within the meaning of Article XX(g) because there had been no showing that other, less restrictive means of addressing the tuna-porpoise problem, such as international agreements, were unavailable.

Using identical reasoning, the panel also found the intermediary nation embargo provision of the Marine Mammal Protection Act to be inconsistent with the General Agreement. The Pelly Amendment provisions were found not to be inconsistent with the General Agreement. While indicating that trade sanctions imposed under the Pelly Amendment would likely be found inconsistent with the General Agreement, the panel stated that a statutory provision that authorizes, but does not require, trade measures inconsistent with the General Agreement is not itself in conflict with the General Agreement. The tuna labeling requirements of the Dolphin Protection Consumer Information Act were determined to be consistent with the General Agreement.

Under GATT procedures, a panel decision does not become effective until it has been adopted unanimously by the GATT Council. That is, one nation can block adoption of the decision. Shortly after release of the panel's decision, 62 members of the U.S. Senate wrote to the President asking that the United States block adoption. Pending further bilateral negotiations, Mexico and the United States agreed not to have the panel decision considered by the GATT Council. Unless and until the Council has adopted the decision, the United States is not technically in violation of the General Agreement and is under no obligation to bring its domestic law into conformance with the General Agreement.

Several nations have expressed concern about the panel's decision and are reviewing potential conflicts between international trade policies and environmental objectives. A GATT working party on trade and the environment has been reconstituted to study whether multilateral agreements may be used as a basis for invoking the Article XX(b) and XX(g) exceptions extrajurisdictionally.

Chapter IV

INTERNATIONAL ASPECTS OF MARINE MAMMAL PROTECTION AND CONSERVATION

Section 108 of the Marine Mammal Protection Act directs that the Departments of Commerce, the Interior, and State, in consultation with the Marine Mammal Commission, seek to further the protection and conservation of marine mammals under existing international agreements and take such initiatives as may be necessary to negotiate additional agreements required to achieve the purposes of the Act. In addition, section 202 of the Marine Mammal Protection Act directs that the Marine Mammal Commission recommend to the Secretary of State and other Federal officials appropriate policies regarding international arrangements for the protection and conservation of marine mammals.

The Commission's activities in 1991 with respect to the International Whaling Commission, alleviating the widespread impacts of high seas driftnet fisheries on marine resources, the conservation and protection of marine mammals in the Southern Ocean, and the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region are discussed below.

International Whaling Commission

During 1991, representatives of the Marine Mammal Commission and its Committee of Scientific Advisors consulted with the U.S. Commissioner to the International Whaling Commission (IWC) in preparation for the 43rd annual meeting of the IWC. They participated in meetings of the IWC and its Scientific Committee and worked with the U.S. Commissioner to the IWC, the Department of State, and others on related post-meeting actions. Activities taking place before, during, and after the 1991 annual meeting of the IWC are discussed below.

Pre-Meeting Activities

Management Procedure Workshop — At its 1982 meeting, the IWC adopted a resolution establishing a moratorium on commercial whaling, effective with the 1985/1986 pelagic and the 1986 coastal whaling seasons. The moratorium provision called on the IWC to, among other things, undertake a comprehensive assessment of the effects of this decision on whale stocks and to consider alternative management procedures. To guide its Scientific Committee in this task, in 1987 the IWC set forth the following three general management objectives: (1) the risk of depleting a stock below some chosen level (*e.g.*, some proportion of its carrying capacity) must be acceptable; (2) catch limits should be stable over time to allow orderly development of the whaling industry; and (3) catch limits should seek to achieve the highest possible continuing yield from the stock.

The IWC Scientific Committee held a series of workshops to examine five potential revised management procedures to assess the status of whale stocks and to serve as the basis for recommending catch quotas. The fourth workshop, held on 5-12 December 1990 in Tokyo, Japan, was convened to review results of tests using the five candidate management procedures and to identify further tests to be undertaken and reviewed during the 1991 meeting of the Scientific Committee. During the December workshop, a recommended approach for comparing the five candidate procedures was developed to help meet the goal of presenting a recommended "best" procedure to the Scientific Committee and the IWC at their 1991 meetings.

Although the United States did not participate directly in developing the candidate procedures,

members of the U.S. delegation to the Scientific Committee (including members of the Marine Mammal Commission's Committee of Scientific Advisors) participated in intercessional workshops. In preparing for the 1991 meeting of the Scientific Committee, they also reviewed the results of the simulation studies conducted at the Tokyo workshop.

Comprehensive Assessment of North Atlantic Fin Whales — As noted above, the 1982 moratorium provision called upon the IWC to undertake a comprehensive assessment of the effects of the moratorium decision on whale stocks, the purpose being to determine if catch limits should be set at levels other than zero. At its 1986 meeting, the IWC Scientific Committee agreed that the comprehensive assessment would include an in-depth evaluation of the status of all whale stocks. For each stock, this would include examination of current stock size, recent population trends, carrying capacity, productivity, and other relevant biological information. The Scientific Committee identified three work components of the comprehensive assessment: (1) a review of current knowledge concerning methodology, stock identity, and data availability; (2) identification and collection of data required for the comprehensive assessment; and (3) examination of possible alternative management regimes.

At its 1990 meeting, the IWC Scientific Committee agreed to convene a special intercessional meeting on 26 February-3 March 1991 in Reykjavik, Iceland, to conduct a comprehensive assessment of North Atlantic fin whales. During the meeting, participants considered stock definition, abundance estimates, population models, ecological interactions, and additional research needs. The meeting was generally unsuccessful. Information proved insufficient to allow a determination as to whether there were two or more discrete fin whale stocks in the North Atlantic, and no conclusions were reached regarding population size. The workshop participants therefore recommended, among other things, that additional data from DNA and/or photographic identification studies be collected to answer questions regarding stock structure and to complete other aspects of the assessment of North Atlantic fin whales.

1991 Meeting of the IWC and its Scientific Committee

Membership and Participation — The 43rd meeting of the Scientific Committee of the IWC was held 10-20 May 1991 in Reykjavik, Iceland. Following the Scientific Committee meeting, representatives of 30 of the 37 member nations participated in the 43rd annual meeting of the IWC on 27-31 May in Reykjavik.

At its 1990 meeting, the IWC deferred consideration of lifting the 1982 moratorium on commercial whaling pending development of a revised management procedure by its Scientific Committee. As described below, the Scientific Committee put forward its best candidate for such a procedure in 1991 and its adoption by the IWC has set the stage for future consideration of commercial catch limits other than zero. The implications for such a decision on the conservation of whale stocks and for the United States are discussed below.

Comprehensive Assessments — As noted above, the 1982 moratorium called upon the IWC to undertake, by 1990 at the latest, a comprehensive assessment of the effects of the moratorium decision on whale stocks and to consider establishing catch limits other than zero. To date, the Scientific Committee has completed or attempted to complete comprehensive assessments for eastern North Pacific gray whales (April 1990); Southern Hemisphere minke and North Atlantic minke whales (June 1990); North Atlantic fin whales (February 1991); North Pacific minke whales (May 1991); and Bering-Chukchi-Beaufort Seas bowhead whales (May 1991).

The comprehensive assessments have been difficult to carry out, largely because of uncertainties concerning key issues, such as stock discreteness and mixing rates, interpretation of abundance trends, appropriate maximum sustainable yield rates and levels, and the integration of biological information into assessment models. At its 1991 meeting, the Scientific Committee noted that these were the same difficulties that resulted in the failure of the previously used management procedure, and that they continued to prevent the Committee from reaching agreement on stock

status. The Committee agreed that, for future assessments, it would need to determine first whether adequate data were available. If not, data needs would have to be identified and satisfied before proceeding with the assessment. To address these problems, the Committee established a working group on population assessment models to develop reliable population models to integrate biological and abundance data.

As discussed in Chapter II, at its 1991 meeting, the Scientific Committee undertook a comprehensive assessment of the Bering-Chukchi-Beaufort Seas stock of bowhead whales. The assessment produced a new estimated initial (1848) population size of 12,400-18,200 whales; a current population estimate of 7,500 whales (95 percent confidence interval 6,400 to 9,200); a provisional rate of annual increase of 3.1 percent (95 percent confidence interval 0.1 percent to 6.2 percent) from 1978 to 1988; and a minimum estimate of annual replacement yield of 92 whales. This new assessment suggests that the Bering-Chukchi-Beaufort Seas stock has increased under relatively consistent subsistence catches of approximately 0.3 percent per year and that the stock may be closer to its maximum net productivity level than previously thought.

The Scientific Committee also conducted a comprehensive assessment of western North Pacific minke whales at its 1991 meeting. It concluded that there are at least two stocks of minke whales — the Okhotsk Sea-West Pacific stock and the protected Sea of Japan-Yellow Sea-East China Sea stock — that mix to some unknown degree in the area north of Japan in early spring. The Committee concluded that, if exploited, individuals from both stocks would be likely subject to harvests in the area where they overlap and, therefore, each stock would need to be managed separately. Despite inadequate biological information, the Committee concluded that, for the Okhotsk Sea-West Pacific stock, the best estimate of population size in the Okhotsk Sea was 19,209 animals (95 percent confidence interval 10,069 to 36,645) and the best estimate of population size in the northwest Pacific was 5,841 animals (95 percent confidence interval of 2,835 to 12,032) with a combined population size of 25,049 whales (95 percent confidence interval of 13,689 to 45,835). Because of the wide range of the confidence intervals for these estimates, it was impossible for the Committee to advise the IWC on the effect of the 1982 moratorium decision on the Okhotsk Sea-West Pacific stock of minke whales.

Regarding future comprehensive assessments, the Scientific Committee recommended, and the IWC agreed to consider, all Southern Hemisphere baleen whales (except minke and right whales) and North Atlantic minke, fin, and sei whales at its 1992 meeting. A steering group for baleen whale assessments was established and is scheduled to meet in Copenhagen on 2-6 March 1992.

Revised Management Procedure — As noted above, the 1982 moratorium provision called upon the IWC to undertake a comprehensive assessment of the effects of the whaling moratorium on whale stocks. The IWC subsequently agreed with a recommendation of its Scientific Committee that this should include an examination of alternatives to its management procedure for calculating whaling quotas. The Scientific Committee began developing a revised management procedure and assessing candidate procedures during a series of workshops and special meetings beginning in 1989.

The Committee reviewed results of the December 1990 workshop in Tokyo and, at its 1991 meeting, it recommended adoption of a single-stock management procedure developed by J. Cooke. Based on an assumption that long-term management of a population should not allow it to be reduced below 72 percent of the stock's carrying capacity or pre-exploitation size, the procedure would: (1) establish catch limits of zero for stocks found to be below 54 percent of their carrying capacity size, and (2) reduce catch limits from maximum level, when the stock is at its carrying capacity size, to zero, as a stock approaches 54 percent of its carrying capacity size.

The IWC subsequently adopted by resolution the recommended single-stock procedure. As a related matter, the resolution also requested the Scientific Committee to address the development of a multi-stock management procedure and provide advice on the minimum standards for data, including coverage and methodology for sighting surveys, analytical tech-

niques, and acceptable levels of precision necessary to implement the recommended revised management procedure. To speed its work, the IWC asked its Scientific Committee to convene an intercessional workshop and special meeting to consider the IWC's recommendations. The intercessional workshop is scheduled for 24-28 February 1992 and the special meeting of the Scientific Committee for 2-6 March in Copenhagen.

Aboriginal/Subsistence Whaling — During its 1991 meeting, the IWC adopted the following aboriginal subsistence catch limits:

- *Bering-Chukchi-Beaufort Seas stock of bowhead whales (taken by Alaska Eskimos)* — 141 total strikes for the years 1992, 1993, and 1994 with no more than 54 whales struck and no more than 41 landed in any one year, and a maximum of 13 unused strikes that may be carried over from the period 1989 to 1991;

- *Eastern North Pacific gray whales (taken by Soviet Eskimos)* — 179 whales for each of the years 1992, 1993, and 1994;

- *West Greenland fin whales (taken by Greenland)* — 21 whales for 1992; and

- *West Greenland minke whales (taken by Greenland)* — 315 total strikes for the years 1992, 1993, and 1994 with no more than 115 whales struck in any one year.

No changes were made in catch limits for other aboriginal subsistence whaling adopted at previous meetings. They remained as follows:

- *East Greenland minke whales (taken by Greenland)* — 12 whales for the years 1990, 1991, and 1992; and

- *Humpback whales (taken by St. Vincent and the Grenadines)* — 3 whales for the 1990/1991 and 1992/1993 seasons.

Special Permits for Scientific Research Whaling — The IWC conservation program allows member nations to issue special permits to take whales for scientific purposes, provided that the IWC and its Scientific Committee have an opportunity to review and comment on the research proposals. Since 1985, the IWC has adopted resolutions setting forth research criteria and guidelines governing its review of such proposals. Acting on advice from its Scientific Committee, the IWC has also adopted non-binding resolutions calling upon member nations to refrain from issuing or to reconsider proposed special permits that do not fully satisfy the IWC research criteria and guidelines.

At its 1991 meeting, the Scientific Committee considered research proposals from the Soviet Union to take 90 minke whales in the Okhotsk Sea and from Japan to take up to 330 Antarctic minke whales. As mentioned above, during its 1991 assessment of western North Pacific minke whales, the Scientific Committee commented on the uncertainties concerning the number and discreteness of minke whale stocks in the Okhotsk Sea and noted that, without better information, it was not possible to assess the effects of the proposed Soviet catch. In addition, the Scientific Committee noted that the Soviet proposal provided insufficient information to assess either the program's objectives, methodology, and minimum sampling needs for the coming and subsequent field seasons, or the degree to which non-lethal techniques could be used as alternatives to killing whales. In view of the Scientific Committee's comments, the IWC adopted a resolution requesting the Soviet Union to refrain from issuing a permit for the proposed catch.

With respect to the Japanese proposal, the Scientific Committee noted that the proposed research was essentially a continuation of the program that it had reviewed extensively during previous meetings. Therefore, the IWC again adopted a resolution inviting Japan to reconsider its research whaling program.

Small Cetaceans — Because the Whaling Convention itself neither lists nor defines the species it was created to manage, there has been extensive debate over the IWC's competence to regulate catches of small cetaceans, particularly as such regulation would relate to the rights of coastal states to regulate small cetacean catches within their respective Exclusive Economic Zones. Despite a lack of consensus on this issue, the IWC adopted a resolution in 1980 that:

(1) noted that the question of the IWC's competence over small cetaceans was not resolved; (2) recommended that the Scientific Committee's subcommittee on small cetaceans continue to review the status of small cetaceans and develop advice on their conservation; and (3) invited all contracting governments to consider that advice.

At its 1990 meeting, the IWC adopted a resolution requesting the Scientific Committee to compile information on the status of small cetacean stocks subject to significant directed and incidental takes and the effect of those takes on the stocks. The Scientific Committee presented its report to the IWC at the 1991 meeting. The report noted that three species of small cetaceans are critically endangered — the Gulf of California harbor porpoise, or vaquita (see Chapter II), the Indus river dolphin (susu), and the Chinese river dolphin (baiji) — and recommended immediate steps to protect them. The report also noted that the IWC-sponsored Workshop on Mortality of Cetaceans in Passive Fishing Nets and Traps, held in 1990 (see the previous Annual Report), reviewed information on the incidental take of small, as well as large, cetaceans in high-seas driftnet fisheries and concluded that this take is largely undocumented.

At its 1991 meeting, the IWC adopted a resolution commending the Scientific Committee for its work and adopting the report's recommendations. It also requested that its Secretariat forward the report to the United Nations for consideration at the 1992 United Nations Conference on Environment and Development, as well as to non-contracting governments, intergovernmental organizations, and other appropriate groups.

Humane Killing — At its 1980 meeting, the IWC adopted a resolution calling for a prohibition on the use of the "cold" or non-explosive harpoon for killing cetaceans. This measure resulted from concern that the non-explosive harpoon, used to improve the condition of the harvested product, prolonged the time it takes a whale to die and its use was, therefore, morally indefensible. As a result, the IWC Technical Committee established a working group on humane killing methods to review annually information on development of humane techniques to kill whales.

At its 1991 meeting, the working group reviewed subsistence whaling programs in Greenland and Alaska. Denmark presented information that, as of 1 April 1991, its whaling vessels were permitted to use only "penthrite" grenade harpoons to take minke and fin whales. (The penthrite harpoon, developed by Japan in the early 1980s, has been shown to significantly reduce the time required for a struck whale to die.) The United States presented a report by the Alaska Eskimo Whaling Commission on steps it had taken to improve harpoons and to train whalers in the use of the penthrite grenade harpoon to take bowhead whales.

The Technical Committee's last comprehensive review of humane killing methods took place in 1980 and new information has since been developed on the efficiency and physiological effects of killing methods. Noting this, the IWC adopted a resolution calling for a workshop to: (1) review killing methods currently in use or under development, and (2) assess and compare the their efficiency. A steering group for the workshop was formed and is expected to meet on 20-22 June 1992, prior to the next IWC meeting.

Review of Catch Limits for Commercial Whaling — As noted above, the 1982 moratorium provides for consideration of catch limits other than zero, based on the results of the comprehensive assessment of whale stocks. With the IWC's 1991 adoption of a revised management procedure for calculating catch limits, the Scientific Committee was given the task of advising the IWC on implementation of the procedure. It is expected to do so at its 1992 meeting. However, during the 1991 meeting, some IWC member nations argued that catch limits for certain whale stocks should be set and commercial whaling resumed under interim provisions until the revised management procedure was in place. Specifically, the Government of Japan proposed an interim take of 50 western North Pacific minke whales and the Government of Iceland proposed an interim take of 92 fin and 192 minke whales from the North Atlantic. Other members argued that it was inappropriate to discuss interim catch limits in light of the IWC's previous resolution to refrain from considering new commercial catch limits until the revised management procedure was implemented and the comprehensive assessments were completed.

During the discussion, Iceland's Commissioner to the IWC cited past IWC resolutions asking Iceland to refrain from issuing special permits for research proposals, its refusal to reclassify Icelandic minke whale stocks despite a Scientific Committee recommendation to do so, and its decision to delay the implementation of the revised management procedure by asking the Scientific Committee for advice on how to do so. Given these actions, the Commissioner stated that the organization is fundamentally flawed and that he would propose to his Government that Iceland withdraw from the IWC. Under Article XI of the Whaling Convention, any contracting government may withdraw from the Convention on 30 June of any year by giving notice to the depository government of its intention to do so on or before 1 January of the same year. Subsequently, by letter of 27 December 1991, the Government of Iceland notified the United States, in its role as depository government for the Convention, that it had filed such a notice and that Iceland intended to withdraw from the International Convention for the Regulation of Whaling on 30 June 1992.

Post-Meeting Activities

Scientific Research Permits — The United States has considered failure to follow resolutions adopted by the IWC on scientific research to be grounds for certification under two provisions of domestic law — the Packwood-Magnuson Amendment to the Magnuson Fishery Conservation and Management Act and the Pelly Amendment to the Fishermen's Protective Act. Certification under the Packwood-Magnuson Amendment mandates an immediate 50 percent reduction in the offending nation's fishery allocation from U.S. waters. Under the Pelly Amendment, the President has discretion to impose economic sanctions by restricting imports of fish and fish products into the United States from the certified nation.

At past meetings, the IWC adopted a series of resolutions asking Japan to refrain from and reconsider authorizing the lethal take of Antarctic minke whales for research purposes. Despite these resolutions, Japan took 272 whales during the 1987/1988 season, 241 whales during the 1988/1989 season, 330 during the 1989/1990 seasons, and 327 minke whale during the 1990/1991 season.

As noted in past Annual Reports, the Secretary of Commerce certified Japan under the Packwood-Magnuson and Pelly Amendments on 9 February 1988 for authorizing a research take. On 6 April 1988, the President directed the Secretary of State to withhold 100 percent of Japan's allocation of fish from U.S. waters pending further review. After each annual meeting of the IWC in 1988, 1989, and 1990, U.S and Japanese officials and scientists have met to discuss revisions or reconsideration of the Japanese research whaling program. Despite disapproval of the technical merits of the program by the IWC, Japan has carried out its research program and killed Southern Hemisphere minke whales.

As mentioned above, the IWC noted that Japan's 1991 research proposal was essentially a continuation of the previous program that failed to meet established criteria for lethal whale research programs. The IWC again adopted a resolution calling on Japan to reconsider its research program take of up to 330 minke whales from Area IV of the Antarctic.

Following the 1991 IWC meeting, Japanese officials and scientists presented U.S. officials with a revised scientific whaling research proposal and, as in previous years, asked that it be reviewed by U.S. scientists before it was submitted to the IWC. Principal changes in the program included the addition of two sighting vessels (for a total of five vessels) for abundance surveys. The Japanese scientists also agreed that, given the number of animals to be taken, they would be able to calculate only average mortality rates rather than age-specific mortality rates, which had been one of the major objectives of its research.

Members of the Marine Mammal Commission's Committee of Scientific Advisors and other U.S. scientists reviewed the revised Japanese research proposal. The reviewers concluded that: (1) the revised program continued to suffer from technical inconsistencies that had been noted in reviews of previous Japanese proposals; (2) it failed to reflect progress towards addressing the concerns identified by the IWC Scientific Committee; and (3) it was not clear whether the proposed objectives would contribute significant information to the IWC conservation program, particularly with respect to information

needed to make use of the revised management procedure.

By letter of 6 November 1991, the IWC Secretariat notified member nations that Japan had provided a revised research plan for the 1990/ 1991 field season.

As noted in previous Annual Reports, the Secretary of Commerce certified Norway in 1986 under the Pelly and Packwood-Magnuson Amendments for exceeding quotas adopted by the IWC for North Atlantic minke whales. The President chose not to impose sanctions against Norway under the Pelly Amendment because the Norwegian Government announced its intent to suspend commercial whaling indefinitely after 1987, thereby demonstrating efforts to bring its whaling program into conformance with the IWC conservation program.

At the 1988 IWC meeting, Norway submitted a scientific research proposal involving the killing of 35 minke whales in the North Atlantic. After reviewing the proposal, the IWC adopted a resolution expressing a majority view that its criteria for research involving the killing of whales had not been fully satisfied and calling upon Norway to refrain from issuing a special permit. Although Norway took 29 minke whales that summer, the U.S. Secretary of Commerce withheld certification in view of Norway's intention to modify its research program to better reflect the advice of the IWC. By the time of the 1989 IWC meeting, the program was not significantly improved and a resolution was again adopted calling on Norway to reconsider its lethal research catches. After the meeting, Norway issued a special permit for the research, allowing the take of 17 minke whales.

In light of Norway's action, the United States began to prepare a certification action. Norwegian and U.S. officials met in November 1989 to review Norway's research program and to discuss Norway's intentions in view of the pending certification. On 3 January 1990, the Marine Mammal Commission provided the National Oceanic and Atmospheric Administration with a summary of actions regarding Norway's research whaling, noting that certification was justified. On 9 February 1990, the Secretary of Commerce advised Norway's Ministry of Foreign Affairs that, if Norway subsequently decided to propose a lethal take of whales in 1990 and if the IWC continued to find that the research proposal failed to satisfy all applicable research criteria, Norway would be certified. At its 1990 meeting, the IWC adopted a resolution noting that Norway's proposed take of five North Atlantic minke whales did not meet all scientific research criteria and it called upon Norway to reconsider its decision to issue the special permit. On 10 August 1990, Norway advised the IWC Secretariat that it planned to issue the special permit. Subsequently, five minke whales were taken.

By letter of 19 October 1990, the Secretary of Commerce wrote to the President certifying that, under the Pelly Amendment, he had found Norway's scientific research activities to be diminishing the effectiveness of the IWC conservation program. On 19 December 1990, the President advised Congress that he had received the certification finding, but that he chose not to impose sanctions against Norway in light of significant improvements in its research program.

Norway did not present a proposal for a scientific catch of whales at the May 1991 meetings of the IWC and its Scientific Committee. Instead, Norwegian scientists provided members of the Scientific Committee with documents describing the ecological importance of minke whales in the northeast Atlantic Ocean and the objectives of the Norwegian marine mammal research program.

On 16-17 September 1991, Norwegian and U.S. officials and scientists met in Washington, D.C., to discuss IWC issues and Norway's marine mammal research program. During the meeting, the Norwegians provided a revised proposal entitled "A Research Proposal to Evaluate the Ecological Importance of Minke Whales in the Northeastern Atlantic," and asked U.S. scientists to comment on it. The proposal sought to address the relationships between minke whales and their prey species, and to estimate minke whale energetic requirements. It calls for a take of 110 minke whales in the North Atlantic in 1992 and 136 minke whales in each of 1993 and 1994. The proposal was reviewed by members of the Marine Mammal Commission's Committee of Scientific Advisors and scientific staff of the National Marine Fisheries Service.

By letter of 18 December 1991, the National Marine Fisheries Service advised the head of the Norwegian scientific delegation that, while most reviewers felt that the basic structure of the research program was well conceived, they questioned the relevance of the program to the IWC's revised management procedure and to its program in general. Some reviewers expressed the view that the newly adopted revised management procedure obviated the need for the biological information on either the whales or their prey that would be generated by the Norwegian program.

Marine Mammal Commission's Review of the IWC Conservation Program — In 1991, the Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, undertook a comprehensive review and assessment of the 1946 International Convention for the Regulation of Whaling, issues currently before the IWC, and options for the future direction of the IWC conservation program. By letter of 5 December 1991 to the U.S. Commissioner to the IWC, the Marine Mammal Commission noted that the IWC is at a critical stage in its history and that past U.S. positions and approaches on key issues merited a thorough reconsideration. It also noted that U.S. positions on the issues facing the IWC had important implications for U.S. policy in many other international arenas. The Commission therefore developed and attached to its letter a discussion paper that reviewed the major issues confronting the IWC, assessed possible U.S. positions on these issues, and recommended positions that the United States might take in order to maintain and improve the IWC conservation program.

While the Marine Mammal Commission concluded that cetacean conservation would best be served in the foreseeable future by maintaining the IWC, it also concluded that the 1946 International Convention for the Regulation of Whaling and the IWC conservation program were outdated and in need of fundamental revision. In particular, they did not reflect modern principles of marine living resource conservation. That is, the Convention has no stated objectives in any of its substantive articles, does not recognize nonconsumptive values of whales, does not specifically mandate IWC authority over small cetaceans, and does not recognize either that whales may be affected by activities other than direct exploitation or that the exploitation of whales may affect other components of the ecosystem of which they are a part. The Commission also noted that the Convention includes a provision that allows governments to issue special permits to their nationals for lethal takes of whales for research, with or without the approval of the IWC.

The Commission further pointed out that, while the revised management procedure adopted by the IWC at its 1991 meeting is a sincere effort to improve the management of the whaling industry, it is based upon traditional single-species, maximum sustainable yield concepts and as yet unverified density-dependent assumptions. Thus, by itself, it does not constitute a significant revision of the IWC conservation program. For example, it still fails to address necessary management measures for monitoring the status of target stocks and for verifying or enforcing compliance with catch quotas and other regulations.

The Commission also urged that, before considering lifting the moratorium on commercial whaling, the United States and other member nations must, at a minimum, be assured that: (1) research and monitoring measures are adequate to verify, with reasonable certainty, that exploited populations remain within their optimum sustainable ranges (*i.e.*, a population size between maximum net productivity level and the maximum size supportable within the ecosystem); (2) no catches are allowed from any depleted stocks (*i.e.*, stocks below 60 percent of initial size); (3) catches, in conjunction with other human activities or natural events affecting the cetacean stocks, do not result in unsustainable mortality levels or reduce population levels more rapidly than can be detected by a monitoring program under the revised management procedure; (4) effective catch verification, enforcement, and population monitoring programs receive the full support and participation of all countries engaged in commercial whaling; and (5) catches, in conjunction with other human activities affecting cetacean stocks, do not irreversibly alter the functional role of that species in the ecosystem.

The Marine Mammal Commission concluded that the United States and other like-minded member nations should initiate efforts to revise and update both the 1946 Whaling Convention and the IWC

conservation program to incorporate modern principles of marine living resource conservation. To this end, the Commission recommended that the United States seek to renegotiate the International Whaling Convention so that it: (1) incorporates sound principles of living resource conservation that take into account the possible effects of all human activities on whales and on the ecosystems of which whales are a part; (2) recognizes the non-consumptive values of cetaceans; (3) clarifies the scope of IWC authority over small cetaceans; and (4) seeks adherence to advice on all aspects of the IWC conservation program, including the lethal takes of animals for research purposes.

As noted above, the comprehensive assessments undertaken to date by the IWC indicate that some whale stocks are above maximum net productivity levels and could safely sustain some level of regulated takes. If a three-fourths majority of the IWC were to approve a catch limit other than zero for such stocks, whaling could resume. It is likely that this will be considered at the next IWC meeting. Therefore, the United States must decide whether it should either continue to oppose all commercial whaling or agree to support catch limits it considers safe under certain conditions. In this regard, the Marine Mammal Commission pointed out that, while "science" may indicate that commercial whaling *could* be resumed without risk to the population, science alone does not weigh, one way or the other, on the question of whether commercial whaling *should* be resumed. It also noted that the Marine Mammal Protection Act prohibits the taking of marine mammals based, in part, on moral and ethical grounds independent of economic, biological, or other scientific concerns. For example, the Act acknowledges that non-consumptive values are valid components of a management program that is based on sound principles of living resource conservation. Because section 108(a)(4) of the Act directs that the purposes and policies of the Act shall be the official policies of the United States in negotiating and renegotiating international agreements concerning marine mammals, there appears to be a clear directive for the United States to seek incorporation of such principles into a revised convention.

The Marine Mammal Commission acknowledged the potential disadvantages of unyielding U.S. opposition to commercial whaling and cautioned that continued opposition could erode the United States' leadership position within the IWC and weaken its effectiveness on other international environmental matters. With this in mind, the Commission suggested that the United States address commercial whaling issues in terms of potential conservation gains for all cetaceans and for the conservation and sustained utilization of marine living resources in general.

The Commission concluded that the United States must re-examine its commercial whaling policy in light of modern principles of living resource conservation that recognize, among other things, non-consumptive as well as consumptive values of whales. It recommended that the United States:

- (a) adopt the position that non-consumptive values of whales may be of equal, if not greater, importance than their consumptive values, and that science alone should not dictate the resumption of commercial whaling;

- (b) except as specified in (d) below, oppose the resumption of commercial whaling on the basis of previous failures in the conservation of stocks and the need to consider non-consumptive values;

- (c) recognize that resumption of commercial whaling under a conservative management program (*e.g.*, conservative quotas, effective enforcement and inspection, comprehensive data collection on every whale harvested, *and* effective population monitoring) would not jeopardize the affected whale stocks or the ecosystems of which they are a part; and

- (d) take the position that, if a three-fourths majority of the IWC members agree to resume commercial whaling under a scientifically up-to-date and carefully controlled regime, the United States would not view such a resumption as "diminishing the effectiveness" of the IWC conservation program and would not apply or seek to have other nations apply sanctions against the countries that resume whaling.

To these ends, the Marine Mammal Commission urged the U.S. Commissioner to the IWC to undertake discussions with other Commissioners to foster broad support for these concepts. It also urged that he work with Congress to determine under what conditions, if any, the United States would or would not oppose a resumption of commercial whaling. To begin this process, the Commission recommended that, by February 1992, the National Oceanic and Atmospheric Administration chair an interagency working group to review these issues and develop for presentation at the 1992 IWC meeting background documents and a proposal for revising the IWC conservation program. Until such time as the Whaling Convention is amended to take account of the above points, the Marine Mammal Commission recommended that the United States position should be to continue to oppose any resumption of commercial whaling.

With regard to other issues facing the IWC, the Marine Mammal Commission also recommended that the National Oceanic and Atmospheric Administration:

- convene a working group of U.S. experts to develop terms of reference for monitoring, reporting, verifying, enforcing, and carrying out research programs necessary to implement the IWC's revised management procedure;

- convene a group of scientists with expertise in population assessment to identify data needed to complete comprehensive assessments of priority stocks, including small cetaceans, and to prepare scientific background papers identifying minimum data requirements and minimum levels of precision necessary for comprehensive assessments;

- investigate the circumstances surrounding the issuing of a license by the Canadian Government for the take of a bowhead whale from the Bering-Chukchi-Beaufort Seas stock and, if appropriate, certify the Government of Canada under the Pelly Amendment for diminishing the effectiveness of the IWC conservation program (see Chapter II);

- develop and implement a bowhead whale recovery plan that takes into account long-term monitoring and management needs relative to subsistence takes and the effects of oil and gas resource development on the arctic marine habitat, and undertake or cause to be undertaken the research called for by the IWC to monitor the status of the Bering-Chukchi-Beaufort Seas bowhead stock and the effect of the subsistence take thereon;

- develop and propose revisions to the International Whaling Convention and to the IWC Schedule of Regulations that would formally establish the IWC's competence to regulate directed catches of all cetaceans; and

- in addition to considering certifications and trade sanctions under U.S. law to persuade member nations to comply with IWC resolutions on special permits to kill whales for research purposes, undertake or cause to be undertaken multi-lateral discussions and negotiations aimed at persuading offending nations of the value of complying with the IWC program.

On 13 December 1991, the U.S. Commissioner to the IWC met with U.S. agency representatives to discuss preparations for the 1992 IWC meeting and the recommendations contained in the Marine Mammal Commission's 5 December 1991 letter. The group agreed that a working group of agency scientists should be set up to review and recommend actions to: (1) identify data needs for the comprehensive assessment of whale stocks by the IWC, (2) develop guidelines for incorporating "modern principles of living resource utilization" into the 1946 Whaling Convention, and (3) carry out recommended bowhead whale research. With regard to policy-related issues, they agreed that a task force should be convened and chaired by the U.S. IWC Commissioner to review and formulate recommendations for U.S. policy on: (1) revising the 1946 Whaling Convention; (2) monitoring, reporting, verifying, and enforcing the IWC conservation program; (3) incorporating the revised management procedure and necessary related programs into the IWC Schedule; (4) encouraging continued participation of all member nations in the IWC; and (5) identifying U.S. options relative to

certifications pursuant to the Pelly Amendment on scientific research whaling that is contrary to the IWC conservation program.

At the end of 1991, the Marine Mammal Commission was looking forward to participating in efforts to reassess U.S. policies and positions relative to the IWC and its conservation program.

High Seas Driftnet Fisheries

The rapid growth of foreign high seas driftnet fisheries over the past decade has been a source of great concern to the United States and many other countries. These fisheries, which began in the North Pacific Ocean and Mediterranean Sea, are highly efficient, large-scale operations; they are also indiscriminate in that they catch not only target species, but all non-target species that do not fit through the net mesh.

Driftnets consist of gillnet segments about 50 meters in length that are strung together to make nets that can be 60 kilometers long. Like curtains, the nets float at or just below the water surface to a depth of about 10 meters. Nets are usually deployed in the evening, allowed to drift overnight, and retrieved the following morning. At the peak fishing season in recent years, some 850 fishing vessels from Japan, Taiwan, and the Republic of Korea have deployed as much as 40,000 kilometers of net nightly.

The target species include neon flying squid taken from April to December, salmon taken principally in June and July, and albacore and billfish taken throughout the year. In addition to target species, driftnets incidentally catch non-target animals, including many species of seabirds, marine mammals, sea turtles, finfish, and sharks. Some of these species are endangered or threatened. Of particular concern to the United States are salmon, seabirds, sea turtles, and marine mammals.

Among the marine mammals taken by driftnet fisheries in the North Pacific are Dall's porpoises, northern right whale dolphins, Pacific white-sided dolphins, common dolphins, striped dolphins, false killer whales, pilot whales, Cuvier's beaked whales, North Pacific fur seals, elephant seals, and some large whales. The large catch of some species, including northern right whale dolphins and some seabirds, raises concern that some populations may become seriously depleted. Perhaps even more important, the overall amount of biomass removed or killed, and the possible depletion of populations of certain key predator or prey species, raise serious questions about impacts upon the structure and integrity of pelagic marine ecosystems.

Progress in addressing the driftnet issue has been realized through a series of agreements negotiated with Japan, Taiwan, and the Republic of Korea, and through other international actions, including a number of resolutions adopted by the United Nations General Assembly. These matters are discussed below.

United States Agreements with Japan, Taiwan, and the Republic of Korea

In response to concerns about the effect of high seas driftnet fisheries on salmon and other marine resources of the United States, Congress passed the Driftnet Impact Monitoring, Assessment, and Control Act of 1987. The Act directs the Department of Commerce, through the Department of State, to negotiate driftnet monitoring and enforcement agreements with countries conducting high seas driftnet fisheries that affect U.S. marine resources. The required monitoring agreements must provide statistically reliable assessments of the numbers of each species being killed by each nation's driftnet fleet.

The Act also requires that, if a driftnet fishing nation fails to enter into and implement an adequate monitoring or enforcement agreement, the Secretary of Commerce must certify that nation under the Pelly Amendment to the Fishermen's Protective Act. Certified nations may be subject to embargoes on some or all fishery products imported into the United States. The imposition of such sanctions is at the discretion of the President.

In response to this directive, driftnet monitoring and enforcement agreements were negotiated with

Japan, Taiwan, and the Republic of Korea and signed in June, August, and September 1989, respectively. Canada also was a party to the agreement with Japan. All three agreements were renegotiated in 1990 and 1991 and are effective until 30 June 1992, the effective date for a global moratorium on large-scale pelagic driftnet fishing called for in United Nations General Assembly Resolution 44/225 (see "Other International Actions," below). Each agreement provided for a two-year phase-in of monitoring programs, the details of which were to be negotiated separately prior to each fishing season.

Advice provided by the Marine Mammal Commission with regard to developing the monitoring programs is discussed in previous Annual Reports. As provided in the agreements, the monitoring programs address the training and placement of agreed numbers of observers from each country aboard a representative portion of each nation's driftnet fishing fleet. The agreements also address the types of data to be collected, the form in which they are to be gathered and recorded, how they are to be summarized, and the form in which they are to be released to the public. The enforcement agreements establish area and seasonal closures to diminish the take of U.S. salmon, require the placement of satellite transmitters on driftnet fishing vessels so they can be located on a real-time basis, and address vessel boarding and inspection rights.

In 1989, the only monitoring program implemented was a pilot program involving about four percent of the Japanese squid driftnet fleet. Separate monitoring programs involving selected vessels from each nation were carried out in 1990. The 1991 programs were renegotiated on the basis of experience gained in 1990, and the arrangements were set forth in exchanges of letters with Taiwan on 16 April 1991, with Japan on 23 April 1991, and with the Republic of Korea on 8 May 1991.

The 1990 Driftnet Fishing Seasons

On 14 June 1991, the Governments of Japan, Canada, and the United States jointly released a summary report of results from the May-December 1990 Japanese squid driftnet monitoring program. The 1990 monitoring program placed 35 U.S., 10 Canadian, and 29 Japanese observers aboard 74 fishing vessels. Catch and bycatch data were recorded for 2,879 net retrievals representing about 12 percent of Japan's squid driftnet fishing operations.

The target catch in the observed portion of Japan's squid driftnet fishery included 7.9 million squid. The bycatch included 3.2 million Pacific pomfret, 81,956 blue sharks, 90,011 albacore tuna, 162,631 skipjack tuna, 9,747 salmon, 499 billfish, 30,464 seabirds, 545 North Pacific fur seals, 840 northern right whale dolphins, 459 Pacific white-sided dolphins, 318 Dall's porpoise, 119 other dolphins, and 35 sea turtles. It is reasonable to assume that significant numbers of animals were killed or seriously injured in the nets, but fell out during net retrieval before being counted.

Results of the 1990 monitoring programs for Taiwan's squid and large-mesh driftnet fisheries and for Korea's squid driftnet fishery were due to be released in June. However, because of problems in quality control of the data and in the computer programs used to prepare data summaries, they were not released until 10 September and 2 October 1991, respectively. Despite prior training, Taiwanese and Korean observers were not able to identify all species caught. The problems were so substantial that the National Marine Fisheries Service concluded that those 1990 program results were not statistically reliable and should not be combined with results from the Japanese monitoring program to assess overall driftnet fishing effects in the North Pacific.

The 1991 Driftnet Fishing Seasons

Arrangements for monitoring the 1991 driftnet fishing seasons were negotiated early in 1991. The program with Japan called for placing 30 U.S., 10 Canadian, and 21 Japanese observers aboard Japanese squid driftnet fishing vessels to monitor at least 2,626 net retrievals. The Taiwanese monitoring program called for placing 11 observers from the American Institute in Taiwan and 9 observers from the Coordination Council for North American Affairs aboard Taiwanese driftnet fishing vessels to monitor at least 105 net retrievals. The Korean program called for placing 13 U.S. and 13 Korean observers aboard Korea's squid driftnet fishing vessels to monitor at

least 90 net retrievals. The results of these efforts are to be summarized and made available by mid-1992.

Enforcement efforts during the 1991 fishing season verified that significant numbers of driftnet vessels from Taiwan and the Republic of Korea were fishing in closed areas of the northern North Pacific Ocean in June and July. Some observations were made as a result of aerial and shipboard surveillance carried out as part of the cooperative U.S.-Canadian driftnet enforcement program. Other observed infractions, involving at least 21 vessels, resulted from data gathered from the satellite-linked radio transmitters required under the agreements with Korea and Taiwan. Although a Taiwanese enforcement vessel was seen near boats fishing illegally, there was no indication of any efforts being made on its part to stop the illegal fishing operations. The location of the illegal fishing and the number of vessels involved make it likely that significant numbers of U.S. marine resources, particularly salmon, were taken. Although protests were filed with Taiwan and Korea, they did not recall the vessels and the boats continued to fish.

In response to these developments, the Secretary of Commerce wrote to the President on 13 August 1991 certifying, pursuant to the provisions of the Magnuson Fishery Conservation and Management Act, that the Governments of Taiwan and the Republic of Korea had allowed their nationals to conduct driftnet fishing in a manner inconsistent with their scientific monitoring and enforcement agreements with the United States. Such certification is deemed to be a certification for purposes of the Pelly Amendment to the Fishermen's Protective Act and authorizes the President to restrict imports of fish and fish products from the certified nation. On 18 October 1991, the President advised Congress that he was deferring the imposition of sanctions against the two countries for 90 days pending an evaluation of their efforts to penalize the offending vessels and prevent further incidents. At the end of 1991, sanctions against those nations remained under review, and the President's report to Congress on the matter will be submitted early in 1992. Because of these actions, the monitoring programs with each country were temporarily suspended and observations of some fishing trips were canceled.

On 18 and 20 September 1991, 17 other driftnet fishing vessels and two support ships were observed fishing illegally southeast of the Kamchatka Peninsula in waters of the former Soviet Union. The vessels were observed and photographed during joint U.S.-Canadian surveillance flights and the Government of the Soviet Union was advised. Some vessels carried markings of the People's Republic of China and others were unidentified. On being presented with the findings, the Chinese Government, which had previously advised the United States that its fisherman did not engage in driftnet fishing, reaffirmed that they had authorized no driftnet fishing, and said that they would investigate the matter. At the end of 1991, the Chinese had ordered the boats to withdraw and were continuing their investigation of the incident. The Commission looks forward to learning the response to the U.S. inquiry.

The 1992 Driftnet Fishing Seasons

As noted above, the driftnet monitoring and enforcement agreements with Japan, Taiwan, and the Republic of Korea expire on 30 June 1992. United Nations General Assembly Resolution 44/225 calls upon all nations to end large-scale high seas driftnet fishing after that date unless jointly agreed conservation measures have been developed that ensure that unacceptable impacts are avoided. Given provisions of this resolution and the seasons during which North Pacific Ocean driftnet fishing occurs, efforts to monitor driftnet fishing in 1992 were not contemplated early in 1991.

However, as noted below, the United Nations General Assembly adopted a new resolution in December 1991 calling for a global moratorium on all large-scale high seas driftnet fishing effective after 31 December 1992, rather than 30 June 1992. Therefore, at the end of 1991, the Secretary of Commerce was considering what steps, if any, should be taken to extend and implement monitoring and enforcement agreements with each of the three driftnet fishing nations through 1992.

Other International Actions

The monitoring and enforcement agreements with Japan, Taiwan, and the Republic of Korea are only a part of the international picture as it relates to high seas driftnet fisheries. Actions being taken within the United Nations and other fora and by U.S. agencies, including the Marine Mammal Commission, to more broadly address the driftnet issue are discussed below.

Actions by the United Nations in 1989 and 1990 — In December 1989, the United Nations General Assembly passed Resolution 44/225 sponsored by the United States and ten other nations. The resolution acknowledged potential impacts of the high seas driftnet fisheries and called upon the international community to, among other things: (1) review, through international organizations, data on large-scale high seas driftnets and agree on further regulations and monitoring measures needed to protect living marine resources by 30 June 1991; (2) suspend high seas driftnet fishing by 30 June 1992 unless effective conservation and management measures, jointly agreed by concerned international parties and supported by scientifically sound analyses, are developed to ensure that unacceptable impacts will be prevented; (3) progressively reduce and, by 1 July 1991, cease high seas driftnet fishing in the South Pacific Ocean as an interim measure pending the development of appropriate conservation and management agreements; and (4) immediately cease further expansion of such fishing pending the results of the regional review.

The resolution also called upon the United Nations Office of Ocean Affairs and Law of the Sea to prepare a report on the effects of driftnet fisheries and efforts to implement Resolution 44/225 for consideration at the 45th session of the United Nations General Assembly session late in 1990. To help prepare its report, the Office asked members and international organizations for views and relevant information on these fisheries. In response, in mid-1990 the Government of Japan submitted a paper expressing support for continuing high seas driftnet fishing after 30 June 1992. The Japanese expressed the view that driftnet fisheries could be managed to minimize the bycatch of non-target species through additional research aimed at modifying gear and through regulations to control fishing effort, length of fishing seasons, areas fished, and species taken.

The National Marine Fisheries Service, in consultation with the Department of State, the Marine Mammal Commission, and other Federal agencies, subsequently developed a paper submitted by the State Department on behalf of the United States. The paper expressed strong support for the provisions of the United Nations resolution and noted that conservation measures relative to high seas driftnet fisheries were entirely inadequate and that suspending driftnet fisheries by 30 June 1992 was likely to be justified. The paper clearly set forth the view of the United States that the burden of proof in determining the acceptability of driftnet fishing lies with the fishing nation.

The United Nations Office of Ocean Affairs and Law of the Sea considered these and other submissions and completed its report, which was submitted to the United Nations General Assembly on 26 October 1990. On 21 December 1990, the United Nations General Assembly adopted Resolution 45/197 reaffirming the points in the resolution adopted on the matter in December 1989. The new resolution also requested the that United Nations prepare a report summarizing results of the regional review and other new information for consideration at the General Assembly's 46th session late in 1991.

Marine Mammal Commission Actions in 1990 and 1991 — Continuing its efforts begun in the late 1980s to ensure an aggressive, coordinated U.S. role in pursuing international actions to end driftnet fishing, the Marine Mammal Commission made a series of recommendations to the Department of State (26 October and 14 December 1990) and the National Marine Fisheries Service (7 and 21 December 1990 and 21 February 1991). Among other things, the Commission noted that details of monitoring agreements with Japan, Taiwan, and the Republic of Korea needed to be reviewed and that the United States needed to prepare for a regional review of driftnet fisheries in the North Pacific pursuant to United Nations General Assembly Resolution 44/225.

In its letters, the Commission recommended that the Department of State and the National Marine

Fisheries Service jointly prepare for a regional review. In this regard, it recommended that a group of U.S. experts be convened to assess the adequacy of available information on the effects of high seas driftnet fisheries in the North Pacific and the conditions, if any, under which the fisheries might be permitted to continue. The letters also recommended that a regional review by international experts be undertaken in the spring of 1991 to examine: (1) available at-sea sighting data, (2) the range and extent of target and non-target species taken by driftnet fisheries, (3) the biological and population data related to those species, and (4) data and information on the impacts of driftnet fishing on affected stocks. The agencies agreed and efforts were begun to prepare for a regional review of North Pacific driftnet fisheries in June 1991 (see below).

In addition, in August 1991, the Department of State began convening weekly meetings of an *ad hoc* interagency group that also involved representatives of the National Oceanic and Atmospheric Administration and National Marine Fisheries Service, the Coast Guard, the Fish and Wildlife Service, and the Marine Mammal Commission. The group provided advice on actions related to the driftnet fishing agreements with Japan, Taiwan, and Korea as well as other international conservation efforts discussed in this Report.

1991 Regional Review of North Pacific Driftnet Fisheries — As noted above, Resolution 44/225 called upon regional fisheries organizations to hold regional reviews on the status of high seas driftnet fisheries by 30 June 1991. In response to this request, Canada offered to host a meeting to review driftnet fisheries in the North Pacific Ocean. The offer was accepted and the meeting was held in Sidney, British Columbia, Canada, on 11-14 June 1991.

The purpose of the meeting was to review available scientific information on the effects of large-scale driftnet fisheries on marine resources of the North Pacific Ocean. Participants included scientists, resources managers, and observers from Australia, Canada, Japan, the Republic of Korea, Taiwan, the United Nations, the United States, and the International North Pacific Fisheries Commission. U.S. participants in the meeting included representatives of the Marine Mammal Commission. The primary background information available for the review included catch summaries for the 1989 and 1990 Japanese squid driftnet fishing seasons. The summaries were products of the 1989 and 1990 monitoring programs carried out by Japan, Canada, and the United States. The discussions were limited because results of the 1990 observer programs with Taiwan and the Republic of Korea were not available.

The Japanese participants provided estimates of the total catch and bycatch for the 1990 Japanese squid driftnet fishery. They estimated that, to harvest approximately 106 million neon flying squid in 1990, the Japanese squid driftnet vessels had taken more than 41 million individuals of more than 100 other species. More specifically, they estimated that the 1990 bycatch in this one driftnet fishery included 39 million fish (including 33.8 million Pacific pomfret, 700,000 blue sharks, and more than 141,000 salmon), 270,000 seabirds, nearly 25,000 individuals of other species, 24,000 marine mammals, and 406 sea turtles. The meeting participants also concluded that populations of northern right whale dolphins and Pacific white-sided dolphins had declined and would likely continue to decline as a result of incidental takes in driftnet fisheries. The report of the Sidney meeting was submitted to the United Nations Office of Ocean Affairs and Law of the Sea in August 1991.

Actions by the United Nations and others in 1991 — As indicated above, the United Nations Office of Ocean Affairs and Law of the Sea had been requested to prepare a summary report on the results of regional reviews, the North Pacific review, and other information for consideration by the United Nations General Assembly at its 1991 session late in 1991. As part of this effort, the Department of State took steps in 1991 to further clarify U.S. views and analyses based on more recent information. Late in July 1991, it circulated a draft submission to the United Nations on U.S. driftnet policy.

By letter of 24 July 1991 to the State Department, the Commission noted that the draft U.S. paper reflected outdated single-species management concepts that failed to adequately consider to uncertainties and concerns regarding ecological effects caused by driftnet fishing-related disruptions to marine food chains. The letter also noted that, while referring to

sound principles of resource management, it did not identify those principles. In addition, the Commission noted that the draft failed to recognize the findings of the North Pacific regional review recently held in Sidney in June.

The National Marine Fisheries Service, in cooperation with the Commission, the Department of State, and other agencies, worked to develop an acceptable document for submission to the United Nations. The paper was substantially revised and improved and, on 26 August 1991, the report, entitled "U.S. Policy Concerning Large Scale Pelagic Driftnets and Comments on the North Pacific Scientific Driftnet Review Meeting Held in Sidney, British columbia, Canada on June 11-14, 1991," was submitted to the United Nations. In the report, the United States stressed that the use of living marine resources carries with it a responsibility to protect the integrity of the ecosystem such that: (a) the risk of irreversible or long-term adverse effects on target, non-target, or associated species, or the ecosystem as a result of use is minimized; (b) the maximum possible range of management options for present and future generations is preserved; and (c) consumptive and non-consumptive values can be optimized on a continuing basis.

The report also expressed the view that available data clearly demonstrate the wastefulness and potential ecosystem-level impacts of large-scale driftnet fisheries in the North Pacific. It also noted that existing scientific monitoring and enforcement programs do not constitute acceptable conservation and management programs. The report therefore concluded that a moratorium must be imposed in the North Pacific Ocean without delay. It further noted that, because comparable data on the catch of target and non-target species in other areas do not exist and because agreement on acceptable conservation and management measures will therefore be impossible, the global moratorium on large-scale pelagic driftnet fishing is entirely justified and must go into effect by 30 June 1992 as called for in the United Nations General Assembly Resolution 44/225.

New Zealand, Canada, and the South Pacific Forum also submitted statements to the United Nations on the results of the Sidney meeting. Their submissions supported the U.S. view. Japan, however, stated in its 26 September 1991 submission that, in its view, the results of the Sidney meeting did not support the assertions that these fisheries have unacceptable impacts on stocks of marine species, that effective management measures cannot be established, or that a driftnet moratorium should be implemented. The Japanese report further noted that an upcoming meeting sponsored by the International North Pacific Fisheries Commission would include a symposium on high seas driftnet fishing, to be held 4-6 November 1991 in Tokyo, Japan, and that presentations at the meeting would provide further information.

Representatives of the Marine Mammal Commission attended the Tokyo meeting, and information presented provided additional support for the view that the effects of driftnet fisheries on marine resources are unacceptable. Among other things, an analysis by U.S. scientists of observer data from the Japanese, Taiwanese, and Korean driftnet fisheries confirmed for the first time that these fisheries take large whales as well as dolphins and other marine mammals.

In addition to the above actions to prepare for driftnet-related deliberations at the 1991 session of the United Nations, the Department of State initiated efforts through the *ad hoc* interagency working group on driftnets to draft a new resolution. A draft was completed in the fall and, on 11 October 1991, it was tabled by the United States for consideration at the 46th session of the United Nations General Assembly. Among other things, the proposed resolution called upon all members of the international community to end all large-scale pelagic driftnet fishing on the high seas of the world's oceans and seas by 30 June 1992.

The resolution proposed by the United States was discussed with representatives of the Government of Japan and other driftnet fishing nations at that time. In response, Japan submitted an alternative proposal on the same day. The Japanese proposal called on "specialized agencies and other appropriate organs, organizations and programs of the United Nations system, as well as the various global, regional and sub-regional organizations, to study all aspects of large-scale pelagic driftnet fishing operations on the high seas and their impact on living marine resources." In further efforts to reach agreement with Japan on the driftnet issue, State Department representatives

met early in November with Japanese representatives to discuss a moratorium of indefinite duration, rather than an outright ban on high seas driftnets, that could be phased in by the end of 1992. On 26 November 1991, the Japanese announced that they would cease high seas driftnet fishing by the end of 1992. On the same date, the Department of State announced that Japan and the United States had agreed to support a moratorium to accomplish this.

On 20 December 1991, the United Nations General Assembly adopted by consensus Resolution 46/215 entitled "Large-scale pelagic drift-net fishing and its impact on living marine resources of the world's oceans and seas." The resolution, cosponsored by the United States, Japan, and 28 other nations, calls on all members of the international community to: (1) by 30 June 1992, reduce driftnet fishing effort by 50 percent through measures such as reducing the number of vessels, length of net deployed, and area of operation; (2) continue to ensure that driftnet fisheries are not expanded into new areas; and (3) ensure that a global moratorium on large-scale high seas driftnet fishing in all of the world's oceans and seas is fully implemented by 31 December 1992.

The Wellington Convention — As reported in the previous Annual Report, concern for the effect of large-scale driftnet fisheries on South Pacific albacore stocks culminated in the adoption of the Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific. The Convention, more commonly known as the Wellington Convention, was adopted on 29 November 1989 by South Pacific countries and territories. The Convention provides for collecting, preparing, and disseminating information as well as facilitating scientific analyses and the preparation of annual reports on driftnet activity in the convention area. To address the need for a mechanism by which states outside the Convention area could accept legally binding obligations with respect to driftnet fishing in the South Pacific, two protocols were prepared. Protocol I prohibits driftnet fishing by all nations and seeks development of conservation measures for South Pacific albacore within the Convention Area. Protocol II prohibits driftnet fishing in waters under the jurisdiction of Pacific Rim countries.

The Convention entered into force on 17 May 1991. The United States, which had signed the Wellington Convention on 14 November 1990, ratified it on 3 December 1991. On 26 February 1991, the United States also signed Protocol I. The United States did not sign Protocol II because doing so would have been inconsistent with current U.S. obligations under the International Convention for the High Seas Fisheries of the North Pacific Ocean, which allows Japan to conduct a salmon driftnet fishery in the U.S. Exclusive Economic Zone subject to U.S. law.

European Economic Community Actions — On 28 October 1991, members of the European Community Council of Fisheries Ministers met in Brussels to discuss, among other things, the conservation of European fisheries resources. In particular, Council members discussed technical measures relative to continuing large-scale driftnet fisheries operated by member nations. In November 1991, Council members adopted measures that would phase out large-scale high seas driftnet fishing by 31 December 1993. At the end of 1991, the United States was studying the Council's decision with respect to its conformance with United Nations General Assembly Resolution 46/215.

South Pacific Conference Resolution on Driftnets — On 31 October 1991, the South Pacific Conference adopted a resolution that reaffirmed its full support for United Nations General Assembly Resolutions 44/225 and 45/197; called upon eligible nations to sign and ratify the 1990 Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific and its two protocols; and expressed full support for efforts in the 46th session of the United Nations General Assembly aimed at ending large-scale high seas driftnet fishing by 30 June 1992.

Second-Order Effects of Large-Scale High-Seas Driftnet Fisheries on the North Pacific Marine Ecosystem — Since 1989, the Marine Mammal Commission has stressed the importance of focusing attention upon the ecological effects of high seas driftnet fisheries as well as on its effects on individual species. When scientists from Canada, Japan, Republic of Korean, Taiwan, the United States, and other North Pacific rim countries met in Sidney, British Columbia,

in June 1991 to assess the impacts of driftnet fisheries on marine species in the North Pacific, they did not assess the possible indirect or second-order effects. Considering such an examination to be critical to understanding driftnet fisheries, the Marine Mammal Commission contracted for a study to review and assess how large-scale driftnet fisheries in the North Pacific may have affected, and be affecting, the structure and productivity of the North Pacific marine food web (see Chapter IX).

Conclusion

The Marine Mammal Commission views high seas driftnet fisheries as a serious threat to marine ecosystems. In 1992, the Commission will continue to provide advice and assistance to the Department of State, the National Marine Fisheries Service, and other agencies in their efforts to address this issue. In particular, it will seek to ensure that the United Nations Resolution 46/215 calling for global moratorium on high seas driftnet fisheries by 31 December 1992 is enforced, that domestic statutes are amended as necessary to make them compatible with the United Nations resolution, and that multilateral agreements to deal with illegal driftnet operations are developed and implemented.

The Marine Mammal Commission commends the Department of State for the vigorous manner in which it has sought to bring these unregulated and extraordinarily damaging fisheries under control.

Conservation and Protection of Marine Mammals in the Southern Ocean

At least 13 species of seals and whales inhabit or occur seasonally in the Southern Ocean, the seas surrounding Antarctica. As noted in previous Commission Annual Reports, two of the seal species (the Antarctic fur seal and the southern elephant seal) and regional populations of humpback, blue, fin, sei, and sperm whales were and in some cases remain severely depleted as a result of poorly regulated commercial hunting.

There has been no commercial-scale sealing in the Antarctic since the 1950s. With the exception of several elephant seal colonies that have declined in recent years for unknown reasons, all of the exploited seal stocks appear to have recovered, or to be recovering, to their pre-exploitation levels. Further, in 1972, the Antarctic Treaty Consultative Parties concluded the Convention for the Conservation of Antarctic Seals. This Convention, which entered into force in 1977, provides for strict regulation of commercial sealing in the Antarctic, should it ever be resumed.

At present, there also is a moratorium on commercial whaling (see the discussion earlier in this Chapter on the International Whaling Commission). Therefore, neither commercial sealing nor commercial whaling presently poses a threat to the continued existence of Southern Ocean populations of seals and whales. However, both commercial sealing and commercial whaling could be resumed in the future. In addition, developing fisheries, particularly the fishery for antarctic krill (*Euphausia superba*), pose threats to seals, whales, and other components of the Southern Ocean ecosystem. In some areas, construction and operation of scientific stations and increasing tourism also pose threats.

As discussed below, in 1991, the Antarctic Treaty Consultative Parties concluded an Antarctic Protocol on Environmental Protection. Among other things, the Protocol will prohibit mineral exploration and exploitation in Antarctica for at least 50 years. The Protocol will enter into force when it is ratified by all of the 26 Antarctic Treaty Consultative Parties.

Because of the possible direct and indirect effects of fisheries, mineral development, and other activities on marine mammals, the Marine Mammal Commission, as noted in previous Annual Reports, has undertaken a continuing review of matters that might affect marine mammals, krill, or other components of the Southern Ocean ecosystem upon which marine mammals may depend. It has made recommendations to the National Science Foundation, the Department of State, the National Oceanic and Atmospheric Administration, and the National Marine Fisheries Service on the need for basic and directed research, and for international agreements to effectively regulate seal-

ing, whaling, fisheries, non-living resource exploration and development, and related activities in the Southern Ocean. Since 1978, Marine Mammal Commission representatives have served as scientific advisors on most U.S. delegations to regular Antarctic Treaty Consultative Meetings, Special Consultative Meetings held to negotiate international agreements regarding Antarctica, and the annual meetings of the Commission and the Scientific Committee established by the Convention on the Conservation of Antarctic Marine Living Resources (see below).

In 1991, Commission representatives participated in interagency meetings to develop U.S. positions for the XIth Special Antarctic Treaty Consultative Meeting, the XVIth regular Antarctic Treaty Consultative Meeting, and the meetings of the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources. In addition, Commission representatives served on the U.S. delegations to the XVIth Antarctic Treaty Consultative Meeting and the 1991 meeting of the Scientific Committee for the Conservation of Antarctic Marine Living Resources.

XIth Special Antarctic Treaty Consultative Meeting

As noted in the Commission's previous Annual Report, conclusion in June 1988 of the Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA) generated much controversy. In response, the Antarctic Treaty Consultative Parties agreed, at the XVth Consultative Meeting held in Paris in October 1989, that a Special Consultative Meeting should be held in 1990 to consider various proposals for protection of the Antarctic environment. The first session of this, the XIth Special Antarctic Treaty Consultative Meeting, was held in Viña del Mar, Chile, from 19 November to 6 December 1990. Subsequent sessions were held in Madrid, Spain, on 22-30 April, 17-22 June, and 3-4 October 1991.

The negotiating session in Viña del Mar, Chile, produced a draft protocol, and agreement that a second session would be held in Madrid, Spain, in April 1991 to finalize a draft agreement for consideration and adoption by the Consultative Parties. The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, reviewed and, on 8 March 1991, provided comments to the Department of State on the draft agreement. Additional comments were provided to the Department of State by letter of 25 March 1991.

The comments provided by the Commission and others on the draft protocol were used to develop U.S. positions for the three negotiating sessions held in Madrid. These sessions led to the development of the Protocol, which was concluded on 4 October 1991. The Protocol will enter into force 30 days following deposit of instruments of ratification, acceptance, approval or accession by all 26 of the states which were Antarctic Treaty Consultative Parties on 4 October 1991, when the Protocol on Environmental Protection was adopted.[1]

The purpose of the Protocol is to improve the effectiveness of the Antarctic Treaty as a mechanism for protecting the Antarctic environment and for ensuring that the Antarctic does not become the scene or object of international discord. It designates Antarctica as a natural reserve, devoted to peace and science, and will establish general governing principles and legally binding obligations to protect the Antarctic environment.

The Protocol prohibits any activities relating to mineral resource exploration and development, and specifies that this prohibition cannot be lifted for at least fifty years following entry into force of the Protocol and that a legally binding regime to govern mineral resource activities must be in place before the prohibition can be lifted.

The Protocol includes five annexes setting forth specific obligations and requirements with respect to: (1) environmental impact assessment; (2) conservation of native fauna and flora; (3) waste disposal and waste management; (4) prevention of marine pollution; and (5) special area protection and management.

The Protocol establishes a Committee on Environmental Protection to provide advice to the Antarctic Treaty Consultative Meetings on steps needed to effectively implement and meet the objectives of the Protocol. It requires that each Party be prepared to respond promptly and effectively to environmental

emergencies (*e.g.*, oil spills), and provides that contingency plans must be developed.

At the end of 1991, the Department of State, in consultation with the Commission and other interested Federal agencies, was preparing to transmit the Protocol to the Senate for advice and consent to ratification.[2] In 1992, the Commission expects to work with the Department of State and others to develop appropriate implementing legislation.

XVIth Antarctic Treaty Consultative Meeting

The XVIth regular Antarctic Treaty Consultative Meeting was held in Bonn, Germany, on 7-18 October 1991. The meeting was attended by representatives of the 26 Antarctic Treaty Consultative Parties noted earlier. It also was attended by delegations from Contracting Parties to the Antarctic Treaty that are not Consultative Parties (Austria, Bulgaria, Canada, Colombia, Cuba, Czechoslovakia, Denmark, Greece, Guatemala, Hungary, the Democratic Peoples Republic of Korea, Papua New Guinea, Romania, and Switzerland). Observers at the meeting included representatives of the Commission for the Conservation of Antarctic Marine Living Resources, the Scientific Committee on Antarctic Research, the Council of Managers of National Antarctic Programs, the Antarctic and Southern Ocean Coalition, the Intergovernmental Oceanographic Commission, the International Civil Aviation Organization, the International Maritime Organization, the World Meteorological Organization, the International Union for the Conservation of Nature and Natural Resources, the International Hydrographic Organization, the World Tourism Organization, and the United Nations Environment Program.

The purposes of the regular Antarctic Treaty Consultative meetings are to exchange information, hold consultations, and consider and recommend to the Consultative Party governments measures in furtherance of the principles and objectives of the Antarctic Treaty. The meeting endorsed the Antarctic Treaty Protocol concluded in Madrid on October 4th, and reviewed operation of other aspects of the Antarctic Treaty system. It developed and recommended adoption of an Annex on Area Protection and Management to the Antarctic Treaty Protocol on Environmental Protection (see above). The meeting also recommended adoption of four new Sites of Special Scientific Interest (SSSI), two new Specially Protected Areas (SPA), and four new historic sites or monuments. It approved and recommended adoption of management plans for eight existing Specially Protected Areas. The meeting also endorsed and called upon Parties to voluntarily comply with management plans proposed by the United States for the area around the U.S. Palmer Station on the southwest side of Anvers Island, and a Specially Reserved Area on the north side of the Dufek Massif.

As noted in previous Commission Annual Reports, the possible need to provide protection for additional types of areas in Antarctica was considered at the XIIIth and XIVth Antarctic Treaty Consultative Meetings. At the XVth Consultative Meeting, the Parties adopted, largely as a result of U.S. initiatives, recommendations providing for: (1) the establishment of Specially Reserved Areas (SRA) to protect areas with outstanding physical or aesthetic features, and (2) the establishment of Multiple-use Planning Areas (MPA) to assist in planning and coordinating activities to avoid mutual interference and minimize cumulative environmental impacts in high-use areas. With regard to the latter category, the Marine Mammal Commission, as noted in its Annual Report for calendar year 1988, organized and held a workshop in November 1988 to develop background information and a recommended plan for managing activities in the vicinity of the U.S. Palmer Station on the southwest side of Anvers Island.

The National Science Foundation used the report from the Commission-sponsored workshop to develop a proposal for designating the area around Palmer Station as a Multiple-use Planning Area. The proposal was presented to, and considered by, the XVIth Antarctic Treaty Consultative Meeting. The recommendation providing for the establishment of Multiple-use Planning Areas is not yet in force and likely will be superseded by provisions of the Antarctic Treaty Protocol on Environmental Protection signed in Madrid on 4 October 1991. The meeting noted that it would be desirable to begin gathering practical experience in implementing such management plans and, as indicated earlier, agreed that Parties should

voluntarily require compliance with the proposed management plan.

Recognizing that effective implementation of the Protocol on Environmental Protection would require development of environmental monitoring programs, the Parties agreed that a meeting of experts should be held to consider and provide advice on: (1) the types of cooperative, long-term monitoring programs needed to give effect to the provisions of the Protocol; (2) the best methods for collecting, reporting, storing, exchanging, and analyzing needed data; and (3) where and how frequently various environmental parameters should be measured. The meeting also agreed that the Consultative Parties would have to meet annually, rather than biennially, and that meeting should be held in the spring rather than the fall to provide for effective implementation of the Protocol. Most, but not all, Parties agreed that a small secretariat should be established to facilitate operation of the Antarctic Treaty system.

The Group of Experts Meeting on Environmental Monitoring is tentatively scheduled to be held in Argentina in June 1992. The next Consultative Meeting is to be held in Venice, Italy, in November 1992. The Commission, in consultation with its Committee of Scientific Advisors, will work with the Department of State, the National Science Foundation, the National Oceanic and Atmospheric Administration, the Environmental Protection Agency, and other Federal agencies to prepare for these meetings.

Activities Related to Marine Living Resources

In the early 1960s, the Soviet Union and Japan began experimental fisheries for krill (*Euphausia superba*) in the Southern Ocean. In the late 1960s, the Soviet Union began commercial finfish fishing in the Southern Ocean. As noted in previous Commission Annual Reports, concerns that developing fisheries, particularly the krill fishery, could adversely affect seals, whales, and other non-target, as well as target, species led the Antarctic Treaty Consultative Parties to negotiate and adopt the Convention on the Conservation of Antarctic Marine Living Resources. The Convention was concluded in May 1980 and came into force in April 1982. It established the Commission and the Scientific Committee for the Conservation of Antarctic Marine Living Resources. The first meetings of these bodies were held in 1982. The Marine Mammal Commission's involvement in negotiation of the Convention and the first nine meetings of the Commission and Scientific Committee are described in previous Annual Reports.

The 1991 meetings of the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources were held in Hobart, Tasmania, Australia, from 21 October to 1 November 1991.[3] During the meetings, the Commission and Scientific Committee considered a broad range of issues, including finfish conservation, assessment and monitoring of exploited krill stocks, development of a scientific observer program, information requirements regarding new and developing fisheries, assessment and avoidance of incidental mortality, and ecosystem monitoring.

Finfish Conservation — The total finfish catch in the 1990-91 season was 98,610 metric tons, up significantly from the 47,720 metric tons taken in 1989-90. As in the past, most of the catch was taken by fishing vessels from the Soviet Union. The increase was due to a more than three-fold increase in the catch of lantern fish (*Electrona carlsbergi*), a small myctophid that is an important component in the diet of several seabirds and other higher trophic level species.

At the 1991 meeting, the Commission adopted conservation measures: (1) prohibiting directed fishing for six species in Statistical Sub-area 48.3 (the area around South Georgia Island); (2) limiting the allowable catch of *Dissostichus eleginoides* in Statistical Sub-area 48.3 to 3,500 metric tons; and (3) limiting the total catch of *E. carlsbergi* in Statistical Sub-area 48.3 to 245,000 metric tons with no more than 53,000 metric tons being taken from the Shag Rocks region. The latter species, as noted earlier, is an important component in the diets of several seabirds and other higher trophic level species and the rapid increase in catch is cause for concern.

On a related matter, some of the fishing countries have not been providing required catch, effort, and related biological information as and when needed. The Scientific Committee called this to the attention of

the Commission during the 1991 meetings. The Commission, in turn, called upon members to comply fully with the reporting requirements that had been agreed.

Krill Assessment and Monitoring — The total catch of krill during the 1990-91 fishing season was 357,538 metric tons, down slightly from the catch of 374,775 metric tons in 1989-90. Fishing was done by vessels from Chile, Germany, Japan, the Republic of Korea, Poland, Spain, and the Soviet Union. As in the past, most of the catch was by Soviet vessels (275,495 metric tons), followed by Japan (67,582 metric tons). All but 746 metric tons was taken from the South Atlantic sector (Statistical Area 48).

The Living Resources Commission, acting on advice from the Scientific Committee, established a "precautionary" catch limit of 1.5 million metric tons of krill per year in Statistical Area 48. The Scientific Committee had recommended that sub-area limits be established, but the Commission was unable to reach agreement on limits for the three sub-areas. The Commission agreed that, should the total krill catch in sub-areas 48.1, 48.2 and 48.3 exceed 620,000 metric tons in any season (the sum of the historic maximum catches in each of the sub-areas), it would set precautionary limits for each of the sub-areas or on such other bases as the Scientific Committee may advise.

The Scientific Committee again noted the need for haul-by-haul and biological data concerning krill catches, and advised the Commission that some members are not providing the required data. The Commission agreed that such data should be collected and provided to the Secretariat. The Soviet delegation noted that technical difficulties had prevented them from complying with the data collection requirements. The Japanese and Korean delegations indicated that legislation in their countries made them unable to provide the required haul-by-haul data.

Scientific Observers — To ensure reliability of length frequency and other biological information concerning krill and fish catches must be collected by trained scientists or technicians. Both the Living Resources Commission and the Scientific Committee had recognized this need and, at its last meeting, the Commission directed the Secretariat to prepare and distribute a draft paper on scientific observation for consideration during the 1991 meetings. The Secretariat did so and following careful consideration of the paper, the Commission's Standing Committee on Observation and Inspection developed a proposal for an International Scientific Observation System in support of the Convention. Some members of the Commission could not accept certain provisions of the proposed system and it therefore could not be agreed upon. It was agreed that discussions should be continued at the next meeting and that, in the interim, members should initiate establishment of the International Observer System by making bilateral arrangements to place observers on board commercial fishing vessels operating in the Convention Area.

New and Developing Fisheries — As noted in the Marine Mammal Commission's previous Annual Report, the National Marine Fisheries Service issued a permit in 1990 authorizing a Seattle-based fishing vessel to conduct exploratory fishing for king and stone crabs in Sub-areas 48.1, 48.2, and 48.3 during the 1990-91 fishing season. This action sparked a debate and led to agreement that the Commission would consider at its 1991 meeting elaboration of measures to govern development of new fisheries in the Convention Area. To help prepare for this discussion, and at the same time ensure that the exploratory crab fishery was consistent with Article II of the Convention, the National Marine Fisheries Service, in consultation with the Marine Mammal Commission and the Department of State, required the permittee to develop and submit a Plan for Research and Data Collection, including an Environmental Impact Assessment, for the proposed exploratory crab fishing.

Although logistic complications prevented the fishermen from initiating exploratory crab fishing in 1991, the United States circulated the research plan and environmental impact assessment to advise the Commission and Scientific Committee of what it had done to ensure that the permitted fishing would be in conformance with Article II of the Convention. Following the U.S. example, the Commission adopted a conservation measure requiring that members, intending to develop a new fishery, notify the Commission at least three months in advance of its next meeting, and, with the notification, provide informa-

tion on the nature of the proposed fishery and baseline information on such things as the discreteness, distribution, abundance, and productivity of the stock or stocks that would be affected by the fishery.

Assessment and Avoidance of Incidental Mortality — In recent years, there have been reports of significant seabird mortality associated with the longline fishery for *Dissostichus eleginoides*. Data provided for consideration during the 1991 meetings of the Living Resources Commission and Scientific Committee suggest that 1,700 birds, including 580 albatrosses, may have been caught and killed incidental to longline fishing in Sub-area 48.3 during the 1990-91 season. There also is evidence that substantial numbers of seabirds may collide with and become entangled in cables used to monitor trawl nets. To minimize such incidental mortality, the Commission, acting on the advice of the Scientific Committee, adopted conservation measures: (1) prohibiting the use of net monitor cables on fishing vessels in the Convention Area after the 1993/94 fishing season; and (2) requiring that longline fishing operations be conducted using a streamer line to discourage birds from settling on baits during deployment of longlines and that operations be conducted in such a way that the baited hooks sink as soon as possible after they are put into the water.

On a more positive note, information presented during the 1991 meeting of the Scientific Committee indicated that the number of fur seals found entangled in net debris at Bird Island, South Georgia, had declined by approximately 80 percent over the past two years, possibly reflecting positive results in efforts to stop dumping debris at sea.

Ecosystem Monitoring — The Convention for the Conservation of Antarctic Marine Living Resources requires that fishing and related activities in the Convention Area be managed to prevent irreversible changes in the structure and dynamics of the Antarctic marine ecosystem, as well as to prevent overfishing and depletion of harvested populations. In 1984, the Scientific Committee for the Conservation of Antarctic Marine Living Resources established a working group to formulate and coordinate implementation of a multi-national research program to assess and monitor the status of key components of the Antarctic marine ecosystem. Since then, the working group has developed and members have begun implementing a long-range program plan, with three major components: (1) monitoring of representative, land-breeding krill predators (*e.g.*, Antarctic fur seals and Adelie penguins) at a network of sites throughout the Antarctic; (2) comprehensive studies of krill, krill predators, and related environmental variables in three integrated study areas (Prydz Bay, the Bransfield Strait, and the area around South Georgia Island); and (3) directed studies of the demography and dynamics of crabeater seals in one or more pack ice areas. The working group also has initiated development of standard methods and formats for collecting and reporting various types of predator, prey, and environmental data. In addition, it has recommended that provision be made to afford special protection to sites where monitoring programs are being conducted.

The working group met at Santa Cruz de Tenerife, Spain, from 5-13 August 1991. The working group report, considered during the Scientific Committee's meeting, proposed that a workshop be held to review available information and identify the most appropriate procedures and technology for obtaining information on the at-sea behavior of penguins and pinnipeds. The group recommended that a pilot study be conducted, at two of the existing monitoring sites, to determine how satellite imagery might be used to obtain an index of sea ice information within the general foraging range of the krill predators being monitored at the site. To allow formulation of management advice based on comparative evaluation of predator, prey and environmental data, the working group requested that members annually make available data on the fine-scale distribution of krill catches, estimates of krill biomass and movements, and relevant environmental data from areas within the foraging range of krill predators at the sites being monitored. The working group noted that myctophids, particularly *Electrona carlsbergi* and *E. antarctica*, are important prey for a wide range of vertebrate predators and that there consequently is a significant likelihood of the rapidly expanding myctophid fishery adversely affecting vertebrate species dependent upon myctophids.

The Scientific Committee and Commission endorsed the working group's proposals. In addition, the Commission provisionally endorsed a management

plan proposed by the United States to ensure that activities carried out by other member nations do not interfere with long-term monitoring studies being done at Seal Island.

Although substantial progress has been made in implementing the provisions of the Convention on the Conservation of Antarctic Marine Living Resources, the Marine Mammal Commission is concerned that the actions taken to date may be insufficient to ensure that new fisheries, and the existing fishery for Antarctic krill, do not pose threats to marine mammals and other components of the Antarctic marine ecosystem. Therefore, in 1992, the Commission, in consultation with its Committee of Scientific Advisors, will undertake a comprehensive review of past and ongoing efforts to implement the Convention.

U.S. Antarctic Marine Living Resources Research Program

The Antarctic Marine Living Resources Convention Act of 1984 established the domestic authority necessary for the United States to implement the Convention on the Conservation of Antarctic Marine Living Resources. Among other things, the Act directs that the National Science Foundation continue to support basic marine research in the Antarctic and that the Secretary of Commerce, in consultation with the Secretary of State, the Director of the National Science Foundation, and appropriate officials of other Federal agencies, such as the Marine Mammal Commission, prepare, implement, and annually update a plan for directed research necessary to effectively implement the Convention. In response to this directive, the National Marine Fisheries Service has prepared and begun implementing a directed Research Plan. The plan was developed in consultation with the National Science Foundation, the Marine Mammal Commission, other Federal agencies, knowledgeable scientists in the United States and abroad, representatives of the U.S. fishing industry, and representatives of interested U.S. environmental groups.[4]

In 1991, scientists from and supported by the National Marine Fisheries Service conducted research in support of the ecosystem monitoring program described above. Studies of land-based krill predators (fur seals, Adelie penguins, and other seals and seabirds) were conducted at Seal Island, off the northwest coast of the Antarctic Peninsula. Studies of physical oceanography, phytoplankton, krill, and fishes were carried out aboard the NOAA ship *Surveyor* in the eastern Bransfield Strait and around Elephant Island. These studies are to be continued in 1992.

As noted in the Commission's previous Annual Report, the value of basic and directed research being conducted or supported by the National Science Foundation and the National Marine Fisheries Service was noted during the Marine Mammal Commission-sponsored workshop held in December 1990 to assess uncertainties and research needs regarding the Bering Sea and Southern Ocean ecosystems (see Chapter VII). The workshop noted, however, that uncertainties about funding and available ship support were preventing effective long-term planning and impairing the ability of the United States to influence and participate in the coordinated, multi-national research programs necessary to give effect to the Convention for the Conservation of Antarctic Marine Living Resources. The Commission noted this in its 25 July 1991 letter transmitting the workshop report to the National Marine Fisheries Service. The Commission echoed the workshop recommendation that the Service seek funding and ship commitments, at least two years in advance and for periods of at least three to five years, to permit better long-term planning and coordination with the basic research programs being supported by the National Science Foundation and the directed research programs being carried out by other members of the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources.

Environmental Impact Assessment

At the XIVth Consultative Meeting, in October 1987, the representatives of the Antarctic Treaty Consultative Parties adopted a recommendation calling upon their governments to evaluate, during the planning process, the possible environmental impacts of scientific research programs and their associated logistic support operations in the Antarctic. In response to this recommendation and Executive Order 12114 (requiring assessment of the possible environmental effects of major Federal actions abroad), the

National Science Foundation prepared and, in early 1991, distributed for comment a Draft Supplemental Environmental Impact Statement on the U.S. Antarctic Program. The supplemental statement updated a Programmatic Environmental Impact Statement (PEIS) done in 1980.

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, reviewed the Draft Supplemental Environmental Impact Statement and provided comments to the National Science Foundation by letter of 18 March 1991. In its comments, the Commission noted that the draft supplemental statement focused on new initiatives regarding safety, environment, and health in Antarctica, but did not describe or provide an evaluation of the possible environmental impacts of the various components of the U.S. science program and related logistic support activities in Antarctica. Likewise, the Commission pointed out that the draft supplemental statement did not describe or provide an evaluation of the Foundation's responsibilities for ensuring that non-governmental expeditions originating in the United States or involving U.S. citizens comply with relevant measures established by Antarctic Treaty recommendations, the Antarctic Conservation Act, the Marine Mammal Protection Act, and other relevant statutes and agreements.

The Commission pointed out that information on the science program, as well as the logistic support program, is needed to realistically assess the possible direct, indirect, and cumulative environmental impacts of the U.S. Antarctic Program. It suggested that the Supplemental Environmental Impact Statement be expanded to provide a description and evaluation of the possible environmental impacts of various components of the science program that is expected to be carried out in the next five or ten years, and/or describe the procedures that are being or will be used to assess and avoid or minimize the possible adverse effects of individual research projects and programs, as well as the logistic support and the new safety, environment, and health initiatives. With regard to the latter point, the Commission suggested that the Foundation: (1) institutionalize a system whereby research proposals, new program initiatives, changes in logistic capabilities or techniques, new station construction, etc. are routinely examined during the preliminary review/planning process to determine how they might affect the environment and existing or planned science and related logistic support activities; (2) in cases where adverse effects are judged possible, prepare Environmental Impact Assessments or Supplementary Environmental Impact Statements, as appropriate, to ensure that possible adverse effects are identified and due consideration given them during the planning process; and (3) design and implement programs to assess and monitor the possible environmental impacts of the U.S. Antarctic Program.

Unlike the United States, many of the countries operating research programs in the Antarctic have little or no practical experience with environmental impact assessment. To help overcome this problem, the Council of Managers of National Antarctic Programs held a workshop in Bologna, Italy, on 17-19 June 1991 to develop a set of practical guidelines for meeting the environmental impact assessment requirements for scientific and related logistic support activities in Antarctica. To assist in preparing for this workshop, the Commission, in a 20 March 1991 letter to the Director of the National Science Foundation's Division of Polar Programs, suggested that the Foundation constitute an *ad hoc* working group, made up of grantees and staff, to develop criteria for judging when environmental impact assessments should be done to comply with the recommendation adopted at the XIVth Antarctic Treaty Consultative Meeting and other relevant statutes and agreements. As a possible first step, the Commission suggested that the *ad hoc* working group be asked to develop: (1) a list of environmental components of concern (*e.g.*, air, snow, ice and water quality, flora and fauna, Specially Protected Areas, etc.); and (2) criteria as to what would constitute negligible, minor or transitory, significant, and unacceptable impacts on each of the components of concern.

On a related matter, the Environmental Protection Agency convened a workshop in July 1991 to assist in identifying studies that are being and could be done in Antarctica to help assess environmental degradation being caused by human activities outside Antarctica. The Commission provided informal comments on this and the previously mentioned Environmental Impact Assessment Workshop through the Interagency Antarctic Working Group chaired by the Department of

State. A Commission representative participated in the Environmental Protection Agency's workshop.

As noted earlier, a Meeting of Experts is to be held in June 1992 to consider and provide advice on environmental monitoring programs needed to give effect to the provisions of the Antarctic Treaty Protocol on Environmental Protection concluded in October 1991. The National Science Foundation is expected to constitute and hold a meeting of an *ad hoc* working group early in 1992 to develop a discussion paper that can be circulated in advance to facilitate the work of the June 1992 Group of Experts meeting. The Commission, in consultation with its Committee of Scientific Advisors, will work with the Foundation and other interested agencies to assist in developing background information and preparing sound U.S. positions for these meetings.

Continuing International Interest in Antarctica

As noted in the Commission's previous Annual Reports, international interest in Antarctica has increased in recent years. Since the Antarctic Treaty entered into force in 1961, 28 additional nations have acceded to it, bringing the total number of Parties to 40. Fourteen of the acceding states have achieved consultative status by establishing and maintaining research programs in the Antarctic, making a total of 26 Parties eligible to participate in making decisions under the Antarctic Treaty.

In 1983, Malaysia raised the "Question of Antarctica" in the United Nations. The subject has been raised at each session of the General Assembly since then, including the 46th session in 1991. At the 46th session, the General Assembly adopted a resolution which, among other things, while welcoming the signing of the Protocol on Environmental Protection, expressed disappointment that all members of the United Nations were not invited to participate in the negotiations. It also expressed regret that the Secretary General or his representative has not been invited to attend the Antarctic Treaty Consultative Meetings. It calls upon the Antarctic Treaty Consultative Parties to increase the level of cooperation and collaboration regarding research in Antarctica with a view to reducing the number of scientific stations in Antarctica.

As noted in its previous Annual Reports, the Marine Mammal Commission believes that the Antarctic Treaty and the related agreements that form the Antarctic Treaty System provide the necessary basis and best means for protecting and conserving marine mammals and their habitat in the Southern Ocean. In 1992, the Commission will continue to work with the Department of State, the National Science Foundation, the National Oceanic and Atmospheric Administration, the National Marine Fisheries Service, the Environmental Protection Agency, and other agencies and organizations to help implement the Antarctic Treaty, the recently concluded Protocol on Environmental Protection, the Convention for the Conservation of Antarctic Seals, and the Convention for the Conservation of Antarctic Marine Living Resources.

Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention)

The United Nations Environment Program has developed and now sponsors 11 Regional Seas Programs around the world. The purpose of these programs is to establish a framework for international cooperation among nations bordering a common body of water. Each program addresses marine environmental protection and development issues of mutual concern within the region. One of the 11 programs covers the Wider Caribbean Region, which includes the Gulf of Mexico, the Caribbean Sea, and the adjacent Atlantic Ocean.

Each Regional Seas Program is guided by an action plan that outlines needed regional environmental projects (*e.g.*, watershed management, oil spill contingency planning, and protection of endangered and threatened species). The commitments of national governments party to the program are formalized by international convention. Among other things, the conventions set forth the scope, procedures, and responsibilities of parties. For special needs, agreed measures may be further elaborated by protocols adopted to expand or modify the conventions.

An action plan for the Wider Caribbean Region was developed and approved in 1981. A related Convention — the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region — was concluded in Cartagena, Colombia, in 1983 and entered into force in 1986. Although 35 nations participate in the work under the action plan, to date only 19 nations, including the United States, have ratified or acceded to the Convention.

The Cartagena Convention calls for cooperation in controlling marine pollution from various sources, including ships, offshore structures, land-based sources, and projects to develop seabed resources. A protocol on combatting oil spills has been written and adopted to help meet this objective.

The Convention also calls for efforts to protect rare and endangered species and their habitats, respond to pollution emergencies, assess environmental impacts of proposed activities, and cooperate in scientific research and the exchange of scientific and technical information. When the Convention was opened for ratification in 1983, a resolution was adopted calling on parties to develop a protocol elaborating measures to protect special areas and wildlife throughout the region. At their first meeting in October 1987, the Contracting Parties agreed to develop a protocol on specially protected areas and wildlife.

Experts from involved countries subsequently met in St. Croix, U.S. Virgin Islands, in October 1988 and in Kingston, Jamaica, in June 1989 to draft the protocol. As noted in previous Annual Reports, the Commission provided recommendations to the Department of State during the process. Based on results of those meetings, the Contracting Parties adopted the final text of the Protocol for Specially Protected Areas and Wildlife of the Wider Caribbean Region at their second meeting in Kingston, Jamaica, in January 1990.

Among other things, the Protocol calls on Parties to identify species of fauna and flora in the Wider Caribbean Region that might require special protection and to list them in one of three annexes. Greatest protection is to be given to species listed in Annexes I (plants) and II (animals). Parties are to provide for the total protection and recovery of species listed in Annex II by prohibiting the taking, commercial trade, and, to the extent possible, disturbance during sensitive biological periods. Exceptions to these prohibitions are permitted for scientific, educational, or management purposes necessary for the survival of a species. Plant and animal species that may be harvested can be listed in Annex III. For these species, Parties are to adopt measures regulating their take in a rational, sustainable manner that seeks to maintain populations at optimum levels.

The Protocol text was signed by representatives of 13 countries, including the United States. It will enter into force after ratification by 9 of the 13 nations. However, the three annexes to the Protocol were not sufficiently developed by the January 1990 meeting for them to be adopted along with the Protocol text. Therefore, before the Protocol could be considered for ratification, the Parties needed to complete the three annexes. For this purpose, the Parties asked the Regional Coordinating Unit of the Caribbean Environment Program, which acts as the Secretariat for the Convention, to develop proposed lists of species for inclusion in the annexes. It also asked that an *ad hoc* group of experts be convened to serve as an interim Scientific and Technical Advisory Committee for the Protocol pending its entry into force. That group was asked to review the proposed lists prepared by the Regional Coordinating Unit and to submit proposed annexes to a Conference of Plenipotentiaries, scheduled for 1991.

The Regional Coordinating Unit completed its work and the *ad hoc* group of experts subsequently met in Martinique in November 1990. The *ad hoc* group agreed on proposed species lists for each Annex to be tabled at the 1991 Conference of Plenipotentiaries. Regarding marine mammals, all cetaceans, pinnipeds, and sirenians were proposed for inclusion categorically on Annex II without specifying which species occurred in the Wider Caribbean Region.

In preparation for the Conference of Plenipotentiaries, the U.S. Fish and Wildlife Service published the proposed Annexes in the *Federal Register* on 21 March 1991 and asked for comments. On 8 May 1991, the Marine Mammal Commission replied to the request. Noting the proposed categorical listing of

marine mammals in Annex II, the Commission suggested that marine mammal species be listed individually and provided a list of species known to occur in the Wider Caribbean Region. The Commission also noted that it was not clear whether listing in Annex II would preclude the taking of some marine mammals that are now taken legally under the U.S. Marine Mammal Protection Act for purposes of public display or incidental to commercial fishing or offshore oil and gas activities. With respect to West Indian manatees, the Commission noted that development of a region-wide recovery plan under auspices of the Protocol could serve as a prototype plan for demonstrating the value of the Protocol, while also affording the species much needed protection. It therefore recommended that the Service take steps to facilitate development of such a recovery plan for manatees.

In light of a desire by the Parties to avoid debate on adding or deleting species on the proposed annexes developed by the *ad hoc* group of experts, the U.S. delegation decided to take no action to propose listing marine mammals individually on Appendix II at the upcoming Conference of Plenipotentiaries. The Commission questioned whether this would preclude U.S. agencies from authorizing the take of marine mammals under the Marine Mammal Protection Act for purposes of public display and incidental to commercial fishing operations and other activities.

The Conference of Plenipotentiaries was convened on 10-11 June 1991 in Kingston, Jamaica. At the meeting, the proposed lists of species for each Annex were adopted without change, thereby completing work necessary for nations to begin the ratification process. All cetaceans, pinnipeds, and manatees are thus included categorically in Annex II of the Protocol. At the end of 1991, it was the Commission's understanding that the State Department had begun steps to consider ratification of the Protocol by the United States.

Although it may be several years before a sufficient number of countries ratify the Protocol and effect its entry into force, it is possible that some interim efforts might be taken in anticipation of that. For example, Article 11 (5) of the Protocol calls upon Parties to establish cooperative programs for managing and conserving species and to develop and implement regional recovery programs. Relative to this provision, two environmental groups, Monitor International and the Save the Manatee Club, convened a meeting on 7 October 1991 in Maitland, Florida. The purpose of the meeting was to identify and recommend steps to develop a Caribbean-wide recovery program for West Indian manatees within the framework of the Caribbean Environment Program and the Cartagena Convention.

Representatives of several Federal and State agencies, including the Marine Mammal Commission, the Regional Coordinating Unit for the Caribbean Environment Program, and several concerned environmental groups participated. At the end of 1991, the final meeting report was being completed. Once it is received, the Commission will review it carefully to determine further steps that might be taken to encourage development of recovery programs throughout the Caribbean.

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

The Convention on International Trade in Endangered Species of Wild Fauna and Flora, which entered into force in 1975, provides an international framework for regulating trade in animals and plants that are or may become threatened with extinction. There are 113 Parties to the Convention, including the United States.

The extent of trade control under the Convention depends upon the extent to which a species is endangered which, in turn, is reflected by its inclusion on one of three Appendices to the Convention. Species included on Appendix I are those considered to be threatened with extinction that are or may be affected by trade. Species on Appendix II are not necessarily threatened with extinction, but may become so unless trade in them is strictly controlled. Species also may be included on Appendix II to facilitate enforcement of the Convention if those species are similar in appearance to, and may be confused with, other species protected under the Convention. Appendix III includes species that any Party identifies as being

subject to regulation within its jurisdiction for the purpose of preventing or restricting exploitation and for which the Party needs the cooperation of other Parties to control trade. Additions or deletions of species listed on Appendices I and II require concurrence by two-thirds of the Parties voting on a listing proposal. In contrast, species may be placed on Appendix III by individual Parties.

Parties to the Convention meet biennially to consider, among other things, changes to the lists of species on the Appendices. The Eighth Conference of Parties to the Convention is scheduled to be held on 2-13 March 1992 in Kyoto, Japan. The Fish and Wildlife Service acts as the lead agency on U.S. delegations to such meetings. In preparation for the conference, the Service published a *Federal Register* notice on 7 February 1991 soliciting suggestions for additions, deletions, or reclassification of species listed on the Appendices. On 24 July 1991, the Service published a summary of the suggested listing changes for further public review before deciding whether to submit any of the proposals to the Convention Secretariat for consideration at the upcoming conference. Only one change with respect to marine mammals was proposed.

At the request of the National Marine Fisheries Service, the Fish and Wildlife Service proposed removing the northern elephant seal (*Mirounga angustirostris)* from Appendix II. In support of that request, the National Marine Fisheries Service noted that the northern elephant seal has reoccupied almost all of its historic range and that utilization of the species is restricted to the few specimens collected for scientific research or public display or taken incidental to commercial fishing operations. The National Marine Fisheries Service also indicated that the species is protected in the southern portion of its range under Mexican law. While northern elephant seal parts are difficult to distinguish from those of the southern elephant seal (*Mirounga leonina*), which would remain on Appendix II, the Service stated it did not believe that listing the northern elephant seal under the similarity of appearance provision was warranted because there is no known commercial trade in the southern elephant seal.

Other Federal activities concerning marine mammals in 1991 also had a bearing on the Convention. As discussed in the North Pacific fur seal section of Chapter II, the National Marine Fisheries Service decided not to pursue an Appendix II or Appendix III listing of that species. Activities with respect to totoaba, and efforts to enhance enforcement of trade prohibitions regarding this fish species, are discussed in the Gulf of California harbor porpoise section of Chapter II.

Other Parties to the Convention did not propose any changes to the Appendices with respect to marine mammals. At the Sixth Conference of Parties in 1987, The Netherlands submitted, but later withdrew, a proposal to list the walrus on Appendix II. During 1991, the Commission was informed that the Netherlands had completed a new analysis to determine whether the walrus meets the Convention's listing criteria. The Netherlands concluded that current data on trade in walruses are insufficient to support a listing and decided not to propose an Appendix II listing at the Eighth Conference of Parties.

North Pacific Marine Science Organization (PICES)

The International Council for the Exploration of the Sea (ICES) was established in 1902 to facilitate development of a program of international investigation of the North Atlantic Ocean and adjacent seas. A new constitution for the Council was established by the 1964 Convention for the International Council for the Exploration of the Sea. The purpose of the Council, as specified in the Convention, is to promote and encourage research and dissemination of information concerning the living resources and other aspects of the North Atlantic Ocean and adjacent seas.

The Council has served a useful function and, in the late 1970s, scientists and others involved in marine research in the North Pacific began to discuss the possibility of a similar organization to facilitate coordination of marine and other research in the North Pacific. These informal discussions led to a series of formal discussions involving representatives of the Governments of Canada, Japan, the People's

Republic of China, the Soviet Union, and the United States — most of the countries bordering on and having principal interest in the North Pacific Ocean. These discussions led to the development of the Convention for a North Pacific Marine Science Organization (PICES). [Note: PICES is included in the formal title of both the Convention and the organization established by the Convention. It is not an acronym.]

The Convention was concluded in December 1990 and will enter into force 60 days after it is ratified by three of the five signatory nations. It provides, among other things, for the establishment of a Governing Council, a Secretariat, and such permanent or *ad hoc* scientific groups and committees as may be determined necessary by the Council. The purpose of the organization is to promote and coordinate marine scientific research in the North Pacific Ocean and its adjacent seas, much as the International Council for the Exploration of the Sea does in the North Atlantic.

The Commission believes that an organization, similar to the International Council for the Exploration of the Sea, could be very beneficial and, in consultation with its Committee of Scientific Advisors, provided advice to the Department of State during negotiation of the Convention. As noted in the previous section, a workshop was convened by the Commission in December 1990 to assess uncertainties and research needs regarding marine mammals and other aspects of the Bering Sea and Gulf of Alaska. The workshop report was transmitted by the Commission to the National Marine Fisheries Service and the National Science Foundation on 25 July 1991. Among other things, the report noted that, while relevant research is being done by a variety of organizations in this and other countries, the research generally is planned and carried out, and its results analyzed, independently. To address this problem, the Commission recommended in its letters transmitting the report that an interagency group be constituted to coordinate domestic research programs in the area and that an existing forum (such as the North Pacific Marine Science Organization) be used or a new forum be established to facilitate cooperative planning and coordination of marine research being carried out by the United States and other countries in the area.

As noted above, the Convention for a North Pacific Marine Science Organization will come into effect 60 days after three of the five signatory states have deposited instruments of ratification, acceptance, or approval. This is expected to occur early in 1992. To facilitate the work of the Governing Council that will be established when the Convention enters into force, the Commission, as noted in Chapter IX, provided funds to the University of Washington to help support a workshop to review the state of knowledge and identify research gaps and priorities in selected fields. The workshop was held at the National Marine Fisheries Service's Northwest Fisheries Science Center in Seattle, Washington, on 10-13 December 1991. Participants included scientific delegations from Canada, Japan, the People's Republic of China, the Soviet Union, and the United States. A Commission representative attended the workshop as an observer.

The workshop discussions were focused on four issues: (1) climate change; (2) the Bering Sea; (3) environmental quality; and (4) fishery oceanography. Information concerning related research being carried out or planned by the various countries was exchanged and discussed. Data gaps and research needed to fill those gaps were identified.

The workshop report, expected to be completed early in 1992, will be provided to member states to assist in preparing for the first meeting of the organization. The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, will review the report and convey its views on critical research needs and priorities to the U.S. members of the Governing Council.

IUCN—The World Conservation Union Species Survival Commission Marine Mammal Specialist Groups

The World Conservation Union (formerly the International Union for the Conservation of Nature and Natural Resources) Species Survival Commission oversees several groups of specialists concerned with the conservation of marine mammals. In 1991, the Marine Mammal Commission was involved in the

activities of three groups: the Seal, Cetacean, and Sirenia Specialist Groups.

Seal Specialist Group

On 9-10 June 1991, a Commission representative participated in a meeting of the Seal Specialist Group in Texel, The Netherlands. The Seal Specialist Group, composed of about 20 researchers with experience in pinniped conservation and management, met to work on a conservation action plan for pinnipeds. The plan will include a review of the status of pinniped species worldwide and will propose needed actions for the conservation of many species.

The World Conservation Union maintains a series of *Red Data Books* listing species of wildlife that are, may be, or have been in some need of conservation or protection. Listed wildlife are assigned to one of several categories: extinct (no confirmed sightings in the wild for at least 50 years), endangered (in danger of extinction), vulnerable (likely to become endangered in the near future), rare (small populations that may be at risk), indeterminate (known to be endangered, vulnerable, or rare, but lacking enough information to determine which of the three categories is most appropriate), insufficiently known, and out of danger (formerly listed but now considered secure).

The participants in the June 1991 meeting reviewed the status of all pinniped species and made the following preliminary recommendations on *Red Data Book* classifications: adding presently unlisted Steller sea lions (*Eumetopias jubatus*) as vulnerable; maintaining Hawaiian monk seals (*Monachus schauinslandi*) and Mediterranean monk seals (*Monachus monachus*) as endangered; and reclassifying Caribbean monk seals (*Monachus tropicalis*) from extinct to endangered. Final recommendations will be made in the action plan after additional review of the data and consultations with species experts.

Other species considered at the meeting included Japanese sea lions (*Zalophus californianus japonica*), Australian sea lions (*Neophoca cinerea*), Hooker's sea lions (*Phocarctos hookeri*), Laptev walruses (*Odobenus rosmarus laptevi*), Guadalupe fur seals (*Arctocephalus townsendi*), Juan Fernandez fur seals (*Arctocephalus philippii*), Saimaa seals (*Phoca hispida saimensis*), Baltic ringed seals (*Phoca hispida botnica*), Lagoda seals (*Phoca hispida lagodensis*), Caspian seals (*Phoca caspica*), and Ungava seals (*Phoca vitulina mellonae*). After completing the preliminary status reviews, the group agreed to circulate drafts to selected experts to be reviewed and updated. In its preliminary review of pinniped conservation needs, the group also agreed that issues concerning the survival of the Mediterranean monk seal were the most pressing facing any pinniped species.

Several general categories of threats to pinnipeds were identified and discussed, including incidental catch in fishing gear, direct harvests. pollution and contaminants, and the effects of commercial harvests of pinniped prey species on pinniped populations. Descriptions of needed conservation actions were drafted to respond to species-specific and general threats, and these will be developed more fully for inclusion in a draft conservation action plan.

On 8 December 1991, members of the Seal Specialist Group met again in Chicago, Illinois, to review progress on developing the draft plan. A final draft of the plan is expected in July 1992.

Cetacean Specialist Group

In 1988, the Cetacean Specialist Group published a cetacean conservation action plan. The plan recommended over 50 projects and actions for the conservation of whales, dolphins, and porpoises to be implemented worldwide between 1988-1992.

In 1990, the Marine Mammal Commission provided support to the Center for Marine Conservation in its efforts to help implement the plan. This funding supported the hiring of a staff member to work directly with the Specialist Group's Chairman.

The cetacean action plan is expected to be revised and expanded in 1992 to reflect cetacean research and conservation needs through 1997. Publication of the revised plan is expected in November 1992.

Sirenia Specialist Group

In 1991, the Marine Mammal Commission continued to provide support to the Sirenia Specialist Group for the publication of its newsletter, *Sirenews*, a compendium of information on sirenians that is periodically sent to scientists throughout the world. The Commission has provided partial support for the newsletter's publication since 1988 and intends to continue doing so.

Notes:

1. The Antarctic Treaty Consultative Parties, as of 4 October 1991, were Argentina, Australia, Belgium, Brazil, Chile, China, Ecuador, Finland, France, Germany, India, Italy, Japan, Republic of Korea, The Netherlands, New Zealand, Norway, Peru, Poland, South Africa, Spain, Sweden, the Soviet Union, the United Kingdom, the United States, and Uruguay.
2. Copies of the Protocol may be obtained from the Office of Oceans and Polar Affairs, Department of State, 2201 C Street, NW, Room 5801, Washington, D.C. 20520.
3. Reports of the meetings of the Commission and Scientific Committee can be obtained from the Executive Secretary, Commission for the Conservation of Antarctic Marine Living Resources, 25 Old Wharf, Hobart, Tasmania 7000, Australia.
4. Information concerning the National Marine Fisheries Service's Antarctic Marine Living Resources Research Program can be obtained from the Program Director, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive, P.O. 271, La Jolla, CA 92038.

Chapter V

MARINE MAMMAL STRANDINGS AND DIE-OFFS

Over the past decade and a half, there has been an increase in the incidence of unusual marine mammal mortalities throughout the world. These incidents have occurred in widely separated areas and have involved a variety of marine mammal species, including monk seals in the northwestern Hawaiian Islands, harbor seals in New England, manatees in Florida, and humpback whales in Cape Cod. Among the largest and most publicized were the deaths of more than 700 bottlenose dolphins along the U.S. mid-Atlantic coast in 1987 and early 1988, and more than 17,000 harbor seals in the North Sea later in 1988.

As noted in the previous Annual Report, there were two incidents of higher-than-normal bottlenose dolphin mortality in the Gulf of Mexico in 1990. There also was a catastrophic die-off of striped dolphins in the Mediterranean Sea. These events and the role played by the Commission and its Committee of Scientific Advisors in efforts to determine the cause and biological significance of these events are described in past Annual Reports.

Unusual Events Occurring in 1991

During 1991, the die-off of striped dolphins in the Mediterranean that began in mid-1990 continued to spread east. In addition, an unusually high number of seals died in Long Island Sound, an outbreak of leptospirosis occurred in California sea lions in northern and central California, and there were indications of a possible fungal infection in dolphins along the southeast Florida coast. In each case, the Commission, in consultation with its Committee of Scientific Advisors, reviewed available information and provided guidance or other assistance to the organizations investigating the events.

Striped Dolphin Die-Off in the Mediterranean Sea

As described in the previous Annual Report, nearly 750 dead striped dolphins (*Stenella coeruleoalba*) were recovered from the Mediterranean coasts of Spain, France, and Italy during the last six months of 1990. Additional dead dolphins were reported in other parts of the western Mediterranean, suggesting that the actual mortality was substantially higher. The Commission provided funds in 1990 for two marine mammal veterinarians experienced in investigating such mortalities to conduct a site visit and consult researchers carrying out the investigations. It also provided supplemental support to help Spanish investigators determine the cause of the incident.

During the first half of 1991, the striped dolphin die-off decreased in intensity. However, dead dolphins began to be recovered farther to the east. From June through September 1991, 198 dead striped dolphins were recovered from Italian waters, primarily along the southern Adriatic coast. By early September, the die-off had reached Greece, where at least 35 dead animals were reported by early November.

The most up-to-date results of the continuing investigations were reviewed at a workshop held in Spain on 4-5 November 1991. The workshop, sponsored by the Greenpeace International Mediterranean Sea Project, included scientists who had worked on the previously mentioned die-offs of bottlenose dolphins, harbor seals, and manatees, as well as scientists investigating the striped dolphin die-off. Workshop participants concluded that the striped dolphin die-off probably was being caused by a previously unknown morbillivirus, tentatively referred to as delphinoid distemper virus. A similar morbillivirus (phocine distemper virus) caused the mass mortality of harbor seals in the North Sea in 1988.

Workshop participants believed that the delphinoid distemper virus is distinct from the phocine distemper virus and has been present, but previously undetected, in the striped dolphin and other cetacean populations in the Mediterranean Sea and elsewhere. That is, the workshop participants doubted that the delphinoid distemper virus was a mutant form of either the phocine or canine distemper virus and that the dolphins had not been infected by contact with either infected seals or dogs.

Many of the striped dolphins found dead in the Mediterranean Sea had secondary bacterial and fungal infections, and unusually high concentrations of organochlorine contaminants in blubber lipids. These findings are similar to what was found in the bottlenose dolphins that died along the mid-Atlantic coast of the United States in 1987 and 1988. In both cases, it was judged that the contaminants were not the ultimate cause, but may well have contributed to the deaths of the animals.

A shipboard population survey done in the western Mediterranean in 1991 after the die-off had diminished indicated that between 115,000 and 350,000 striped dolphins remained in the affected population. Thus, the die-off has not reduced the population to a level where it is in danger of extinction.

Seal Die-Off in Long Island Sound

In mid-March 1991, an unusually large number of seals began to wash up on beaches around Shinnecock Bay, Long Island, New York. Over the next several weeks, seals exhibiting similar skin lesions, thought possibly to be caused by bacterial infections, came ashore and died on several other beaches on the north side of Long Island. They were mostly harbor seals, but included three hooded seals, one gray seal, one harp seal, and one ringed seal.

Representatives of the National Marine Fisheries Service briefed the Commission on the die-off during the Commission's annual meeting on 25-27 April in Bellevue, Washington. At that time, the remains of 31 animals had been recovered, all showing a similar type of skin lesion. Some of the animals had full stomachs, indicating that they died soon after eating. The Service noted that the episode met four of the five agreed-upon criteria (see below) for deciding that special investigation is merited. Accordingly, the Service had initiated an investigation, and had notified organizations involved in responding to strandings further north to be alert to the possibility of increased pinniped mortalities.

By memorandum of 6 May 1991, the coordinator of the Service's Northeast Regional Stranding Network provided a summary of available information concerning the event. At that time, the remains of 33 animals had been recovered. The Commission, in consultation with its Committee of Scientific Advisors, reviewed the summary. On 13 May 1991, the Commission recommended to the National Marine Fisheries Service that (1) a medical director be appointed immediately to oversee the medical aspects of the investigation; (2) either the Gulf of Mexico Die-Off Review Team or a substantial portion of the National Task Group on Unusual Marine Mammal Mortalities be convened as soon as possible to meet with the medical director and the stranding coordinator to review and evaluate all aspects of the investigation; and (3) given the migratory paths of some of the involved species, appropriate Canadian scientists be invited to join the discussions.

Shortly after the Commission's letter was sent, the die-off abated. Tissues had been collected from many of the dead seals for bacterial, contaminant, and other types of analyses. At the end of 1991, the results of the analyses were not yet available.

California Sea Lion Die-Off

In July 1991, 12 California sea lions (*Zalophus californianus*) stranded live or washed up dead along the north-central coast of California. All animals were diagnosed as having leptospirosis, a disease that periodically reaches epidemic proportions in California sea lions. The outbreak worsened in August when 98 California sea lions were found sick or dead along the California coast (compared to 35 in 1990 and 36 in 1989). Of these, 56 of 77 live animals were diagnosed as having leptospirosis, and half of those eventually died. The event continued into September and October, when 39 and 23 cases were diagnosed, respectively. In November and December, the number of affected animals dropped to 7 and 1.

A total of 144 animals were diagnosed as having leptospirosis during the seven-month period. In view of the fact that leptospirosis outbreaks occur periodically, this was not judged to be alarming. In several cases, animals were found with bladder cancers, unusual seizure disorders, and unusual skin diseases. Organizations involved in rescuing and rehabilitating sick and injured sea lions and other marine mammals in California are looking for further unusual occurrences of this nature.

Bottlenose Dolphins in Biscayne Bay

During the 1990 die-off of bottlenose dolphins (*Tursiops truncatus*) in the Gulf of Mexico, the National Marine Fisheries Service's Southeast Fisheries Science Center obtained a permit to take animals from the Gulf of Mexico exhibiting unusual lesions or behavior. In December 1990, researchers working in Biscayne Bay on Florida's east coast observed bottlenose dolphins that appeared to be infected with a fungal skin disorder known as lobomycosis. By April 1991, the incidence of infected animals seemed to be increasing. The Center therefore requested an emergency modification of its permit to allow collection of tissue (biopsy) samples from the infected animals.

On 1 May 1991, the National Marine Fisheries Service requested the Commission's comments on the emergency authorization request. The Commission, in consultation with its Committee of Scientific Advisors, reviewed the request and, by letter of 7 May 1991, recommended that it be approved. Subsequently, the presence of lobomycosis was confirmed in one animal that stranded. Fortunately, there was no subsequent increase in strandings, suggesting that the disease had not caused or contributed to a substantial increase in dolphin mortalities.

Development of a National Die-Off Response Plan and Improvement of the Regional Stranding Networks

As noted in previous Annual Reports, the Commission sponsored a workshop in 1977 to assess the possible causes of mass marine mammal strandings and to determine how the scientific value of both live- and dead-stranded marine mammals might be enhanced. The workshop participants recommended, among other things, that regional networks of volunteers be established to improve reporting and investigation of strandings of both live and dead animals (see Appendix B, Geraci and St. Aubin 1979). In response, the National Marine Fisheries Service, in consultation with the Commission, has worked with public display facilities, museums, and other interested organizations and individuals to establish volunteer stranding response networks in each of its management regions.

In 1987, the Service sponsored a workshop to review operation of the regional stranding networks. In 1989, the Service initiated an in-depth review of its policies and programs regarding marine mammal strandings. The workshop proceedings and the report of the program review were published in 1991, and can be obtained from the National Marine Fisheries Service.

The stranding networks played an important role in detecting and investigating the unusually high mortality of bottlenose dolphins that occurred along the U.S. mid-Atlantic coast from June 1987 through January 1988. The networks also were responsible for detecting, and provided assistance in investigating, the unusually high numbers of humpback whales that died in Cape Cod Bay in December 1987, the unusually high numbers of bottlenose dolphins that died in the Gulf of Mexico in 1990, the unusually high mortality of seals in Long Island Sound in spring 1991, and the outbreak of leptospirosis in California sea lions in the summer of 1991.

As noted in previous Annual Reports, the Minerals Management Service, the Fish and Wildlife Service, the Smithsonian Institution, and many private and volunteer organizations, as well as the Commission and the National Marine Fisheries Service, have contributed to development of the regional stranding networks.

Response Planning

As noted in the previous Annual Report, on 18 December 1990, the National Marine Fisheries Service, in response to a Commission recommenda-

tion, convened a meeting of the group that had been constituted earlier in the year to review and provide advice on the Service's efforts to determine the cause of the unusually high numbers of bottlenose dolphins found washed up on beaches along the northern Gulf of Mexico earlier in the year. The purposes of the meeting were to review the results of the 1990 bottlenose dolphin die-off investigation, provide advice on measures that could be taken to be better prepared to respond to similar die-offs in the future, and consider how best to utilize a special $400,000 Congressional appropriation.

Meeting participants included representatives of the Marine Mammal Commission, the National Marine Fisheries Service, several academic institutions, the Armed Forces Institute of Pathology, the Environmental Protection Agency, the Naval Oceans Systems Center, and the Fish and Wildlife Service. Meeting participants identified ways that the $400,000 special appropriation could be used to improve the Regional Marine Mammal Stranding Networks. They noted, for example, that part of the supplemental appropriation could be used to prepare and distribute kits to respond to unusual mortalities. The kits included data forms, as well as specimen bags, labels, knives, and other equipment and supplies needed to collect basic morphological data and tissue samples from routine strandings.

The group noted that animals decompose rapidly after dying and that successfully determining the cause of unusual mortality events often requires obtaining and collecting samples from animals soon after they die. It recommended that the National Marine Fisheries Service develop standard protocols for doing postmortem examinations of, and collecting tissue samples from, dead stranded marine mammals. It also recommended that the National Marine Fisheries Service consider entering into agreements with veterinary schools or other organizations in each of its regions to conduct necropsies and collect standard sets of tissue samples and other data from marine mammals recovered during unusual mortality events. The group constituted four *ad hoc* subgroups to draft standard protocols for collecting general biological and life history information, conducting gross necropsies, and collecting samples for histopathology, microbiology, and toxicology analyses. It was agreed that the group would meet again early in April 1991 to review: (1) the draft protocols; (2) the results of the 1990 Gulf of Mexico die-off investigation; and (3) the results of ongoing efforts to develop an effective die-off response plan.

To facilitate identification and consideration of related issues, the Commission developed a discussion paper on "Development of a Coordinated Interagency Marine Mammal Monitoring and Emergency Response Plan." The paper was sent to the National Marine Fisheries Service, the Environmental Protection Agency, the Minerals Management Service, and other relevant agencies on 26 February 1991. The paper described the problems that had impeded investigation of the previously noted marine mammal die-offs. It identified seven things that could be done to more effectively identify and be prepared to investigate such die-offs in the future: (1) evaluate and improve operation of the Regional Marine Mammal Stranding Networks; (2) design and implement a program to determine and monitor the levels, sources, and effects of environmental contaminants present in a representative sub-set of marine mammals inhabiting U.S. coastal waters; (3) review available information and conduct such additional studies as may be necessary to determine what and how natural biotoxins may be contributing to unusual marine mammal mortalities; (4) design and conduct studies to improve basic knowledge of the types and etiology of bacteria, viruses, parasites, and other pathogens that affect marine mammals and of means for diagnosing and, as appropriate, treating or preventing highly contagious and debilitating diseases; (5) establish a contingency fund and an expert advisory group to assist in developing and implementing contingency plans; (6) expand basic population studies to obtain baseline information necessary to judge the biological significance of unusual mortality events; and (7) constitute an interagency task force, with representatives from the National Marine Fisheries Service, the Fish and Wildlife Service, the Environmental Protection Agency, the Minerals Management Service, the Animal and Plant Health Inspection Service, and the Armed Forces Institute of Pathology, to agree on a plan for cooperatively implementing the required programs.

On 8 April 1991, the National Marine Fisheries Service convened another meeting of the group

established to assist in developing and implementing a national die-off response plan. In advance of the meeting, the Service organized and held a workshop in Galveston, Texas, to field test the draft necropsy and tissue sampling protocols developed by the group following its meeting in December 1990. The results of this workshop were discussed and used at the 8 April meeting to revise and agree on a tentative schedule for completing standard protocols for collecting life history information, conducting necropsies, and collecting samples from dead stranded marine mammals.

At the April meeting, the group also developed a set of agreed criteria for determining when a mortality event is sufficiently unusual to merit special investigation. The criteria are:

- the number of animals stranding is substantially higher than would be expected from prior stranding records;
- animals are stranding at a time of the year when strandings generally are unusual;
- strandings are occurring in a localized area (possibly suggesting a localized problem), are occurring throughout the species' geographic range, or are spreading over a larger geographic range (suggesting spread of an infectious disease) as time passes;
- the age or sex composition of the stranded animals is different than that of animals that normally strand in the area; and
- the general physical condition (*e.g.*, weight) of stranded animals is different than that seen normally, or the animals have unusual lesions.

A sixth and more or less independent criterion would be mortalities involving highly endangered species. For example, stranding of only two or three highly endangered right whales for reasons not apparant (such as entanglement or ship collisions) would merit immediate investigation.

Development of a National Marine Mammal Tissue Bank

During investigation of the 1987-1988 die-off of bottlenose dolphins along the U.S. mid-Atlantic coast, it became clear that there were inadequate baseline data and no source of tissues that could be analyzed to determine pre-existing levels of anthropogenic contaminants and natural biotoxins present in the population prior to the die-off. As a first step in avoiding this problem in the future, the National Marine Fisheries Service initiated steps in 1989 to establish a National Marine Mammal Tissue Bank. Many of the protocols being used to collect, prepare, and store tissue samples are derived from a program begun by the Minerals Management Service in 1984 to obtain and curate tissue samples from walruses and other marine mammals taken by Alaska Natives for subsistence.

Recognizing that the value of the Tissue Bank would depend on the number, types, and quality of tissues being maintained, the National Marine Fisheries Service established a Group of Experts to oversee development of the bank. This group, which includes a Commission representative, has met at least once each year since 1989. In response to recommendations made by the group, the National Marine Fisheries Service has: (1) established basic protocols for collecting, preparing, storing, and accessing tissue samples; (2) conducted a pilot program to test the protocols; and (3) initiated studies to determine whether the levels of various contaminants present in tissues vary with time or the part of the body from which the tissue samples are taken.

Proposed Legislation

As noted above, difficulties and uncertainties encountered during investigation of the bottlenose dolphin die-off along the mid-Atlantic coast in 1987 and early 1988 caused the Commission to initiate efforts to develop a National Die-off Response Plan. Also, as noted above, they caused the National Marine Fisheries Service to initiate development of the National Marine Mammal Tissue Bank, improve operation of the Regional Stranding Networks, and take other steps to be better prepared to respond to such unusual mortality events in the future. They also

caused several members of Congress to draft and propose enactment of a bill to amend the Marine Mammal Protection Act "to provide for examination of the health of marine mammal populations and for effective coordinated response to strandings and catastrophic events involving marine mammals."

The bill (H.R. 3486) is pending before the House of Representatives Committee on Merchant Marine and Fisheries. If enacted as written, it would direct the Secretaries of Commerce and the Interior to cooperatively establish programs for collecting baseline data on the health of marine mammals inhabiting U.S. waters and for promptly responding to unusual live stranding and mortality events. It would establish a "Marine Mammal Emergency Response Contingency Fund," and direct that the National Marine Fisheries Service establish a group of experts to assist in developing contingency plans and deciding how best to respond to unusual mortality events. At the end of 1991, the Commission was reviewing and preparing comments on the bill.

Workshop on Release of Rehabilitated and Captive Marine Mammals

Each year, many sick and injured cetaceans, pinnipeds, sea otters, and manatees strand or haul out on beaches in the United States. In cases involving species that are endangered, threatened, or depleted, it is possible that the rescue, rehabilitation, and return of animals to the wild could help stop and reverse population declines. In cases involving non-depleted species and populations, these actions serve a humanitarian function and can prevent undue pain and suffering. In both cases, rescue and rehabilitation can help increase knowledge of the biology, physiology, and diseases of marine mammals and identify causes of marine mammal mortality from both natural and human-related causes.

In certain circumstances, rescue and rehabilitation programs may have undesirable effects. For example, if the rescued animals are carrying infectious diseases, they could transmit them to healthy animals being held at the rehabilitation facilities and possibly to domestic animals. Conversely, they possibly could contract exotic diseases from domestic or other animals while in captivity, and, when released, transmit those diseases to wild populations with no natural immunity or resistance to them. In addition, both live and dead stranded animals may pose hazards to the general public and to persons involved in rescue, rehabilitation, and release programs. Also, in cases where populations are at or near carrying capacity levels, sick and dying animals may be a manifestation of natural population regulation, and release of rehabilitated animals back into the wild may cause the population to exceed carrying capacity, over-exploit food supplies or other key habitat components, and result in population declines and more sick and dying animals. Further, while in captivity, animals may lose their ability to locate and capture food, detect and avoid predators, or interact normally with another animal of the same species. If so, return to the wild could result in undue mortality, pain, or suffering.

It is not clear whether all of the organizations involved in, and responsible for authorizing, rescue-release programs are fully aware of and taking steps necessary to avoid the types of problems mentioned above. Therefore, the Commission and the National Marine Fisheries Service cooperatively sponsored a workshop to review and determine what more might be done to avoid such problems. The workshop was held in Chicago, Illinois, on 3-5 December 1991. It included representatives of the National Marine Fisheries Service, the Fish and Wildlife Service, the Commission, the public display industry, rescue and rehabilitation centers, and representative state agencies, as well as experts in marine mammal disease, pathology, medicine, disease transmission, and public health.

At the end of 1991, the Commission, in consultation with its Committee of Scientific Advisors, was determining what follow-up actions might be merited before completion of the workshop report, not expected until mid-1992.

Chapter VI

IMPACTS OF MARINE DEBRIS

Plastic and other synthetic material lost or intentionally discarded into the marine environment kills and injures significant numbers of many marine species, including marine mammals. For example, derelict fishing nets and traps, rope and line, strapping bands, and other such debris may attract and entangle or accidentally entangle marine mammals, seabirds, turtles, fish, and crustaceans. Marine animals also confuse floating plastic bags, small plastic fragments, and other debris with natural prey and ingest them.

Among the animals affected are species listed as endangered or threatened, and commercially valuable crustaceans and fish. Indeed, marine debris kills some of the country's most imperiled marine species (*e.g.*, Hawaiian monk seals, right whales, West Indian manatees, and Kemp's Ridley and green sea turtles) and its most commercially valuable species (*e.g.*, lobsters and king crabs). Marine debris also poses serious health, safety, and navigation hazards for humans and causes aesthetic impacts that are costly to clean up.

Since the early 1980s, the Marine Mammal Commission has played a major role in focusing domestic and international attention on the need to assess and mitigate wildlife problems caused by marine debris. Among other things, the Commission provided initial funding and terms of reference for the first international symposium on marine debris in 1984. These and other past efforts are discussed in previous Annual Reports. Activities undertaken by the Commission and others in 1991 are discussed below.

Background

The amount of debris in many coastal and open-ocean areas has increased dramatically since the 1950s. At least three factors appear to have contributed to this trend. First, synthetic materials that degrade slowly in sea water are being used more and more in manufactured items commonly lost or discarded at sea. As a result, the total debris load in a given area at a given time reflects the amount of synthetic material lost and discarded over a significantly longer period of time than was the case when natural fibers predominated prior to the 1950s. Second, because synthetic materials often cost far less than the natural materials they replaced and because many items are now made for one-time use (*e.g.*, plastic bags, bottles, cups, etc.), economic incentives for re-using or recycling are reduced. Third, the number of ships and coastal residents that lose or discard debris have increased substantially.

As the amount of synthetic debris increases, so too does its threat to wildlife. Marine animals that become entangled in loops or openings of marine debris may drown, lose their ability to catch food or avoid predators, or incur wounds and infections from the abrasion of attached debris. Those that ingest objects made of synthetic materials may have digestive tracks blocked, stomach linings damaged, or feeding drives reduced by a false sense of satiation. Because of their increased durability and strength, synthetic materials are more likely to kill or injure animals than natural materials used previously. That is, plastic sheeting is more likely than paper to remain lodged for long periods in an animal's digestive tract, and monofilament nets will retain their ability to entangle and kill animals much longer than cotton netting.

Until recently, the magnitude of such effects has been masked by the size of the ocean, the deceptively simple nature of the threat, the erroneous perception that encounters between marine mammals and debris are unlikely, and the apparent absence of large num-

bers of marine animals strangled, drowned, starved, or choked by marine debris.

However, plastic and other types of debris may be concentrated by disposal patterns, winds, and ocean currents on beaches, in drift lines, and along current margins where marine mammals and other species are most likely to occur. In addition, many species actively seek out debris because of associated prey species attracted to the cover it provides, its resemblance to prey, or because it represents objects of play. Thus, encounters between marine life and debris are often not chance occurrences, but rather the result of purposeful responses on the part of the animals involved. At the same time, however, evidence of encounters may not be readily apparent because animals that are killed may sink below the surface, be eaten by predators, be scattered by their own movements after becoming entangled and before dying, or remain offshore or underwater where they are not likely to be found.

Widespread concern over the extent to which marine debris pollution was affecting marine life can be traced to a November 1984 Workshop on the Fate and Impact of Marine Debris convened by the National Marine Fisheries Service. The Commission's role in recommending and guiding development of that Workshop is discussed in previous Annual Reports. The Workshop proceedings clearly demonstrated that marine debris was a widespread form of marine pollution posing serious threats to a wide array of marine species.

In light of the workshop findings and other information, Congress provided funds to the National Marine Fisheries Service in 1985 to begin a Marine Entanglement Research Program. The program, which has been carried forward annually since 1985, is one of only two U.S. programs directed explicitly at addressing research and management needs relating to marine debris pollution. The other program is part of the Navy's research and development program. The Navy has dedicated extensive resources to develop trash compactors, pulpers, plastic waste processors, and other hardware for handling and processing solid wastes generated during the course of routine vessel operations. By virtue of this program, the Navy has become the leader in developing and applying technological solutions to address new discharge standards pertaining to ship-generated garbage.

In addition, Federal agencies, including the Marine Mammal Commission, and Congress accelerated U.S. efforts to ratify and implement Annex V of the International Convention for the Prevention of Pollution from Ships. Annex V establishes an international framework for regulating the disposal of garbage from ships. Among other things, it prohibits the discharge of all plastics at sea. Its provisions apply to all ships (other than military vessels) registered with signatory nations anywhere in the world and to all ships (foreign and domestic) within waters of a signatory nation.

Although Annex V was part of a Convention Protocol concluded and opened for signature in 1978, most countries, including the United States, made minimal efforts to vigorously pursue ratification and entry into force prior to the mid-1980s. This appears to be due to a prevailing view that ship-generated garbage was principally an aesthetic problem, attention to which could be deferred pending progress on other more serious ship pollution issues. Given the results of the 1984 Workshop on the Fate and Impact of Marine Debris, however, this view changed quickly and, on 31 December 1987, the United States deposited its instrument of ratification for Annex V.

U.S. ratification brought the number of nations acceding to Annex V to 31. Collectively, those nations represented more than half of the world's commercial shipping tonnage. These levels satisfied the criteria for Annex V's entry into force internationally, and it triggered a one-year period during which acceding nations were to adopt the domestic regulations necessary to give effect to the provisions of Annex V within their areas of jurisdiction. Thus, on 31 December 1988, regulatory measures in Annex V became binding upon signatory nations.

Although it is not clear what proportion of marine debris originates from routine ship disposal practices, disposal of ship-generated garbage at sea has been a standard practice for centuries. It also is likely that ships are the principal source of at least some of the materials (*e.g.*, net fragments) most hazardous to wildlife. Effective implementation of the provisions

of Annex V is, therefore, a central part of efforts to resolve problems.

The Marine Entanglement Research Program

In 1985, Congress appropriated $1,000,000 to the National Marine Fisheries Service to develop and begin implementing a program to address marine debris problems. As noted in previous Annual Reports, the Commission played a major role in identifying and organizing initial program efforts. The work begun that year has been carried forward since then through the National Marine Fisheries Service's Marine Entanglement Research Program, administered by the Northwest and Alaska Fisheries Science Center. To continue the work, Congress has appropriated between $700,000 to $750,000 annually since 1985 and directed that the Service obtain the concurrence of the Marine Mammal Commission on how those funds are spent.

To help determine the future direction of the Marine Entanglement Research Program, the Service convened a program planning meeting on 19-20 June 1991 at the Northwest and Alaska Fisheries Science Center in Seattle, Washington. The purpose of the meeting was to review the status and results of recent marine debris-related research and management activities and to identify priority tasks to be carried out in FY 1992. Representatives of the Commission and other involved Federal agencies participated.

Based on results of the meeting, the Service developed a proposed program plan, which it sent to the Commission for review on 4 November 1991. The projects proposed in the plan appeared appropriate to improve understanding marine debris pollution or to reduce or mitigate its effects. Therefore, by letter of 13 December 1991 to the Service, the Commission concurred with the plan and recommended that steps to implement it be taken promptly.

The Fiscal Year 1992 plan allocates $685,800 among 18 research and management projects addressing education, mitigation, and research, and one program management task. Twelve projects, including the program management task, continue or build upon efforts begun in previous years. Because a substantial part of marine debris pollution appears to be caused by incremental effects of seafarers, beach users, coastal residents, and others, preventing disposal requires broad public awareness of marine debris problems and disposal restrictions. A substantial part of program funding therefore is devoted to public education.

In this regard, the 1992 plan supports tasks to (1) continue and provide supplies for two marine debris information offices; (2) print brochures and placards on marine debris pollution and vessel discharge regulations for distribution by the Coast Guard Auxiliary; (3) continue a State of Hawaii education outreach program and adapt it for use in other Pacific island areas; and (4) in cooperation with the Intergovernmental Oceanographic Commission's Caribbean Subcommission, develop an education outreach program for the Gulf of Mexico and the Wider Caribbean Region.

Other parts of the 1992 plan support mitigation work to (1) organize and carry out volunteer beach clean-up campaigns, (2) free entangled Hawaiian monk seals and remove hazardous debris from seal haulout beaches in the Northwestern Hawaiian Islands, (3) undertake a comprehensive review through the National Research Council's Marine Board of U.S. strategies to implement and assure compliance with recent regulations to limit the disposal of garbage from ships, (4) complete a study of economic aspects related to marine debris pollution and mitigation needs, and (5) assist U.S. efforts to broaden international acceptance and implementation of Annex V of the Convention for the Prevention of Pollution from Ships.

In order to ensure, insofar as possible, that mitigation efforts focus on the most serious effects and respond to pollution trends in a timely manner, research and monitoring studies are needed to improve understanding of marine debris sources, effects, and trends. In this regard, the 1992 plan supports (1) a continuation of long-term studies to monitor the types and amounts of entangling debris on certain Alaska beaches, (2) work by the National Park Service to

monitor trends in marine debris washing ashore at selected National Seashores, (3) an assessment of the capabilities of different types of fisheries observers and existing fisheries observer programs to gather marine debris pollution data; (4) studies to develop new methods of capturing juvenile sea turtles and marine debris along surface convergence zones and to otherwise assess impacts of marine debris on such animals during their pelagic phase; and (5) the purchase of equipment necessary for disentangling large whales off the New England coast.

Domestic Regulations for Disposal of Ship-Generated Garbage

As noted above, the provisions of Annex V became binding upon signatory nations, including the United States, on 31 December 1988. To provide the domes tic authority necessary to give effect to its provisions, Congress passed the Plastic Pollution Research and Control Act of 1987. Among other things, the Act amended the existing Act to Prevent Pollution from Ships by granting the Coast Guard authority to enforce regulatory provisions set forth in Annex V for all navigable waters of the United States.

The Coast Guard immediately began developing regulations under the new authority. Proposed regulations were published in the *Federal Register* on 27 October 1988, interim rules were published on 28 April 1989, and most of the interim rules were adopted as final rules on 4 September 1990. The regulations (1) establish discharge limitations for disposal of ship-generated garbage that mirror those in Annex V (Table 12), and (2) require ports to provide adequate port reception facilities for ship-generated garbage returned to port. Commission comments on these rulemaking efforts are discussed in previous Annual Reports.

During 1991, the regulations implementing Annex V were amended to conform with amendments to the Annex, which also became effective this year. As noted in previous Annual Reports, shortly after Annex V entered into force late in 1987, the Marine Environment Protection Committee of the International Maritime Organization approved two amendments to Annex V. One amendment added the North Sea to the list of Special Areas identified in regulation five of Annex V. The other amendment, proposed by the United States, deletes an exemption from the Annex that allowed the accidental loss of plastic net fragments incidental to at-sea net repair work.

Both amendments became binding upon signatory nations on 18 February 1991. To make conforming changes in the domestic regulations implementing Annex V, the Coast Guard published proposed rule changes on 9 January 1991 and final rules on 29 April 1991. The new amendments designate the North Sea as a Special Area and eliminate an exemption for the loss of synthetic material incidental to the repair of fishing nets.

Annex V of the Convention for the Prevention of Pollution from Ships

The Convention for the Prevention of Pollution from Ships is an international agreement concluded in 1973 to provide a cooperative international framework for eliminating intentional and minimizing accidental pollution of the marine environment by ships. A Protocol concluded in 1978 added five annexes to the Convention. Each Annex sets forth regulations to address a particular form of pollution: Annex I, oil pollution; Annex II, noxious liquid substances carried in bulk; Annex III, harmful substances carried in packaged form or freight containers; Annex IV, sewage; and Annex V, ship-generated garbage.

The Marine Environment Protection Committee of the International Maritime Organization is the international organization responsible for overseeing international cooperation relative to this Convention. The U.S. Coast Guard serves as lead agency for delegations representing the United States at meetings of the Organization and its committees, held periodically in London, England. The following discusses recent U.S. and international efforts relative to Annex V.

Guidelines for Implementing Annex V

For the 24th Session of the Marine Environment Protection Committee in February 1987, the Coast

Table 12. Summary of Garbage Discharge Limitations under the International Convention for the Prevention of Pollution from Ships (1973-1978) and the U.S. Act to Prevent Pollution from Ships, as Amended

Type of Garbage	Discharge Prohibitions for All Vessels		Discharge Prohibitions for Offshore Platforms and Associated Vessels[3]
	Outside Special Areas[1]	Inside Special Areas[2]	
Plastics, including synthetic ropes and fishing nets and plastic bags	Disposal prohibited	Disposal prohibited	Disposal prohibited
Dunnage, lining, and packing materials that float	Disposal prohibited less than 25 miles from nearest land	Disposal prohibited	Disposal prohibited
Paper, rags, glass, metal bottles, crockery, and similar refuse	Disposal prohibited less than 12 miles from nearest land	Disposal prohibited	Disposal prohibited
Paper, rags, glass, *etc.*, comminuted or ground[4]	Disposal prohibited less than 3 miles from nearest land	Disposal prohibited	Disposal prohibited
Food waste not comminuted or ground	Disposal prohibited less than 12 miles from nearest land	Disposal prohibited less than 12 miles from nearest land	Disposal prohibited
Food waste comminuted or ground[4]	Disposal prohibited less than 3 miles from nearest land	Disposal prohibited less than 12 miles from nearest land	Disposal prohibited less than 12 miles from nearest land
Mixed refuse types	Apply most stringent disposal restriction	Apply most stringent disposal restriction	Apply most stringent disposal restriction

1 Under the Act To Prevent Pollution from Ships, discharge limitations in the United States apply within all navigable waters, including rivers, lakes, and other inland waters.
2 Special Areas are the Mediterranean, Baltic, Red, Black, and North Seas and the Persian Gulf/Gulf of Oman.
3 Offshore platforms and associated vessels include all fixed or floating platforms engaged in exploitation or exploration of seabed mineral resources and all vessels alongside or within 500 m of such platforms.
4 Comminuted or ground garbage must be able to pass through a 25-mm (1-inch) mesh screen.

Guard submitted a paper on behalf of the United States urging that guidelines be developed to provide nations advice on steps to implement Annex V. The paper, drafted by the Marine Mammal Commission, reviewed information on the effects of ship-generated garbage, the importance of Annex V in addressing the issue, and the types of advice that would be appropriate to include in guidelines addressing Annex V provisions. The paper was well received and the Committee agreed to develop the guidelines. For this purpose, the U.S. delegation offered to draft guidelines for consideration at the next Committee meeting.

The National Oceanic and Atmospheric Administration, with assistance from the Marine Mammal Commission and others, took the lead in drafting the guidelines. Upon completion, the Coast Guard submitted them for consideration at the 25th Session. They were circulated for review by the Committee and, at the 26th Session in September 1988, the guidelines were adopted with modifications. Substantive sections of the guidelines address advice on training, education, and information; provisioning ships to minimize the amount of garbage generated; procedures for handling, processing, and storing garbage aboard ships; shipboard equipment for processing garbage; port reception facilities for garbage returned to port; and ensuring compliance.

Because of the difficulty in enforcing restrictions against at-sea disposal of garbage (due in part to the large ocean area to be patrolled and limited numbers of enforcement officers), effective implementation of Annex V must rely primarily on voluntary compliance by all seafarers. This, in turn, requires that all ship crews and passengers (1) understand why the new restrictions are needed and what is required of them, and (2) have access to port reception facilities so that it is easy for them to comply. Therefore, to implement Annex V effectively, it is critically important for nations to move quickly to ensure that adequate and convenient port reception facilities are available.

When the guidelines for Annex V were written, however, little information was available on how to develop port reception facilities for garbage. The section on this subject was therefore brief. Late in the 1980s, however, much new information was being developed, particularly through projects supported by the Marine Entanglement Research Program. This new information was reviewed at the Second International Conference on Marine Debris—a conference first recommended by the Marine Mammal Commission—held in April 1989 in Honolulu, Hawaii. During the meeting, a Conference Working Group on Policy and Law recommended that the Marine Environment Protection Committee review its guidelines for Annex V with a view towards improving advice on how best to develop port reception facilities.

The Commission reviewed the workshop results and concluded that this recommendation was particularly important and merited prompt attention. It therefore drafted a paper for submission to the Marine Environment Protection Committee reviewing new advice. Sections of the draft paper assessed administrative arrangements and procedures for setting up and operating port reception facilities, the types and costs of equipment for receiving and handling ship-generated garbage in port; space requirements and siting considerations for port reception equipment and storage; recovery of operating costs, educating port users on the availability and use of garbage reception facilities; and projecting the amounts and types of garbage likely to be returned to port. The draft paper concluded with a request that the Committee review and, as possible, expand the port reception facility section of its guidelines.

The Commission provided the draft paper to the Coast Guard and recommended that it be submitted to the Marine Environment Protection Committee. The Coast Guard agreed with the points and thrust of the paper and, with some modifications, it was submitted to the Committee for consideration at its 30th Session in November 1990. During the 30th session, the Committee agreed to consider revising the guidelines at a future session, based on an analysis of available port reception facility information. For this purpose, the U.S. delegation offered to receive and analyze relevant information from Committee members.

The Marine Entanglement Research Program assumed lead responsibility for carrying out the delegation's commitment to review and analyze the new information. Little information was submitted by Committee members and the Program therefore contracted for a report that relied on the considerable

information that had been developed on the subject within the United States. The report provided a very useful review of information on the subjects raised in the Commission's paper recommending revision of the guidelines, as well as other relevant matters.

The final report was provided to the Coast Guard by the Marine Entanglement Research Program for submission to the Marine Environment Protection Committee at its 31st Session in July 1991. The Netherlands also submitted a paper on port reception facilities to the Committee for its July session. It proposed developing a comprehensive manual to provide advice on how best to meet port reception facility requirements for all types of ship-generated pollutants regulated under the Convention (*i.e.*, oily wastes, noxious liquid substances, and garbage). The Committee agreed to the proposal and to an offer by The Netherlands to consolidate the guidance on the matter following the meeting. It therefore took no action at the 31st Session to review advice on port reception facilities for garbage.

The 32nd Session of the Committee is scheduled for March 1992. At the end of 1991, it was the Commission's understanding that The Netherlands was preparing a paper regarding development of the comprehensive manual and that a working group of the Committee would be convened at the 32nd Session to address The Netherlands' proposed manual. At that time, the U.S. report on port reception facilities for garbage submitted for the July 1991 Session will be considered within the context of developing a comprehensive manual.

Special Area Designations

Regulation five of Annex V provides for the establishment of "Special Areas" where more stringent garbage discharge limits shall apply. Its purpose is to address particular debris discharge problems in areas where it may be concentrated because of factors such as surrounding land masses, current patterns, etc. Discharge standards for Special Areas are indicated in Table 12. Five Special Areas (the Mediterranean, Baltic, Black and Red Seas, and the Gulf of Oman/Persian Gulf) are listed in the regulation; other areas may be added by amending Annex V.

For Special Area standards to take effect, however, Annex V requires that nations bordering the area first affirm to the International Maritime Organization that adequate port reception facilities have been developed and are available at ports along its shores. To date, nations bordering the original five Special Areas have not so advised the Organization. Thus, even though listed in the original Annex, the areas are not yet in effect. This situation underscores the need for further work on the above-mentioned port reception facility guidelines.

Since Annex V entered into force, however, the North Sea has been added to the list of Special Areas and has entered into effect. A proposed amendment to add that water body was developed by nations surrounding the North Sea and submitted to the Marine Environment Protection Committee. The amendment was adopted at the 28th Session and subsequently circulated to member governments under a tacit amendment process. This procedure allows measures to be accepted if a prerequisite number of objections are not filed within a given period.

The amendment cleared this process in 1990 and, following an additional six-month period to allow signatory nations time to bring their domestic regulations into conformance with the new provision, the listing entered into force on 18 February 1991. The addition of the North Sea brings the number of Special Areas listed under Annex V to six. The nations bordering the North Sea also have advised the Organization that adequate port reception facilities exist in ports bordering the area. Thus, the North Sea is the first Special Area under Annex V to actually become effective.

Efforts to list the Gulf of Mexico as a Special Area also are being pursued by the United States. Interest in doing so is prompted, in part, by the serious debris problems evident along certain Texas beaches and concern about the effects of debris on resident sea turtles. As a related matter, the Marine Mammal Commission contracted for a review of information on marine debris in several areas, including the Gulf of Mexico and Caribbean Sea (see Appendix B, Heneman and the Center for Environmental Education 1988). Among other things, the study report recommended that the Caribbean Sea, as well as the Gulf of

Mexico, be listed as a Special Area. In support of listing the Gulf of Mexico as a Special Area for purposes of Annex V, the Environmental Protection Agency prepared a summary of technical information that the Coast Guard submitted for the 29th Session of the Marine Environment Protection Committee in March 1990.

At the 30th Session of the Committee in November 1990, a proposed amendment to designate the Wider Caribbean Region, including the Gulf of Mexico as a Special Area, was developed by a drafting committee and circulated for review by member governments. Recognizing that all countries in the region may not develop port reception facilities within the same timeframe, the proposal provides that Special Area status may be conferred to sub-regions, such as the Gulf of Mexico, once nations around that sub-region notify the International Maritime Organization that adequate reception facilities exist.

During its 31st Session in July 1991, the Committee adopted the proposed amendment, which is now being considered under the tacit amendment process. It will be considered accepted on 4 October 1992 unless nations representing more than 50 percent of the world commercial shipping tonnage file objections. Assuming the amendment is accepted, the new Special Area would be added to regulation five of Annex V on 4 April 1993. As no nations around the Gulf of Mexico or other subregions of the Wider Caribbean area have affirmed to the International Maritime Organization that adequate port reception facilities for garbage are in place, it is not clear when Special Area standards would become effective.

Other Amendments to Annex V

At the 28th Session of the Marine Environment Protection Committee in October 1989, the U.S. delegation proposed an amendment to delete an exception to the discharge restrictions. The exception allowed accidental loss of net fragments made of synthetic material that were generated during the course of net repair operations. The amendment was adopted by the Committee and considered under the tacit amendment process. Based on the lack of objections from members, the amendment became effective on 18 February 1991. As a result, fishermen who are citizens of signatory nations or fishing in waters of signatory nations are responsible for any synthetic materials they may lose at sea, whether deliberately or accidentally.

Chapter VII

MARINE MAMMAL MANAGEMENT IN ALASKA

While several states face difficult marine mammal conservation problems, issues in Alaska present an extraordinary challenge. Contributing to the complexity of marine mammal issues in Alaska are the large populations of many different species within and adjacent to State waters, the State's extensive and often remote coastline, the use of marine mammals for subsistence purposes, and interactions with commercial fisheries and offshore oil and gas development.

In 1991, particularly important issues in Alaska included developing conservation plans for selected marine mammals, assessing the possibility of fundamental changes in the condition of marine ecosystems in the Bering Sea and other parts of Alaska, implementing a marking and tagging program for marine mammals taken by Native subsistence hunters to help collect harvest data and to prevent illegal taking and trade in marine mammal products, and continuing efforts to clean up and assess effects of the *Exxon Valdez* oil spill. In 1991, there were also significant developments in several marine mammal-related court cases that bear on future marine mammal management actions. These matters are discussed below.

Efforts to protect and conserve Alaska's marine mammals also were made with respect to exploration and development of offshore oil, gas, and hard mineral resources (see Chapter VIII), and particular issues concerning walruses, harbor seals, North Pacific fur seals, Steller sea lions, humpback whales, bowhead whales, killer whales, polar bears, and sea otters (see Chapter II).

Species Conservation Plans and Species Reports

In amending the Marine Mammal Protection Act in 1988, Congress added a section that directs the Secretaries of the Interior and Commerce to develop conservation plans for depleted and, when appropriate, non-depleted marine mammals. Conservation plans are similar to recovery plans for endangered species. Their purpose is to help identify, organize, and coordinate research and management programs to restore marine mammal populations to optimum sustainable levels or to maintain them at those levels.

As noted in past Annual Reports, the Commission has long held that such planning would further conservation objectives for a number of marine mammal species in Alaska. In this regard, the Commission supported efforts to develop a series of species reports with research and management recommendations for ten species of marine mammals in Alaska. The species reports were completed in 1988 (see Appendix B, Lentfer 1988) and transmitted to the Fish and Wildlife Service and the National Marine Fisheries Service. Among other points, the Commission recommended that the species reports for walruses, polar bears, sea otters, and Steller sea lions be used as a basis for developing conservation plans. It also recommended that the conservation plan begun for North Pacific fur seals be completed.

During the annual meeting of the Commission and its Committee of Scientific Advisors in Bellevue, Washington, on 25-27 April 1991, a careful examination was undertaken of issues pertaining to Alaska's marine mammals. This included the status of efforts to develop conservation plans. Representatives of the Fish and Wildlife Service and the National Marine Fisheries Service attended and provided helpful information. Although there was general agreement that developing conservation plans for each of the five species offered a valuable opportunity to identify, coordinate, and otherwise strengthen the basis for carrying out priority work, progress on the plans varied.

With respect to marine mammals under jurisdiction of the Fish and Wildlife Service (*i.e.*, walruses, polar bears, and sea otters), Service representatives noted that management plan advisory teams had been established for each species. The teams' purpose is to assist the Service with planning and oversight of priority tasks. Because of other pressing management needs, however, the Service had been unable to devote the staff or funds needed to complete draft plans for any of the species.

At its annual meeting, the Commission, therefore, offered to help overcome these problems by arranging for and paying for efforts to develop initial draft conservation plans for walruses, polar bears, and sea otters. The draft plans could then be used by the Service and its management plan advisory teams as a starting point to develop the needed plans. Based on the favorable response at the meeting, the Commission wrote to the Service on 29 April 1991 confirming its offer to help develop initial draft plans.

By letter of 30 August 1991, the Service reaffirmed its desire to complete conservation plans for walruses, polar bears, and sea otters by the end of 1992. In this regard, the Service stated it would use the species reports completed by the Commission in 1988 as well as any draft plans that the Commission would be able to provide. During 1991, the Commission completed a draft plan for Pacific walruses and transmitted it to the Service. Draft plans for polar bears and Alaska sea otters also were substantially completed in 1991, and the Commission expects to transmit them to the Service early in 1992. A description of these efforts is included in Chapter II.

With regard to conservation plans for other Alaska marine mammals, a Recovery Team appointed by the National Marine Fisheries Service completed a draft recovery plan for Steller sea lions and circulated it for public review during 1991. As noted in Chapter II, the Commission provided comments to the Service. The final plan is expected to be approved by the Director of the Service early in 1992. As a related matter, the Commission contracted for a study to update the Steller sea lion species report that it had published in 1988 (see Chapter IX). The updated report will compile and synthesize the large amount of recent data on Steller sea lions and thereby improve the basis for evaluating and implementing priority tasks identified in the recovery plan being developed by the Service.

Regarding North Pacific fur seals, the Service, as in previous years, made no substantive progress on developing a draft plan (see also Chapter II).

In addition to work on the above species, the Commission took steps to update the harbor seal species report and develop a species report on killer whales in Alaska (see Chapters II and IX). Recent information documents substantial declines in harbor seal numbers in parts of Alaska for reasons that are not fully known. In addition, conservation issues have arisen in recent years regarding Alaska killer whales. Among other things, there is evidence of fisheries interactions that have been detrimental to both fishermen and whales, and of possible adverse effects from the *Exxon Valdez* oil spill (see below).

The species reports will provide a summary and analysis of recent data on both species and will include research and management recommendations. They will be used by the Commission and others to determine further actions that may be needed to protect harbor seal and killer whale populations in Alaska. The final reports are expected to be completed by the spring of 1992 and, along with the Steller sea lion report, will update the series of Alaska species reports published by the Commission in 1988.

The Bering Sea and Gulf of Alaska Ecosystems

In addition to substantial declines in the number of harbor seals (*Phoca vitulina*), North Pacific fur seals (*Callorhinus ursinus*), and Steller sea lions (*Eumetopias jubatus*) discussed elsewhere in this Report, substantial declines also have been observed in four species of fish-eating birds in the North Pacific: two species of kittiwake, black-legged (*Rissa tridactyla*) and red-legged (*R. brevirostris*), and two species of murre, common (*Uria aalge*) and thick-billed (*U. lomvia*). Populations of other species, including harbor porpoises (*Phocoena phocoena*) and other

small cetaceans, may have declined as well. As noted in Chapter II, the North Pacific fur seal and the Steller sea lion have declined so precipitously that they have been listed, respectively, as depleted under the Marine Mammal Protection Act and threatened under the Endangered Species Act.

The cause or causes of the declines are not clear. They may include: (1) entanglement in lost or discarded fishing gear; (2) incidental take in driftnet, trawl, and other fisheries; (3) decreased food availability due to overharvesting of pollock or other finfish; (4) decreased food availability due to climate or other natural changes affecting the distribution, abundance, or productivity of important prey species; (5) diseases; and (6) environmental pollution.

Many studies have been and are being done to assess and monitor the status of and annual variation in marine mammal, seabird, and fish populations in the Bering Sea and Gulf of Alaska. Some scientists are also trying to determine how bottom topography, currents, wind, and other physical factors affect nutrient cycling, primary and secondary productivity, and other ecosystem processes. With few exceptions, these programs have been carried out independently. Particularly in the case of seabirds and marine mammals, most research has been concerned with species-specific studies of the life history, ecology, behavior, and human use patterns. Little research has been done on the interrelationships among fish, bird, and mammal species and the physical and chemical oceanographic, geologic, and climatological factors that may affect them or the ecosystem of which they are a part.

In the 1970s and 1980s, two multi-year studies examined the oceanography and productivity of the Bering Sea. The first, entitled Processes and Resources of the Bering Sea Shelf, or PROBES, was conducted by researchers at the University of Alaska with support from the National Science Foundation. The PROBES study investigated interactions between and among the climatological, chemical and physical oceanographic, and biological processes (mainly primary and secondary production) that affect and support the Bering Sea ecosystem. In considering higher trophic level interactions and effects, however, the PROBES study only examined interactions between seabirds and oceanographic factors in the Bering Sea. Overall, PROBES effectively developed hypotheses and presented information on the energy transfer from the base of the food web to fish and seabirds, but the study did not consider other higher trophic level species.

The second study, entitled the "Inner Shelf Transfer and Recycling program," or ISHTAR, was carried out in the early 1980s by scientists from a number of institutions, including the Universities of Alaska, South Florida, Washington, and others, and was also supported by the National Science Foundation. ISHTAR examined carbon and nitrogen cycling in the Bering and Chukchi Seas and its effect on primary production in the Arctic Ocean. It provided significant insight into the processes that support the food webs, but, like PROBES, it did not examine interactions with the higher trophic levels.

In 1979, the Marine Mammal Commission provided funds to the North Pacific Fishery Management Council to help support a review of available data on the status, feeding habits, and habitat requirements of marine mammals in the Bering Sea. The review was conducted by the Alaska Department of Fish and Game under contract to the Council, and was completed in 1982. The report identified information gaps and recommended that a workshop be held to determine how best to obtain needed data and how available data could be used to improve and coordinate management of marine mammals and fisheries in the Bering Sea. The workshop, co-sponsored by the Commission, the Council, and the Alaska Sea Grant College Program, was held in Anchorage, Alaska, in October 1983. The objectives of the workshop were to review existing knowledge of interactions between marine mammals and fisheries in the southeastern Bering Sea, identify critical data gaps and uncertainties concerning ongoing and planned research and monitoring programs, and describe actions that should be taken to better meet the goals of the Marine Mammal Protection Act and the Magnuson Fishery Conservation and Management Act. The workshop report, published in 1984 (see Appendix C, Melteff and Rosenburg 1984), provides a summary of available information concerning fisheries, fish stocks, and marine mammals in the Bering Sea, and identifies priority research and management needs.

By the late 1980s, it had become even more apparent that the declines in Steller sea lion, fur seal, harbor seal, and seabird populations, and the significant annual variation in the biomass of walleye pollock and other fish and crustacean species in the Bering Sea and Gulf of Alaska needed to be analyzed as interconnected parts of the ecosystem, rather than as separate conservation and management units. In the summer of 1990, the Marine Mammal Commission consulted with a broad range of agencies and individuals with expertise and responsibilities regarding the Bering Sea and Gulf of Alaska. From these consultations emerged a consensus that available information should be compiled and evaluated as soon as possible to identify critical uncertainties and research needs for key components of these ecosystems and that this could best be accomplished by a workshop.

The Commission subsequently consulted scientists from the National Marine Fisheries Service, the Fish and Wildlife Service, the Alaska Department of Fish and Game, the University of Alaska, the University of Washington, and other institutions to develop a workshop agenda and identify participants. As marine research programs being initiated in the seas surrounding Antarctica (see Chapter IV) are intended, in part, to avoid the types of management problems presently being faced in the Bering Sea and Gulf of Alaska, the Commission concluded that it might be useful to compare research and management approaches in the two areas. Thus, the scope of the workshop was expanded to include consideration of how experience in the Southern Ocean might be used to improve research planning and management in both areas. The objectives of the workshop were to: (1) identify critical uncertainties concerning the causes of and possible relationships among the observed population declines in the Bering Sea and Gulf of Alaska; (2) identify the research that would be required to resolve the uncertainties; and (3) determine how to improve research planning and resource management in both areas.

The workshop, funded by the Commission and the National Marine Fisheries Service, was held in Seattle, Washington, on 12-13 December 1990. The participants identified the types of research that would be required to answer key questions about the structure and relationships among key components of the Bering Sea and Gulf of Alaska ecosystems and the causes of the population declines. With respect to marine mammals, the participants concluded that the most critical uncertainties were: (1) the location and availability of key prey species in areas where Steller sea lions and harbor seals feed during the pupping and breeding seasons; (2) the winter distribution, movements, and critical feeding areas of different age and sex classes of Steller sea lions and harbor seals; and (3) the diet and principal feeding areas of North Pacific fur seals in their first two years of life. They also cited many areas where available data are insufficient to support ecosystem-based management.

The workshop report, published in July 1991, recommended improved research and monitoring programs for many species for which there is insufficient information to draw conclusions about the observed declines. The recommendations included: (1) continuing ongoing programs to assess and monitor Steller sea lions and North Pacific fur seals in the Bering Sea and Gulf of Alaska; (2) expanding efforts to identify and monitor declining harbor seal populations; (3) compiling and comparing fishery survey data, and data on fishery development, fish catches, and incidental take of marine mammals in the Bering Sea and Gulf of Alaska with available data on the Steller sea lion, fur seal, and harbor seal declines; (4) continuing and expanding efforts to use satellite-linked radio tags to determine the at-sea movements and important feeding areas of Steller sea lions in order to obtain information by season, age, and sex; (5) expanding the satellite-linked tracking program to obtain information on the at-sea movements and important feeding areas of harbor seals in regions where declines have occurred; (6) if possible, using similar techniques to determine the movement patterns and possible critical habitats of fur seals during their first two years of life; and (7) surveying representative Steller sea lion, fur seal, and harbor seal feeding areas to establish baselines and monitor the availability and nutritional quality of food fish present in the areas.

The workshop report was forwarded to the Fish and Wildlife Service, the National Marine Fisheries Service, and the National Science Foundation on 25 July 1991. At that time, the Commission made

recommendations to these agencies to improve research and conservation programs in the Bering Sea and Gulf of Alaska. Among the Commission's recommendations were that: (1) the Services continue and expand their monitoring and assessment programs for marine mammal, bird, and fish populations in the Bering Sea and Gulf of Alaska; (2) the Services and the Foundation work together to either make use of existing, or, if necessary, develop new national and international fora to assist in planning, coordinating, and analyzing the results of multi-disciplinary research programs in the Bering Sea and Gulf of Alaska; (3) a common data management system be developed and used to facilitate storing, accessing, mapping, and integrating marine mammal, seabird, fish, fishery, environmental, and other data; and (4) a group, including representatives of the National Oceanic and Atmospheric Administration, the National Marine Fisheries Service, the Fish and Wildlife Service, the Minerals Management Service, the Alaska Department of Fish and Game, relevant academic institutions, and, as appropriate, industry and environmental groups, be constituted to cooperatively plan, coordinate, and evaluate the results of U.S.-supported research in the area. The Commission further recommended that a workshop be held, as described in the Commission's "Recommended Guidelines to Govern the Incidental Taking of Marine Mammals in the Course of Commercial Fishing Operations after October 1993," to consider and provide advice on the management of commercially exploited fish stocks and the relationships among the fish stocks and other components of the ecosystem of which they are a part (for a discussion of the Commission's recommended guidelines, see Chapter III).

On 11-14 March 1991, the Alaska Sea Grant College Program held a workshop to assess whether the observed population declines in the Bering Sea and Gulf of Alaska may have been caused by fisheries-related or natural changes in abundance of pollock or other finfish that are the primary prey of Steller sea lions, fur seals, and harbor seals. The workshop participants discussed the problem of quantifying the relationship between availability of food and the observed declines. When the workshop report is published, the Commission will review it and other information (see below), in consultation with its Committee of Scientific Advisors, to determine what additional actions should be taken to assess and conserve marine mammal populations and other resources in the Bering Sea and Gulf of Alaska.

The *Exxon Valdez* Oil Spill in Prince William Sound

On 24 March 1989, the oil tanker *Exxon Valdez* ran aground on Bligh Reef in Prince William Sound. The accident ruptured the vessel's hull and caused the release of 11 million gallons of crude oil into the sound. Over the next two months, spilled oil was carried by winds and currents 500 miles west to waters and beaches as far away as the Kodiak Archipelago and the Alaska Peninsula. More than 1,200 miles of shoreline received moderate to heavy coats of oil. The accident produced the largest oil spill in U.S. history.

At least nine species of marine mammals occur in the Sound. They include sea otters, Steller sea lions, harbor seals, harbor porpoises, Dall's porpoises, killer whales, humpback whales, minke whales, and fin whales. In addition, several other species, including gray whales and northern fur seals, occur in areas of the Gulf of Alaska affected by the spill.

Damage Assessment and Restoration Planning

Within 24 hours of the grounding, marine mammal specialists from Federal and State agencies were on-site to begin assessing the effects and determining how best to minimize the impacts of the spill on marine mammals, as well as other resources. Efforts by the Commission and others to coordinate and rank initial cleanup and damage assessment needs are discussed in previous Annual Reports.

Under applicable Federal law, a Natural Resources Trustee Council was formed shortly after the spill to oversee efforts to minimize and assess damages to natural resources. The Council includes one representative each from the Alaska Department of Fish and Game, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the U.S. Forest Service. Taking into account comments from the Marine Mammal Commission and many other agen-

cies and organizations, the Council adopted a Federal-State Natural Resources Damage Assessment Plan in April 1989 for the first year of assessment work (*i.e.*, through 28 February 1990).

As discussed in previous Annual Reports, the 1989 assessment plan included 58 studies. Seven projects costing approximately $1,900,000 addressed marine mammal work. Nearly half of those funds was devoted to work on sea otters; the remainder was allocated to studies of effects on humpback whales, killer whales, stranded cetaceans, Steller sea lions, and harbor seals. In 1990, the Council approved a plan for damage assessment work during the second year (1 March 1990 through 28 February 1991). Follow-up work for each of the 1989 marine mammal studies was included, with the exception of work on stranded cetaceans. Funding for the second year of marine mammal studies again totaled about $1,900,000, nearly two-thirds of which was allocated to sea otter studies.

In 1991, the Council adopted a plan for the third year (1 March 1991 to 29 February 1992) of damage assessment and restoration work. It included studies on sea otters, killer whales, and harbor seals costing approximately $400,000. Studies conducted during the first two years after the spill on humpback whales and Steller sea lions were not continued in 1991.

Regarding sea otters, the 1991 plan described a three-year project (March 1991 to March 1993) to assess and monitor changes in sea otter densities in Prince William Sound and to describe habitat use patterns. Work scheduled for 1991 included efforts to evaluate, design, and implement aerial and vessel surveys to monitor pup and non-pup densities in different parts of the sound and to compare habitat use patterns in oiled and non-oiled areas. The continuation of work in 1992 and 1993 will depend on the results of work in 1991. The cost of work proposed for 1991 was estimated at $176,600. Work also will continue on monitoring otters instrumented with transmitters and released back to the wild prior to 1991.

The goal of harbor seal studies was to gather data on the abundance, behavior, and habitat use patterns of seals in previously oiled and non-oiled areas of Prince William Sound. A pilot study was planned to attach satellite transmitters to five seals (two in April 1991 and three in September 1991), to evaluate the ability of the devices to gather data on seal movements, diving patterns, feeding locations, and haulout patterns. Also planned was an aerial survey of the sound during the autumn molt to continue monitoring the trend in seal numbers in oiled and non-oiled areas. The estimated cost of harbor seal work for the 1991 planning period was $181,500.

The focus of work on killer whales was on improving the basis for identifying and describing habitat requirements. Planned work included continuing photographic identification to document the composition of killer whale pods resident in Prince William Sound; gathering and synthesizing all published and unpublished killer whale sighting data relative to the spill area; correlating that data with data on water depth, sea surface temperatures, and the catch of killer whale prey species in commercial fisheries; and developing an assessment of habitat use patterns in Prince William Sound. Also planned was an assessment of the feasibility of developing and applying satellite transmitters to tracking killer whales in 1993. The estimated cost of the killer whale work during the 1991 planning period was $43,500.

Summary of Oil Spill Impact

Because of legal considerations related to pending lawsuits against Exxon seeking reimbursement for spill damages, results of damage assessment studies were not released in 1989 or 1990. Given a pending settlement of the Governments' suits early in 1991, however, a summary of impacts was made available in March 1991. The settlement later fell apart and further details were withheld. Available assessments of the nature and magnitude of effects therefore remain preliminary. The following describes effects of the spill on marine mammals based on preliminary information released as of the end of 1991.

The most apparent oil spill impact on marine mammals was to sea otters. Preliminary estimates of the number of otters killed directly by the spill range from 3,500 to 5,500 animals. During 1989, 1,011 sea otter carcasses were recovered from the spill area, including 490 from Prince William Sound, 188 from

the Kenai Peninsula, 198 animals from the Kodiak Archipelago, and 135 that died at rehabilitation centers or aquaria. Prior to the spill, the number of otters in Prince William Sound was estimated to be as high as 10,000 animals; the number of otters in the Gulf of Alaska was estimated to be at least 20,000 animals. Post-spill population estimates are not yet available.

The cause of death for many otters was hypothermia. This was due to matting of fur by oil, which caused the loss of its insulating capability. Others died from acute toxic effects. Necropsies on otters that died at rehabilitation centers during the first three months after the spill revealed high rates of lung lesions, particularly pulmonary emphysema. Toxic hydrocarbon fractions evaporate rapidly in the first hours and days after a spill, and the observed lung abnormalities probably were caused by inhaling toxic vapors in the early stages of the spill. All but two of the severe cases of emphysema were found in the first six weeks after the grounding. High rates of liver abnormalities and high concentrations of hydrocarbons in the blood also were reported from otters that died at the rehabilitation centers. Stress from capture and handling also may have contributed to the death of some animals.

Efforts to mitigate the effects of the spill by rehabilitating oiled otters resulted in 329 animals being captured live and brought to rehabilitation centers for cleaning. Before the centers closed in September 1989, 193 otters were either reintroduced back into the wild or placed in aquaria because they were judged unsuitable for release. Of the animals released into the wild, 45 of the healthiest animals were fitted with radio transmitters to help assess subsequent survival rates. In March 1991, it was reported that 16 of the tagged animals were still alive, 13 were known dead, 15 were missing, and the transmitter on one animal was known to have failed.

There are indications that sea otters continue to be exposed to and be affected by petroleum hydrocarbons. Blood and fat samples collected in 1990 from otters in previously heavily oiled areas had elevated concentrations of certain aromatic compounds. Elevated petroleum hydrocarbon concentrations also continued to be found in sea otter prey items taken from oiled areas. In addition, mortality rates among prime aged otters (ages 2 to 8 years) in heavily oiled areas were abnormally high in 1990, and preliminary data from the spring of 1991 suggest yearling mortality is higher in oiled areas than in non-oiled areas of the sound.

Harbor seals also were affected by the spill. Live oiled seals were unusually lethargic and unwary. The carcasses of 19 seals were recovered and some 200 harbor seals were estimated to have been killed. Most of the dead animals were not recovered because seals usually sink when they die. The only estimate of harbor seal numbers in Prince William Sound was in the mid-1970s when the population was estimated to be 3,000 to 5,000 animals. Surveys of selected haulout areas in 1984 and 1988 indicate that harbor seal numbers were declining in the sound before the spill for reasons that are not known. After the spill, between 1988 and 1990, they continued to decline at a similar rate at non-oiled sites (13 percent mortality) but at a significantly greater rate at oiled sites (35 percent mortality).

Harbor seals may have encountered and ingested oil or oil-contaminated prey for some time after the spill. Petroleum hydrocarbons found in bile samples taken from seals sampled a year after the spill were five to six times higher in previously oiled than in non-oiled areas. It also is possible that the elevated levels were caused by metabolizing fat reserves deposited during the spill.

Effects on killer whales are uncertain. Based on extensive pre-spill information, nine distinct pods of killer whales, including approximately 182 animals, occurred in the sound before the spill. Through photo-identification techniques, it was determined that one pod known to contain 36 animals six months before the spill had seven fewer animals one week after the spill. The missing animals remained unaccounted for in 1990 and six more animals disappeared from the pod. Such losses are highly unusual and may be related to the spill. However, it is also possible that factors other than the spill are responsible.

Federal Marine Mammal Marking and Tagging Regulations

In 1981, the Marine Mammal Protection Act was amended to give the Fish and Wildlife Service and the National Marine Fisheries Service authority to promulgate regulations requiring the marking, tagging, and reporting of marine mammals taken by Alaska Natives. The purpose of the amendment was to make it possible to obtain better information on the marine mammals taken for subsistence and handicraft purposes and to prevent illegal trade in products from those species.

Marking and tagging regulations were published by the Fish and Wildlife Service on 28 June 1988. They require that, within 30 days of taking any polar bear, walrus, or sea otter, the Alaska Native hunter must report the take to the Service and present specified parts of the animal to be marked and tagged. Polar bear and sea otter skins and skulls and walrus tusks must all be marked or tagged. Reports must include, among other things, the date and location of the take and the sex of the animal taken. Raw, unworked, or tanned parts from these three species taken between 21 December 1972 (the date the Marine Mammal Protection Act became effective) and 26 October 1988 (the effective date of the regulations) that had not yet been converted into handicrafts or clothing were required to be presented for marking by 24 April 1989. Possession or transportation of unmarked marine mammal parts, except as authorized in the regulations, is a violation of the Act.

Since promulgating its regulations, the Service has worked closely with Native groups and the State of Alaska to implement the marking and tagging program. At present, almost 100 individuals, in more than 80 coastal villages, have been trained and authorized to tag marine mammal parts taken by Alaska Natives. The authorized taggers include Native village residents working under contract to the Service, and Service employees in Anchorage and at National Wildlife Refuges. Taggers, responsible for specific geographic areas, affix official tags and marks to marine mammal parts and collect information on the harvested animals.

In 1990, the Service began using a computerized data management system to help store, manipulate, and retrieve data gathered through the marking and tagging program. The following year, the Service assigned a second employee to work full-time on the marking and tagging program. Also in 1991, the Service changed the way in which it maintains data with respect to polar bears. While data for sea otters and walruses will continue to be maintained on a calendar year basis, polar bear data is now recorded on the basis of a harvest year, which runs from 1 July to 30 June. This change will facilitate comparison of recent polar bear data with data from past years.

Data on the number of marine mammals tagged under the Fish and Wildlife Service's program through 1991, are presented in Table 13. To date, the National Marine Fisheries Service has not implemented any marking and tagging regulations for species under its jurisdiction which are taken by Alaska Natives for subsistence or handicraft purposes.

Litigation Related to Marine Mammals in Alaska

Katelnikoff v. *U.S. Department of the Interior*, *Didrickson* v. *U.S. Department of the Interior*, and *Alaska Sea Otter Commission* v. *U.S. Department of the Interior* — The *Katelnikoff* lawsuit was filed in 1985 in the U.S. District Court for the District of Alaska. It concerns the take of sea otters for handicraft purposes. At issue was confiscation by the Fish and Wildlife Service of certain items — teddy bears, hats and mittens, fur flowers, and pillows — made of sea otter pelts by Alaska Natives and offered for sale as handicrafts. The Service confiscated the items because it did not consider them to be traditional Native handicrafts of a type made prior to passage of the Marine Mammal Protection Act in 1972. Under the Service's regulatory definition of "authentic native articles of handicrafts and clothing" adopted in 1972, the Act's Native exception applied only to traditional handicrafts commonly made by Alaska Natives on or before the effective date of the Act. The plaintiff challenged the validity of the Fish and Wildlife Service's regulatory definition, arguing that the Act

Table 13. Number of Sea Otters, Walruses, and Polar Bears Presented for Marking and Tagging by Alaska Natives

Year[1]	Sea Otters	Walruses	Polar Bears
Pre-rule[2]	470	1,293	139
1988[3]	52	1	136
1989	273	765	105
1990	188	1,483	59
1991[4]	127	1,938	3

1 Sea otter and walrus data are provided on a calendar year basis. Polar bear data are provided on the basis of the harvest year, which runs from 1 July of the year indicated to 30 June of the following year.

2 "Pre-rule" refers to stocks of raw, unworked, or tanned marine mammal parts from animals taken between 21 December 1972 and 26 October 1988 and still held by Native hunters when the regulations became effective.

3 Figures include only marine mammals taken after 26 October 1988. Figures for polar bears include those animals taken between 26 October 1988 and 30 June 1989.

4 Preliminary estimate only. Receipt of harvest certificates may not be complete.

preserved the right of Alaska Natives to take marine mammals for handicraft purposes regardless of whether such items had been commonly made before the Marine Mammal Protection Act took effect.

On 21 July 1986, the Court ruled in favor of the Service, holding that the language of the Act and its legislative history supported establishing 1972 as a cutoff date in the regulations. However, a new challenge to the Service's definition was filed by an intervening party (Didrickson) in October 1987. The new challenge claimed that the regulation was unconstitutionally vague because it did not provide sufficient guidance to determine what handicrafts were commonly produced from sea otters before 21 December 1972 when the Act took effect.

On 27 June 1988, the Court issued an order stating that it would consider the new challenge and strongly implying that the regulatory definition would be found to be vague. The Court therefore suggested that the Service undertake an administrative review to determine if the use of sea otters for handicrafts by Natives calls for a special regulation or, at least, a supplementary interpretation of the handicraft definition as it applies to sea otters.

The Service followed the Court's advice and, on 14 November 1988, published a proposed rule providing additional guidance on allowable uses of sea otters in the making and selling of traditional handicrafts and clothing. After an extensive comment period, the Service published a final rule amending its regulatory definition of "authentic native articles of handicrafts and clothing" on 20 April 1990. The amended definition clarifies that no items created in whole or in part from sea otters fit within the definition. Under the amended regulation, no sea otter handicrafts may be sold.

Plaintiffs challenged the legality of the final rule and filed a motion on 17 July 1990 seeking to enjoin enforcement of the new regulatory interpretation. Plaintiffs contended that the regulation was inconsistent with the rulemaking record which, they alleged, supported the view that trade, barter, and other economic uses of sea otter handicrafts and clothing by Alaska Natives before 1972 were extensive. In addition, plaintiffs reasserted their earlier argument that the 1972 cut-off date for determining whether handicrafts had been traditionally made was inconsistent with the Marine Mammal Protection Act and its legislative history. The Alaska Sea Otter Commission filed a similar challenge, which was later consolidated with plaintiffs' lawsuit. Friends of the Sea Otter, which had supported adoption of the new regulation, was granted intervenor status on 18 October 1990.

At a status conference among the parties on 31 October, plaintiffs withdrew their motions for injunctive relief and, instead, agreed to have the case reviewed on cross-motions for summary judgment. Oral argument was heard on 24 January 1991.

The Court issued an opinion on 17 July 1991, ruling in plaintiffs' favor. In so doing, the court noted that "it was on the wrong track" when it initially ruled for plaintiffs in 1986. Upon re-examining the matter, the court found that no deference was due the Service's regulatory definition of "authentic native articles of handicrafts or clothing" inasmuch as Congress had already defined that term in section 101(b)(2) of the Marine Mammal Protection Act.

Applying the statutory definition, the court found that, as long as the underlying taking was not wasteful, the Act exempted all Native handicrafts produced from non-depleted marine mammals using traditional methods (*e.g.*, weaving, carving, stitching, sewing, beading, drawing, and painting) whether or not such handicrafts had traditionally been produced. Therefore, the Court invalidated the Service's regulation.

The Department of Justice filed a protective notice of appeal in the case on 5 November 1991. A decision on whether to withdraw the appeal is pending. A notice of appeal also was filed by Friends of the Sea Otter on 7 November 1991. Briefing of the appeal was expected to begin early in 1992.

United States v. *Clark* — In 1988 a Yup'ik Eskimo was criminally charged with violating section 101(b)(3) of the Marine Mammal Protection Act by taking marine mammals in a wasteful manner. Specifically, the U.S. Government alleged the defendant had failed "to salvage for human consumption the edible meat of approximately nine walrus." Before the trial, the defendant filed a motion to dismiss the charges. He claimed that the Marine Mammal Protection Act's requirement that the taking of a marine mammal by an Alaska Native not be accomplished in a "wasteful manner" was unconstitutionally vague. The motion to dismiss was denied and the trial was held on 19-20 July 1989. The jury found the defendant guilty of illegally taking marine mammals in a wasteful manner. On 24 August, he was sentenced to three months in jail and fined $550.

A stay of the sentence pending appeal was granted and, on 30 August 1989, a notice of appeal was filed. The defendant's appellate brief, filed on 1 December 1989, argued that the statutory requirement that Native taking not be wasteful and the Fish and Wildlife Service's regulatory implementation of the provision are unconstitutionally vague because "affected persons must guess at what conduct is proscribed and because arbitrary enforcement is encouraged."

Late in 1989, the Alaska Federation of Natives petitioned the Court of Appeals for leave to file an *amicus curiae* brief and to participate in oral argument. The Federation asserted not only that the statutory provision and the Service's regulations should be declared void for vagueness, but also that the regulations prohibiting Natives from taking marine mammals in a manner "which results in the waste of a substantial portion" of the animal constituted an impermissible interpretation of Congressional intent.

The case was argued before the Ninth Circuit Court of Appeals on 7 August 1990. The Court's opinion, issued on 28 August 1990, upheld the conviction for wasteful taking in violation of the Marine Mammal Protection Act, and the Court found the Service's regulation prohibiting the taking of a marine mammal by an Alaska Native for subsistence or handicraft purposes where a "substantial portion" is wasted to be consistent with Congressional intent as enunciated in the Act's legislative history. The Court further determined that the regulation provides sufficient notice of the conduct that is proscribed so as to enable a jury to determine if wasteful taking occurred.

The appellant filed a petition on 23 November 1990 to have the case reviewed by the United States Supreme Court. On 7 January 1991, the Supreme Court denied the appellant's petition, bringing this matter to a close.

Alaska Wildlife Alliance v. *Jensen* — In 1990, the National Park Service authorized 109 cruise ship entries into Glacier Bay, Alaska. At that time, the Commission and others questioned the procedures used by the Service to authorize entries in excess of the 107-entry ceiling imposed by Service's own regulations. On 21 August 1990, the Alaska Wildlife Alliance filed a complaint challenging the National Park Service's decision to authorize the two additional cruise ship entries. The plaintiff alleged that the Service, in authorizing those entries, did not follow applicable procedures, exceeded the maximum allowable number established by regulation, and violated the National Environmental Policy Act by not preparing a supplemental environmental assessment. Plaintiffs, however, did not seek injunctive relief and none of the cruise ship entries authorized for 1990 were enjoined. As noted in the humpback whale section in Chapter II, 107 cruise ship entries into Glacier Bay were authorized in 1991.

The plaintiffs also alleged that commercial fishing operations being conducted in Glacier Bay violated

applicable law and, in combination with tour boat operations, may be having adverse effects on humpback whales and other cetaceans. As discussed in Chapter II, the Park Service recognized that it had not properly authorized commercial fishing operations in the Park and, by *Federal Register* notice of 5 August 1991, proposed regulations authorizing certain fishing activities in Park waters through 1997.

Parties to this lawsuit met early in 1991 to try to negotiate a settlement in the case. Pending completion of those efforts, the parties, with judicial consent, have stayed further proceedings in the matter.

United States v. *F/V Distant Water* — As discussed in the Pacific walrus section in Chapter II, the National Marine Fisheries Service, in 1989, adopted a two-year seasonal fishery closure around Cape Peirce, Round Island, and the Twins Islands under the Magnuson Fishery Conservation and Management Act. On 25 June 1991, the defendant fishing vessel was found fishing within the closed area surrounding Round Island. Further investigation revealed that the vessel also had violated the closure regulations on two earlier occasions. Subsequently, the National Oceanic and Atmospheric Administration filed a complaint seeking forfeiture of the vessel and its catch.

On 12 August 1991, the defendant filed a motion for summary judgment or, alternatively, to dismiss the complaint. In support of its motion, the defendant argued that the regulations establishing the closure were beyond the scope of the Magnuson Act and were therefore invalid. Specifically, the defendant contended that, while the Magnuson Act authorized the regulation of fisheries for the conservation and management of fishery resources, marine mammals were expressly excluded from coverage under the Act. They further asserted that the Marine Mammal Protection Act provided the exclusive mechanism for regulating the taking of marine mammals incidental to commercial fisheries. Inasmuch as the challenged regulations were promulgated solely to protect walruses and not fishery resources and had not been issued pursuant to the Marine Mammal Protection Act, they should, defendant claimed, be found to be invalid.

Federal prosecutors responded that the regulations were a proper exercise of the Service's authority under the Magnuson Act. As evidence of Congressional intent to allow regulation of fisheries for purposes other than managing fishery resources, prosecutors pointed to the Act's definition of the term "conservation and management" which includes those measures "required to rebuild, restore, or maintain...any fishery resource and the marine environment...and...designed to assure that...irreversible or long-term adverse effects on fishery resources and the marine environment will be avoided...." Similarly, the Magnuson Act's allowance for consideration of any relevant "economic, social, or ecological factor" when determining optimum yield was cited as evidence that the scope of the Act went beyond fishery resources. Prosecutors also pointed to section 114(g)(3) of the Marine Mammal Protection Act, which directs the Secretary of Commerce to request that the Fishery Management Councils established under the Magnuson Act take actions necessary to mitigate adverse impacts to marine mammals from fisheries under certain circumstances, to support the view that regulation of fisheries to protect marine mammals or other, non-fishery resources is appropriate. Moreover, section 114(g)(3) specifically includes adjustments to requirements with respect to fishing times and areas as possible actions that might be taken by the Councils to protect marine mammals.

At the end of 1991, briefing of the case had been completed and a bond hearing and a hearing on the merits had been scheduled for early in 1992.

Trustees for Alaska v. *Lujan* — Trustees for Alaska filed suit on 8 August 1990 seeking to halt oil and gas exploration activities being conducted in the Chukchi Sea, alleging that unauthorized takings of walruses had and would continue to occur. This lawsuit, originally filed with the Ninth Circuit Court of Appeals, was transferred to the District Court for the District of Alaska after the appellate court ruled that it did not have original jurisdiction of the matter under the Outer Continental Shelf Lands Act, as plaintiffs had argued.

On 19 February 1991, Trustees for Alaska refiled the case in the District Court. Plaintiffs' complaint alleged that exploratory drilling activities authorized by the Minerals Management Service were likely to take walruses in violation of the Marine Mammal

Protection Act if conducted in the vicinity of the retreating or advancing ice edge. Plaintiffs also noted that, although the oil companies operating in the Chukchi Sea had requested authorization from the Fish and Wildlife Service for the incidental take of small numbers of walruses and polar bears under section 101(a)(5) (see discussion of small-take exemptions in Chapter VIII), such authorization had yet to be issued. A motion for summary judgment was filed by plaintiffs on 14 May 1991.

Federal defendants filed a cross-motion for summary judgment on 14 June 1991, contending that plaintiffs had not sufficiently demonstrated that walruses would be taken if the exploratory activities were allowed to proceed. While the summary judgment motions were pending, the Fish and Wildlife Service completed its rulemaking and issued letters of authorization pursuant to section 101(a)(5) of the Marine Mammal Protection Act authorizing the taking of walruses and polar bears incidental to oil and gas exploration in the Chukchi Sea. Consequently, on 2 July 1991, Federal defendants filed a motion to dismiss the case as being moot. At the end of 1991, a decision in the case had not been rendered.

Greenpeace v. *Mosbacher* — Greenpeace and other environmental groups filed suit on 26 June 1991 seeking to invalidate the 1991 pollock harvest level adopted by the National Marine Fisheries Service. Plaintiffs alleged violations of section 7 of the Endangered Species Act and the National Environmental Policy Act. On 10 October 1991 the court ruled in favor of the Federal defendants. Further discussion of this case is provided in the Steller sea lion section of Chapter II.

Humane Society of the United States v. *Mosbacher* — The Humane Society brought suit on 31 July 1991 seeking a temporary restraining order to suspend an extension of the fur seal harvest on the Pribilof Islands that had been granted by the National Marine Fisheries Service. Plaintiff's motion for a temporary restraining order was denied on 2 August 1991 and the harvest was allowed to proceed. Further information on this case and the subsistence harvest of fur seals is included in the North Pacific fur seal discussion in Chapter II.

United States v. *Exxon* — On 13 March 1991, the United States filed a lawsuit in the U.S. District Court for the District of Alaska against the Exxon Corporation. The Federal Government sought to recover clean-up costs and natural resources damages associated with the *Exxon Valdez* oil spill under the authority of the Clean Water Act and other Federal statutes. A similar action was brought by the State of Alaska. On 30 September 1991, parties to the suits filed an agreement and consent decree for the Court's approval.

Under the agreement, the Federal Government and the State of Alaska will receive $900 million over the next 10 years to reimburse them for clean-up costs and to fund restoration of natural resources affected by the spill. The Federal and State Governments will act as co-trustees of all the resources affected by the spill and will jointly use the funds received from Exxon to complete the ongoing assessment of environmental damage and to implement plans for restoring or replacing the damaged resources. The agreement also contains a provision requiring Exxon to pay up to an additional $100 million for restoring populations, habitats, or species that have suffered substantial losses or declines as a result of the spill where the loss or decline was unknown and could not have been reasonably anticipated at the time of the agreement. The agreement does not affect the claims filed against Exxon by Alaska Native villages, individual Alaska Natives, or Alaska Native corporations. The agreement and consent decree was approved by the Court on 8 October 1991.

As noted above in the discussion of the *Exxon Valdez* oil spill, only preliminary results of some damage assessment studies have been released to the public because of litigation considerations. By keeping this information confidential, the Federal and State Governments have stifled the normal processes of peer review and scientific inquiry. However, a separate agreement filed with the Alaska Superior Court is expected to ease the problem. Private plaintiffs agreed to release the State and Federal Governments from all claims arising from the spill in return for a commitment from the Governments to give the private plaintiffs access to the scientific information gathered under the ongoing natural resource damage assessment studies.

Chapter VIII

OUTER CONTINENTAL SHELF OIL, GAS, AND MINERAL DEVELOPMENT

Exploration and development of coastal and offshore oil, gas, and hard mineral resources may adversely affect marine mammals and the ecosystems of which they are a part. Under the Outer Continental Shelf Lands Act, the Department of the Interior's Minerals Management Service is responsible for assessing, detecting, and mitigating the adverse effects associated with such activities in offshore water beyond state jurisdiction. Under the Marine Mammal Protection Act and the Endangered Species Act, the National Marine Fisheries Service and the Fish and Wildlife Service are responsible for reviewing proposed actions and advising the Minerals Management Service and other agencies of measures needed to ensure that those actions will not have adverse effects on marine mammals or endangered or threatened species. The Commission reviews relevant policies and activities of these agencies and recommends actions that appear necessary to protect marine mammals and their habitats. The Commission's activities in this regard in 1991 are discussed below.

Proposed Offshore Lease Sales

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, reviews and comments on proposed outer continental shelf oil, gas, and hard mineral lease sales. During 1991, the Commission commented to the Minerals Management Service on proposed lease sales in the Gulf of Mexico and a request for information on a possible lease sale in Cook Inlet, Alaska.

Oil and Gas Lease Sales #139 and 141, Central and Western Gulf of Mexico

In 1990, the Minerals Management Service issued a call for information and notice of intent to prepare an environmental impact statement for two proposed Gulf of Mexico lease sales to be held in 1992. As noted in the previous Annual Report, the Commission, in consultation with its Committee of Scientific Advisors, responded to the Service's request by letter of 20 June 1990.

The Service decided to proceed with the two sales and on 11 April 1991 announced plans for oil and gas lease sales #139 and #141. The proposed sale areas includes approximately 29.1 and 23.5 million acres of submerged lands in the central and western Gulf of Mexico, respectively. A Draft Environmental Impact Statement on the proposed sales was circulated to the Commission and others for comment. The Statement listed 28 species of cetaceans, the West Indian manatee, and California sea lions as occurring in the northern Gulf of Mexico. Six of the cetacean species (the right, blue, sei, fin, humpback, and sperm whales) are listed as endangered under the Endangered Species Act. Of these, only sperm, fin, and sei whales have been seen in the proposed lease sale areas in recent years.

In its Draft Statement, the Service estimated that, under the base case scenario, most marine mammals likely would be affected to an extent that complete recovery to pre-lease conditions would occur within one or two generations. Considering cumulative effects of the proposed sale and other ongoing or proposed activities, the Service concluded that impacts

could be very high, primarily due to the effects of large oil spills, and that such effects might result in the complete loss of a regional population and require three or more generations to recover to pre-lease conditions.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the Draft Statement and provided comments on 18 June 1991. In its letter, the Commission noted that, although the conclusions regarding estimated impacts on marine mammals may be valid, the Draft Statement generally did not provide data, analyses, or references to support them. For example, the Draft Statement stated that production waters and drilling muds would dissipate so rapidly that they would not affect marine mammal food supplies. However, it provided no information on marine mammal diet, feeding areas or food requirements.

The Commission therefore concluded that the Draft Statement did not provide a sufficiently thorough assessment of the proposed action's possible impacts on marine mammals in the sale area. In its letter, the Commission suggested that the Statement be expanded to provide a more thorough assessment of the possible indirect food chain effects, as well as the possible direct effects on marine mammals, particularly endangered sperm whales and local populations of bottlenose dolphins.

As a minimum, the Commission recommended that critical uncertainties, research needs, and recommendations identified at an August 1989 Minerals Management Service-sponsored Workshop on Sea Turtles and Marine Mammals of the Gulf of Mexico be considered and incorporated into the Statement. In addition, the Commission recommended that, if it had not already done so, the Service consult the National Marine Fisheries Service to (a) obtain the most up-to-date information on the distribution, abundance, population structure, diet, and important calving/breeding/feeding areas of sperm whales, bottlenose dolphins, and other marine mammals common to the northern Gulf of Mexico and (b) ascertain the types of site-specific and population monitoring programs needed to ensure that marine mammals and their habitats are not adversely affected by offshore oil and gas activities in the northern Gulf of Mexico.

Proposed Offshore Lease Sale, Cook Inlet, Alaska

By letter of 17 June 1991, the Minerals Management Service advised the Commission and other agencies and organizations that it was considering a potential offshore gas and oil lease sale in the Cook Inlet area off south-central Alaska. In its letter, the Service requested help in updating biological, sociocultural, oceanographic, and geologic information concerning the area. The Service also noted its intention to hold an information transfer meeting early in 1992 for the Gulf of Alaska/Cook Inlet and Bering Sea areas.

In its 3 July 1991 response, the Commission forwarded a number of documents bearing on the assessment of possible impacts of offshore oil and gas activities on marine mammals in the Cook Inlet area. In its letter of transmittal, the Commission noted that a variety of marine mammals occur in the Cook Inlet and Shelikof Strait area and that species of greatest concern are the northern right whale, the Steller sea lion, the beluga whale, the harbor seal, and the sea otter. The North Pacific right whale population may number only a few animals and is probably near extinction. The Steller sea lion population has declined dramatically throughout most of its range during the past 20 years, and has been listed as threatened under the Endangered Species Act.

Therefore, the Commission recommended that, if it had not already been done, the Minerals Management Service immediately consult the National Marine Fisheries Service pursuant to section 7 of the Endangered Species Act to determine whether exploration, development, or related support activities in or near areas being considered for leasing could jeopardize the continued existence of any endangered or threatened species, particularly the right whale and the Steller sea lion.

Very little is known about the distribution, movements, habitat requirements, or essential habitats of marine mammals in the Cook Inlet area. However, it is possible that substantial numbers of some species (*e.g.*, killer whales and harbor porpoise) are killed incidentally in commercial fisheries. Therefore, in its

3 July letter, the Commission noted that such sources of mortality must be considered when assessing the possible effects of oil and gas activities on these species. Thus, the Commission recommended that, if it had not already done so, the Minerals Management Service consult the National Marine Fisheries Service to: (1) obtain the best available information on the status, trends, and incidental catch of small cetaceans that occur in the Cook Inlet Planning Area, (2) determine what additional information would be required to realistically assess the direct, indirect, and cumulative effects of oil and gas activities on these species, and (3) determine how any additional information needs could best be met.

It would be prohibitively costly, if not impossible, to obtain the quality and quantity of information necessary to accurately predict the possible impacts of oil and gas activities on each species and population of marine mammal that could be affected by such activities. Even so, the Minerals Management Service is required by the Marine Mammal Protection Act and other relevant legislation to ensure that such activities do not have adverse impacts on these species. The Commission believes that such requirements might best be met, at least in part, by identifying and monitoring a subset of "indicator" species most likely to be affected in detectable ways. Therefore, the Commission recommended that, if it had not already done so, the Service determine how site-specific and long-term monitoring programs may help the agency meet its statutory responsibilities.

Impact of Oil Spills on Arctic Natives

On 24 March 1989, the *Exxon Valdez* oil tanker ran aground in Prince William Sound, spilling approximately 11 million gallons of crude oil into the Sound (see Chapter VII for a discussion of efforts to assess and mitigate the effects of the spill on marine mammals). As noted in the previous Annual Report, in the months following the *Exxon Valdez* spill, more than 20 pieces of legislation were introduced on tanker safety and pollution liability. The result of this legislative activity was enactment of the Oil Pollution Act of 1990, signed into law on 18 August 1990. The primary goal of the Act is to prevent future oil spills. For spills that do occur, the Act sets forth measures designed to provide quick and efficient cleanup, minimize damage to fisheries, wildlife, and other natural resources, provide adequate compensation for victims of oil spills, and assign costs for such efforts to the oil industry.

Section 8302 of the Act directs the Secretary of the Interior, in consultation with the Governor of Alaska, to conduct a study and provide a report to Congress by 31 January 1991 on issues related to recovery of damages, contingency plans, and coordination actions in the event of an oil spill in the Arctic Ocean. In partial response, the Department of the Interior's Office of Environmental Affairs drafted and, on 11 July 1991, forwarded to the Commission and others a draft report on the impact of potential crude oil spills in the Arctic Ocean on Alaska Natives.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the draft report and, on 16 August 1991, provided comments to the Department. The Commission noted that, as it understood the intent of Congress, the purpose of the report was to obtain objective assessments of: (1) the risk of oil spills occurring and impacting Native communities and subsistence resources along the Arctic coast of Alaska; (2) the types and scale of damages that could occur and the means available to Natives for recovery of damages incurred, and (3) the adequacy of contingency plans and technology for containing, cleaning up, and minimizing the socio-economic and environmental impacts of oil spills along the Arctic coast of Alaska.

The Commission advised the Department that, in its opinion, the draft did not provide all of the requested assessments. It did not, for example, provide assessments of: (1) the risks of oil spills occurring and impacting fish and wildlife resources upon which many Native communities depend, (2) the types and scale of damages that could occur, or (3) the adequacy of existing technology and plans for containing, cleaning up, and minimizing or mitigating the impacts of oil spills on Native communities and subsistence resources. The final report was submitted to Congress on 24 December 1991.

Small-Take Exemptions

Section 101(a)(5) of the Marine Mammal Protection Act directs the Secretaries of the Interior and Commerce to authorize, upon request, the unintentional taking of small numbers of both depleted and non-depleted marine mammals incidental to activities other than commercial fishing operations, when, after notice and opportunity for public comment, certain conditions are met. In particular, the Secretary must find that the total of such taking will have a negligible impact on the affected species or stock, and will not have an unmitigable adverse impact on the availability of the species or stock for taking by Alaska Natives for subsistence uses.

The Secretary also must prescribe regulations setting forth permissible methods of taking and means of affecting the least practicable adverse impact on such species or stock and its habitat and on the availability of such species or stock for subsistence uses, and requirements pertaining to the monitoring and reporting of such taking.

Promulgation of Regulations To Authorize the Incidental Take of Cetaceans and Pinnipeds

As noted in the Commission's previous Annual Report, the National Marine Fisheries Service published a proposed rule in the *Federal Register* on 3 October 1989 to authorize for five years the take of six species of marine mammals (bowhead, gray, and beluga whales and bearded, ringed, and spotted seals) incidental to geophysical surveys and oil and gas exploration activities in the Chukchi and Beaufort Seas. In its comments on the proposed rule, provided to the Service on 9 February 1990, the Commission noted that it was not clear that only "small numbers" of marine mammals, particularly bowhead whales, would be taken. The Commission recommended that the Service estimate the numbers of each species of marine mammal that might be taken and explain the basis of the determination that those numbers are "small." The Commission also recommended that the proposed rule be amended to provide the Commission and the public an opportunity to review and comment on monitoring plans and other aspects of specific requests for incidental take authorizations before letters of authorization are issued. With respect to bowhead whales, the Commission recommended that, prior to authorizing the requested take, the Service develop a bowhead whale recovery plan and, based upon the recovery plan, determine that: (1) the authorized activities would not significantly affect the time it will take the western Arctic bowhead whale population to recover to its maximum net productivity level; and (2) existing baseline data and monitoring programs are sufficient to verify that the activities do not significantly affect the population's recovery rate.

With respect to monitoring, the Service's proposed rule specified that holders of letters of authorization must designate a qualified individual or individuals to observe and record the effects of exploration activities on marine mammals; when applying for a letter of authorization, the applicant must include a site-specific plan to monitor the effects on marine mammals that are present during exploratory activities; and holders of letters of authorization must, within 90 days following the completion of any exploratory activities, submit a report describing, among other things, the results of the monitoring activities, including an estimate of the actual level of take.

Requirements for monitoring plans were not specified in the final rule issued by the National Marine Fisheries Service in July 1990 and, on 26-27 February 1991, the National Marine Fisheries Service and the Minerals Management Service cooperatively convened a workshop in Seattle, Washington, to develop site-specific monitoring guidelines for the 1991 operating season. A former member of the Commission's Committee of Scientific Advisors participated in the workshop on behalf of the Commission. The workshop developed guidelines for evaluating the marine mammal monitoring plans required to be submitted with requests for letter of authorization. The National Marine Fisheries Service advised the Commission of these guidelines by letter of 26 March 1991.

Promulgation of Regulations To Authorize the Incidental Take of Walruses and Polar Bears

On 25 February 1991, the Fish and Wildlife Service published in the *Federal Register* a proposed rule to authorize, for five years, the non-lethal take of

walruses and polar bears incidental to pre- and post-lease oil and gas exploration activities in the Chukchi Sea. The Commission transmitted comments and recommendations on the proposed rule to the Service by letter of 18 April 1991. The Commission noted that the Fish and Wildlife Service, like the National Marine Fisheries Service, had defined "small numbers" to mean "a portion of a marine mammal species or stock whose taking would have a negligible impact." It pointed out that this definition failed to recognize the distinction between the independent requirements of Marine Mammal Protection Act section 101(a)(5) that only takings of small numbers may be authorized, and then only if such takings would have a negligible impact on the species or stock. In this context, the Commission pointed out that Congress, in passing section 101(a)(5), recognized the "imprecision of the term 'small take', but was unable to offer a more precise formulation because the concept is not capable of being expressed in absolute numerical limits" (H.R. Report No. 228, 97th Congress, First Session 19(1981)).

The Commission further pointed out that the statute makes it clear that only the taking of small numbers of marine mammals may be authorized. That is, the legislative history explicitly states that the requirement that the taking have a negligible impact is an "additional and separate safeguard." The Commission recommended that, before issuing letters of authorization, the Service estimate the numbers of each species of marine mammal that might be taken and fully explain its rationale for determining that those numbers are "small." The Commission also recommended that the proposed rule be amended to provide the Commission and the public an opportunity to review and comment on specific requests for letters of authorization before they are issued.

The Commission noted that the proposed rule would establish general monitoring and reporting requirements, and questioned whether the required programs would provide sufficient information to confirm that authorized activities have no more than a negligible impact on the affected species and populations, and no unmitigable adverse impact on the availability of those species for Native subsistence uses. To facilitate further consideration of this issue, the Commission provided a draft discussion paper describing the nature of, and rationale for, programs required to meet the monitoring requirements of section 101(a)(5) of the Act. The Commission recommended that, before issuing letters of authorization, the Service consult the Alaska Department of Fish and Game and its own scientists to assess the adequacy of the existing database and ongoing programs to monitor the status of walrus and polar bear populations. The Commission also recommended that the Service design and implement additional programs, as necessary, to verify the predicted effects and detect any unforeseen effects of oil and gas exploratory activities on these species and their availability for subsistence use. In this context, the Commission noted that the proposed small-take authorization would be valid for no more than five years and that authorization of further taking would be problematic if the monitoring programs during the initial five-year period are insufficient to document that only small numbers of marine mammals were taken and that the effects were negligible.

The Fish and Wildlife Service published its final rule in the *Federal Register* on 14 June 1991. The rule reflected many, but not all, of the Commission's 18 April recommendations concerning the proposed rule. The Commission noted this in a 5 August 1991 letter to the Service. Among other things, it pointed out that the final rule did not provide an estimate of the numbers of walruses and polar bears that might be taken or explain the Service's rationale for determining that those numbers are "small" as required by the Marine Mammal Protection Act and recommended by the Commission. The Commission also pointed out that the rule deferred the determination that taking will be conducted so as to minimize any adverse impacts on walruses, polar bears, and their habitat, and on the availability of these species for subsistence uses, until specific requests for letters of authorization have been received, but provides no opportunity for public review and comment on such requests as recommended by the Commission. The Commission also noted that, while discussion in the preamble to the final rule indicated that the Service concurred with the Commission's recommendations concerning monitoring and reporting requirements, the rule itself did not reflect those recommendations.

The Commission also noted that the 14 June *Federal Register* notice raised a number of additional issues and questions. For example, the notice indicated that the International Agreement on the Conservation of Polar Bears, which entered into force in 1976, is not self-executing and that "Congress has not implemented the 1976 agreement under section 101(a) of the [Marine Mammal Protection] Act." It concluded that, because implementing legislation has not been enacted, the polar bear agreement would not be an impediment to the issuance of the final rule even if a conflict existed. The Commission questioned this conclusion and pointed out that, if implementing legislation is needed, the Service has a responsibility to so advise Congress.

President Ford's 1975 memorandum transmitting the polar bear agreement to the Senate for ratification indicated that no implementing legislation beyond that already contained in the Marine Mammal Protection Act was needed. The Act does not provide a clear means for protecting essential habitat, and the Commission believes that some additional implementing legislation may be needed to ensure that the United States complies fully with its obligations as a party to the polar bear agreement. The Commission therefore recommended that the Service, in consultation with the Commission, prepare a legislative proposal and forward it to Congress for consideration as soon as possible (see Chapter II for additional discussion of this issue).

In the Commission's view, neither the rule issued by the Fish and Wildlife Service nor the rule promulgated by the National Marine Fisheries Service in July 1990 adequately identifies the monitoring requirements or the criteria that will be used to judge the adequacy of monitoring plans submitted as part of requests for letters of authorization to take marine mammals incidental to oil and gas exploratory activities off Alaska. Likewise, neither rule reflects the independent requirements of Marine Mammal Protection Act section 101(a)(5) that: (1) the incidental taking of only small numbers of marine mammals may be authorized, and (2) the taking may be authorized only if it would have a negligible impact on the affected species or stock. The Commission advised the Fish and Wildlife Service of this in the previously noted letter of 5 August 1991.

The Commission conveyed its concerns to the National Marine Fisheries Service in a separate letter on 5 August 1991. In that letter, the Commission noted that, while the Services may be unable to provide a precise formulation of what constitutes "small numbers," they nevertheless should be able to articulate, on a case-by-case basis, the rationale for determining that only small numbers of marine mammals will be taken incidental to authorized activities. The Commission recommended that, as a matter of practice, each request for a letter of authorization be reviewed to determine the number of marine mammals (by species and, as possible, age/size and sex) that could be taken in various ways if the activity proceeds as planned, and that letters of authorization subsequently issued: (1) specify when, where, how, and how many marine mammals may be taken incidentally in the course of the planned activities, and (2) require that the activities be suspended if the monitoring program indicates that marine mammals are being taken in ways or in numbers that are not authorized. The Commission also recommended that the National Marine Fisheries Service initiate rulemaking to amend its definition of "small numbers" to clarify that this requirement is distinct from the "negligible impact" provision.

The Commission noted that the workshop held in February 1991 to develop site-specific monitoring guidelines had been useful, but did not involve all interested parties or address all relevant issues. It recommended that, once the results of the 1991 monitoring programs are available, the National Marine Fisheries Service, the Fish and Wildlife Service, and the Minerals Management Service cooperatively hold a follow-up workshop to: (1) review the 1991 program results, (2) develop recommended criteria for judging the adequacy of site-specific monitoring plans provided with future requests for letters of authorization, and (3) describe such additional baseline and population monitoring programs as will be required to detect any non-negligible changes in the distribution, seasonal movement patterns, abundance, or productivity of bowhead, gray, and beluga whales, ice seals, walruses, and polar bears caused by coastal and offshore oil and gas exploration and any subsequent development.

The Commission noted that the workshop should be held no later than the end of February 1992 to allow the results to be taken into consideration by organizations requesting letters of authorization to take marine mammals during the 1992 open-water season. The Commission also noted that it would be desirable to establish an independent group of scientists to review and provide advice on the adequacy of monitoring plans accompanying such requests and the results of the subsequent monitoring programs.

On 21 November 1991, the Commission wrote again to the National Marine Fisheries Service asking what was being done to organize and hold the recommended workshop. The Service responded by letter of 6 December 1991. In its response, the Service noted that it was planning to hold a workshop late in February 1992 to review the results of the 1991 site-specific monitoring programs and to determine what changes should be made in the site-specific monitoring guidelines developed at the 1991 workshop. The Service questioned the Commission's interpretation of the nature and scope of monitoring programs required to give effect to section 101(a)(5) of the Marine Mammal Protection Act. The Service also indicated that it disagreed with the Commission's interpretation of Congressional intent when it amended section 101(a)(5) of the Act in 1986 to authorize the take of depleted, as well as non-depleted, marine mammals. Specifically, the Service indicated that it believed "the clear Congressional intent behind the 1986 amendments...was to alter the standard for determining negligible impact."

On 24 December 1991, the Fish and Wildlife Service responded to the Commission's 5 August letter concerning the Service's final rule regarding the incidental take of walrus and polar bears. The Fish and Wildlife Service, like the National Marine Fisheries Service, questioned the Commission's interpretations of the "small numbers" and "monitoring" requirements of section 101(a)(5) of the Marine Mammal Protection Act as amended. With regard to the 1976 International Agreement on Polar Bears, the Service indicated that the subject of implementing legislation needed further review. It proposed that the review be conducted by the polar bear management team that it has established (see Chapter II). The Service concurred with the Commission's recommendation that a workshop be held to define and determine how monitoring requirements can best be met, and indicated that it would work with the National Marine Fisheries Service to organize the workshop.

Petition To Amend the Small-Take Regulations

In November 1990, nine oil and gas exploration companies and the Alaska Eskimo Whaling Commission jointly petitioned the National Marine Fisheries Service to amend the Service's regulations governing the taking of marine mammals incidental to oil and gas exploration activities in Alaska. The proposed amendments specified actions that the groups had agreed should be taken to ensure that oil and gas exploratory activities do not adversely affect the availability of marine mammals for Native subsistence uses. By letter of 28 June 1991, the Commission advised the National Marine Fisheries Service that most of the proposed amendments appeared to deal with issues that would be addressed more appropriately in a memorandum of understanding among the petitioners, rather than through amendment of the regulations. The Commission also noted that several of the proposed amendments might result in changes in the traditional ways that Alaska Natives hunt bowhead whales and, if so, could be contrary to the provisions of section 101(b) of the Marine Mammal Protection Act exempting Alaska Natives from the Act's general prohibitions on taking marine mammals.

In addition, the Commission noted that, while not addressed by the petitioners, section 228.37 of the applicable regulations (50 C.F.R. § 228.37) might usefully be revised to describe the monitoring and reporting requirements more clearly. The Commission pointed out that the need for revision was illustrated by the variability and deficiencies in the marine mammal monitoring plans provided in requests for letters of authorization submitted by the Amoco Production Company, Arco Alaska, Inc., Chevron U.S.A. Inc., and Shell Western E&P Inc.

Requests for Letters of Authorization

In 1991, the Commission, in consultation with its Committee of Scientific Advisors, reviewed and provided comments and recommendations to the

National Marine Fisheries Service on four requests for letters of authorization to take bowhead, gray, and beluga whales and bearded, ringed, and spotted seals incidental to oil and gas exploratory drilling operations offshore Alaska. These requests were from Shell Western E&P Inc. (SWEPI), Amoco Production Company, ARCO Alaska, Inc., and Chevron, U.S.A. Inc. The Commission, in consultation with its Committee of Scientific Advisors, also reviewed and provided comments and recommendations on requests for letters of authorization from BP Exploration (Alaska) Inc. and Amerada Hess Corporation to take bowhead, gray, and beluga whales and ringed, bearded, and spotted seals incidental to geophysical seismic exploration activities in the Beaufort Sea during the 1991 open-water season.

In its comments, the Commission noted that the site-specific monitoring plans provided with the requests generally did not provide sufficient information to determine whether the planned monitoring programs would be adequate to verify the number of marine mammals taken incidental to the authorized activities and that the effects of the take are inconsequential. Likewise, in most cases, it was not clear whether the planned monitoring program would be sufficient to determine whether the authorized activities had any unmitigable adverse effects on the availability of the six species for Native subsistence purposes.

On a related point, the Commission noted that, even if properly designed and implemented, the site-specific monitoring programs were not likely, by themselves, to provide an adequate basis for determining whether the authorized activities caused or contributed to changes in the distribution, size, or productivity of the affected populations. The Commission pointed out that, while the effects of any one activity might be negligible, the combined effects of multiple activities may not be negligible and that site-specific monitoring must be accompanied by long-term population and habitat monitoring to ensure that there are no significant adverse cumulative effects.

With respect to exploratory drilling, the Commission noted that such activities could result in drilling muds, petroleum products, etc., being discharged into the environment and that such discharges could contaminate invertebrate and fish species eaten by whales, walruses, and seals. The Commission further noted that these marine mammals could accumulate toxic substances and pose a health threat to Alaska Natives and polar bears who eat them. The Commission therefore recommended that the relevant site-specific monitoring plans be revised to include assessment of the levels and trends of potentially hazardous contaminants in the benthic fauna and in the marine mammals taken by Alaska Natives for subsistence purposes from areas in and near the planned exploratory drilling sites.

The Commission also noted that there were common deficiencies in many of the requests for letters of authorization, suggesting that the National Marine Fisheries Service's regulations or its instructions to applicants did not clearly state what is required to meet the intents and provisions of section 101(a)(5) of the Marine Mammal Protection Act. The Commission recommended that, if it had not already done so, the Service advise all of the applicants that renewal of letters of authorization would be problematic if the site-specific monitoring programs carried out during the 1991 season did not provide sufficient information to verify that only small numbers of marine mammals were taken in the course of the exploratory activities and that the effects of the take were negligible.

Following receipt and review of the comments from the Commission and others, the National Marine Fisheries Service issued letters of authorization to all of the previously mentioned applicants. These authorizations were valid for the 1991 open-water season and allowed the unintentional, non-lethal taking of unspecified numbers of bowhead, gray, and beluga whales and bearded, ringed, and spotted seals incidental to oil and gas exploration activities in the Chukchi and Beaufort Seas.

In addition, the Fish and Wildlife Service issued letters of authorization to Chevron U.S.A. Inc. and Shell Western E&P Inc. allowing the unintentional, non-lethal take of unspecified numbers of walruses and polar bears incidental to offshore oil and gas exploration activities in the Chukchi Sea during the 1991-1992 open-water season. The letter of authorization issued to Shell Western E&P Inc. was based on a petition submitted to the Fish and Wildlife Service

on 30 March 1990 to promulgate regulations pursuant to section 101(a)(5) of the Marine Mammal Protection Act. The letter of authorization issued to Chevron U.S.A. Inc. was issued with no prior notice of the request and with no opportunity for comment by the Commission or the public.

The Minerals Management Service's Environmental Studies Program

As noted above, the Minerals Management Service is responsible for assessing and avoiding or mitigating the possible adverse environmental effects of offshore oil and gas exploration and development. To help meet this responsibility, the Service has established an Environmental Studies Program, administered regionally by its OCS offices in New Orleans, Louisiana; Camarillo, California; Anchorage, Alaska; and Herndon, Virginia. The Service also has contracted with the National Oceanic and Atmospheric Administration's Office of Oceanography and Marine Assessment, National Ocean Service, to plan and administer the Alaska Outer Continental Shelf Environmental Assessment Program.

To help the Service meet its responsibilities with regard to the conservation and protection of marine mammals, the Commission, in consultation with its Committee of Scientific Advisors, reviews and provides comments on regional studies plans, environmental impact statements, and requests for proposals related to marine mammal research developed by the Service; participates, as requested, in meetings of Technical Proposal Evaluation Committees convened by the Service to review research proposals; and helps plan and participates in meetings and workshops to review and coordinate relevant research programs being conducted or planned by the Minerals Management Service, the National Marine Fisheries Service, the Fish and Wildlife Service, and other Federal, state, and private agencies and organizations.

In this regard, on 23 September 1991, the Marine Mammal Commission provided comments on the draft Alaska Regional Studies Plan for fiscal years 1993 and 1994. In its letter, the Commission noted that the plan was well founded and well written, but could be further strengthened in a number of areas. The draft plan did not, for example, fully reflect the possibility that oil and gas activities in the Bering Sea and Gulf of Alaska could adversely affect the threatened Steller sea lion population.

As discussed in previous Annual Reports, in January 1989, the Commission sponsored a Workshop on Measures to Assess and Mitigate the Impacts of Arctic Oil and Gas Exploration and Development on Polar Bears" (see Appendix B, Lentfer 1991). The workshop report recommended that a study be done to evaluate the cost-effectiveness of possible systems for detecting and deterring polar bears from approaching field camps, drilling sites, etc., in the Arctic. The draft Alaska studies plan included a study similar to the one recommended by the workshop. However, the nature and objectives of the study were not described clearly. The Commission therefore recommended that, if the Minerals Management Service had not already done so, it consult polar bears experts in the Fish and Wildlife Service and the Alaska Department of Fish and Game to ensure there is general agreement on what needs to be done and how it can be done most cost-effectively.

The draft plan proposed development of a contingency plan to be better prepared to assess the fate and effects of future oil spills. The Commission noted that opportunistic studies, such as proposed, could contribute much to resolving critical uncertainties concerning the effects of, and the response of marine mammals and other wildlife to, oil spills and related containment and cleanup operations. It pointed out that the *Exxon Valdez* oil spill provided many research opportunities that were not recognized or utilized and that the proposal would help avoid repetition of this experience.

Chapter IX

RESEARCH AND STUDIES PROGRAM

The Marine Mammal Protection Act requires that the Commission maintain a continuing review of research programs conducted or proposed to be conducted under the authority of the Act; undertake or cause to be undertaken such other studies as it deems necessary or desirable in connection with marine mammal conservation and protection; and take every step feasible to prevent wasteful duplication of research. To accomplish these tasks, the Commission conducts an annual survey of Federally-funded marine mammal research; reviews research plans and programs and recommends steps that should be taken to prevent unnecessary duplication and improve the quality of research conducted or supported by the National Marine Fisheries Service, the Fish and Wildlife Service, the Minerals Management Service, and other Federal agencies; convenes meetings and workshops to review, plan, and coordinate marine mammal research; and contracts for studies to help identify, define, and develop solutions to domestic and international problems affecting marine mammals and their habitats so as to facilitate and complement other agencies' activities.

Survey of Federally-Funded Marine Mammal Research

Research directly or indirectly relevant to the conservation and protection of marine mammals and their habitat is conducted or supported by many Federal departments and agencies. To determine the precise nature of this research, assess ways in which it can best be used to facilitate marine mammal conservation and protection, and prevent wasteful duplication, the Commission annually requests and reviews information on the marine mammal research programs being conducted, supported, and planned elsewhere in the Federal Government.

In 1991, the Commission requested information from 20 Federal agencies, departments, and offices, most of which had conducted or supported research relevant to the conservation and protection of marine mammals in previous years. Specifically, the Commission requested information from the Department of Agriculture; the Department of the Air Force; the Department of the Army; the Department of the Navy, the Naval Ocean Systems Center, and the Office of Naval Research; the Department of Energy; the Department of State; the Environmental Protection Agency; the U.S. Fish and Wildlife Service; the Minerals Management Service; the National Aeronautics and Space Administration; the National Institutes of Health; the National Marine Fisheries Service; the National Ocean Pollution Program Office; the National Ocean Service, the Office of Ocean and Coastal Resource Management, and the Office of Ocean Resources Conservation and Assessment; the National Sea Grant College Program; the National Park Service; the National Science Foundation; the Smithsonian Institution; and the U.S. Coast Guard.

Responses to requests for information concerning projects undertaken in FY 1991 and planned for FY 1992 had been received from most of the agencies by December 1991. This information will be summarized early in 1992 and made available in the Commission-sponsored report "Survey of Federally-Funded Marine Mammal Research and Studies."

Research Program Reviews, Workshops, and Planning Meetings

In 1991, the Commission, in consultation with its Committee of Scientific Advisors, reviewed, commented on, or made recommendations on actions concerning bottlenose dolphins; harbor porpoises off

California, Alaska, and New England; Hawaiian monk seals; humpback whales; right whales; gray whales; killer whales; North Pacific fur seals; Steller sea lions; harbor seals; Pacific walruses; polar bears; sea otter populations off California and Alaska; Steller sea lions; West Indian manatees; the tuna-porpoise issue; high seas driftnet fisheries; other marine mammal-fisheries interactions; the disturbance of marine mammals by military activities; the impact of oil spills on marine mammals, their habitats, and availability for subsistence harvests; the possible effects on marine mammals of high-energy, low-frequency sounds associated with global warming research; and entanglement of marine mammals in lost or discarded fishing gear and other marine debris.

The Commission also convened, co-sponsored, provided background information for, or participated in meetings and workshops to review and evaluate marine mammal research programs at the National Marine Fisheries Service's National Marine Mammal Laboratory and Northeast Science Center; review and evaluate the National Marine Fisheries Service's Hawaiian monk seal research program and implementation of the Hawaiian Monk Seal Recovery Plan; determine principles, needs, and objectives of site-specific monitoring programs to detect and assess the effects of offshore oil and gas exploration activities on marine mammals in the Beaufort, Chukchi, and Bering Seas; assess the sustained use of the northeast Atlantic shelf ecosystem, its wetlands, estuaries, coastal zone, fisheries, marine mammals, and other resources; review measures being taken by the National Marine Fisheries Service and others to reduce the incidental take of porpoises in the eastern tropical Pacific yellowfin tuna purse seine fishery; review U.S. domestic policy concerning the possible resumption of commercial whaling and revision of the 1946 Convention for the Regulation of Whaling; review and comment on the draft Protocol to the Antarctic Treaty on Environmental Protection and its associated Annexes as developed at the XIth Special Antarctic Treaty Consultative Meeting; review and develop methods and protocols, including dissection techniques, tissue sampling procedures, and analyses, for research on cetacean die-offs in U.S. and European waters; review and assess plans to develop and implement an international program to monitor pollution in the Arctic; identify and recommend research to assess the effects of high-energy, low-frequency sound on marine mammals; assess programs to rescue and rehabilitate live-stranded marine mammals; and identify priority issues for the newly formed North Pacific Marine Science Organization.

Commission-Sponsored Research and Study Projects

The Departments of Commerce and the Interior have primary responsibility under the Marine Mammal Protection Act for acquiring the biological and ecological data needed to protect and conserve marine mammals and the ecosystems of which they are a part. This responsibility has been delegated to the National Marine Fisheries Service and the Fish and Wildlife Service, respectively.

As noted earlier, the Commission convenes workshops and contracts for research and studies to help identify, define, and evaluate threats to marine mammals and their habitat. It also supports other research necessary to further the purposes and policies of the Act. Since it was established, the Commission has contracted for approximately 826 projects ranging in amounts from several hundred dollars to $150,000. The amounts spent annually on research and studies since 1986 have averaged about $100,000.

From time to time, the Commission's investment in research activities is in the form of transfers of funds to and from other Federal agencies, particularly the National Marine Fisheries Service, the Fish and Wildlife Service, and the Minerals Management Service. When such funds are transferred from the Commission to another agency, the Commission provides detailed scopes of work that describe precisely what the agency is to do or to have done and the requirements for reporting on progress to the Commission. In many instances, this approach has made it possible for agencies to start needed research sooner than might otherwise have been possible and to subsequently support the projects on their own for as long as necessary. The Commission believes that it is valuable to maintain agency involvement to the

greatest extent possible and that such transfers provide a useful means of doing so.

In calendar year 1991, the Commission provided approximately $83,500 of its own funds to support research projects. In addition, the National Marine Fisheries Service and the National Ocean Service transferred a total of $58,500 to the Commission for cooperative support of certain research and studies. The 1991 research projects, including those that were jointly supported, are summarized below.

Final reports from Commission-sponsored studies completed in 1991 and earlier are available from the National Technical Information Service and are listed in Appendix B of this Report. Papers resulting entirely or in part from Commission-sponsored activities and published elsewhere are listed in Appendix C. Projects initiated in 1991 are summarized below.

SPECIES REPORTS

In 1988, the Marine Mammal Commission published a report entitled *Selected Marine Mammals of Alaska: Species Accounts with Research and Management Recommendations* (see Appendix B, Lentfer 1988). The purpose of the report was to provide background material for the development of conservation plans for ten species of Alaska marine mammals. In light of continuing declines of Steller sea lions and harbor seals in Alaska waters and the 1989 *Exxon Valdez* oil spill in Prince William Sound, the Commission contracted with experts in Alaska to revise the original reports for these species and to add a new species report on the killer whale.

Alaska Killer Whale Species Report
(Craig O. Matkin, North Gulf Oceanic Society, Homer, Alaska)

As noted in Chapter II, killer whales (*Orcinus orca*) in Alaska are involved in interactions with fisheries, particularly the longline blackcod, or sablefish, fishery in Prince William Sound and the Bering Sea. Killer whales also are exposed to increasing whale-watching and commercial vessel traffic in Alaska coastal waters. In addition, recent photographic identification studies of killer whales in southern Alaska have indicated that, since the 1989 *Exxon Valdez* oil spill in Prince William Sound, a number of animals are missing from pods known to frequent that area. In recognition of these factors, the Commission contracted for the preparation of a species report synthesizing and evaluating available information concerning: (1) the natural history of killer whales; (2) the demography and status of killer whales in Alaska waters; and (3) issues bearing upon the present and future conservation of killer whales in Alaska waters. The report, which will be completed early in 1992, also will provide an assessment of critical research and management needs, and recommend actions to meet those needs.

Update of Alaska Harbor Seal Species Report
(A. Anne Hoover-Miller, Pacific Rim Research, Haines, Alaska)

When first published in 1988, the species report for Alaska harbor seals (*Phoca vitulina*) noted that the Alaska Department of Fish and Game estimated that about 270,000 harbor seals inhabited Alaska waters in 1973. As noted in Chapter II, recent censuses of harbor seal haulout and breeding sites in Alaska indicate that abundance has declined and is continuing to decline, particularly in the central Gulf of Alaska. For example, in the late 1950s and early 1960s, Tugidak Island in the Gulf of Alaska was one of the largest harbor seal haulouts in the world with about 20,000 seals using the area. Subsequent maximum counts revealed a steady decline in the number of seals as follows: 1976, 9,300 seals; 1979, 4,900 seals; 1984, 2,200 seals; 1986, 1,700 seals, and 1988, 1,400 seals. Similar declines have been documented in other parts of Alaska as well. In view of this situation, the Commission contracted for an update of the 1988 species account with the research and management recommendations. This update is expected to be completed early in 1992.

Update of Steller Sea Lion Species Report
(Donald G. Calkins, Alaska Department of Fish and Game, Anchorage, Alaska)

As noted in Chapter II, Steller sea lions (*Eumetopias jubatus*) have declined throughout most of their range in recent years and have been designated

threatened under the Endangered Species Act. In 1990, the National Marine Fisheries Service constituted a Recovery Team, which subsequently prepared a recommended Recovery Plan. During preparation of the Plan, it became clear that new information had been obtained and additional issues had arisen since the Commission-sponsored species report was published in 1988. Therefore, the Commission contracted in 1991 for an update of the Steller sea lion species account with research and management recommendations aimed at halting the decline. The revised species report is expected to be completed early in 1992.

CONSERVATION PLANS

Section 115(b) of the Marine Mammal Protection Act encourages the development of conservation plans when such plans would facilitate maintenance of marine mammal populations within optimum sustainable population ranges. The Fish and Wildlife Service, in consultation with the Commission, has determined that conservation plans would be useful for identifying and coordinating research and management activities necessary for effective conservation of walruses, polar bears, and Alaska sea otters. At its 1991 annual meeting, the Marine Mammal Commission offered to help the Service prepare draft conservation plans for these species. Once completed, the draft plans are to be circulated by the Service's Alaska Regional Office to the management advisory teams that have been established by the Service for each species. Following review and comment by the advisory teams, the Service will complete, adopt, and take steps to implement the plans.

Pacific Walrus Draft Conservation Plan

(Brendan P. Kelly, Institute of Marine Science, University of Alaska, Fairbanks, Alaska)

The Pacific walrus has been and continues to be an important subsistence resource for coastal Alaska Natives. As noted in Chapter II, walruses provide a source of meat, oil for fuel, skins for the construction of dwellings and boats, and ivory for tools and handicrafts. Although the species is not considered depleted, international concern with the status and management of walrus populations has increased notably in recent years. In 1990, an international workshop was convened in Seattle, Washington, to review and make recommendations concerning the status and management of walrus populations (see the Commission's previous Annual Report). Among other things, the workshop recommended the development of long-range management plans that will restore and sustain all walrus populations at appropriately high, stable levels. To help the Fish and Wildlife Service respond to these recommendations, the Commission provided support for the investigator to prepare a draft conservation plan for the Pacific walrus. The draft plan is intended to establish a framework for cooperative walrus research and management by Federal, State, Native, and private interest groups, and to elucidate research and management priorities over a five-year period. The draft plan was completed in November 1991 and was transmitted to the Director of the Alaska Region of the Fish and Wildlife Service for review and use by the Service's Walrus Management Plan Advisory Team in preparing a final draft conservation plan for consideration by the Service.

Alaska Sea Otter Conservation Plan

(Mara Kimmel, Alaska Sea Otter Commission, Fairbanks, Alaska; Kate Wynne, University of Alaska, Marine Advisory Program, Cordova, Alaska; Donald B. Siniff, Ph.D., University of Minnesota, Minneapolis, Minnesota; and Suzanne Montgomery, Woodstock, Virginia)

The Marine Mammal Commission provided funds for the contractors to attend and provide follow-up reports on a meeting held at the Fish and Wildlife Service's offices in Anchorage, Alaska, on 25-26 September 1991 to discuss conservation issues and research and management needs relative to sea otters in Alaska. The meeting was organized and chaired by the Commission and involved representatives of the Commission, the Fish and Wildlife Service, and the environmental community, as well as the aforementioned individuals. Following the meeting, the Commission prepared and distributed a draft conservation plan to the meeting participants. The draft plan is being revised to take account of reviewers' comments and is expected to be completed and sent to the Fish and Wildlife Service in February 1992.

HABITAT AND ECOSYSTEM STUDIES

Alaska Marine Mammal Geographic Information System Feasibility Study

(A. Anne Hoover-Miller, Pacific Rim Research, Haines, Alaska)

Many Federal agencies, Alaska State agencies, and private organizations are collecting population, environmental, and other data bearing upon the conservation of marine mammals and other wildlife in Alaska and adjacent waters. Many of these data have geographic attributes and could be made more useful and accessible by development of a cooperative or coordinated multi-agency geographic information system. The Marine Mammal Commission provided support for the investigator to assess the possible use of such a geographic information system to facilitate access, integration, and analysis of data bearing upon the conservation of marine mammals in Alaska. The investigator is to contact agencies and institutions that hold marine mammal and related data to determine what kind of data exist and in what format they are archived; develop an inventory of relevant databases being maintained; determine how the utility of various databases might be improved; and identify steps that might be taken to improve access to, and the use of, existing databases. The report, expected to be completed in 1992, will be provided to the relevant Federal, State, and private organizations along with such recommendations as may be appropriate.

Second-Order Effects of Large-Scale High Seas Driftnet Fisheries on the North Pacific Marine Ecosystem

(Simon P. Northridge, Ph.D., Santo, Vanuatu)

Available information indicates that large-scale pelagic driftnet fisheries in the North Pacific Ocean kill large numbers of non-target as well as target species, including some species that are endangered or threatened. As noted in Chapter IV, in June 1991, a meeting of scientists from the United States, Canada, Japan, South Korea, and Taiwan was held in Sidney, British Columbia, to assess the impacts of large-scale high seas driftnet fisheries on marine species in the North Pacific. However, the reviewers did not assess the possible indirect or second-order effects of these fisheries on the North Pacific ecosystem. Therefore, the Marine Mammal Commission contracted for this study to determine, to the extent possible, how the large-scale driftnet fisheries in the North Pacific may affect or have affected the structure and productivity of the North Pacific marine food web. In addition, the contractor is to identify the types of assessments that should be done before new fisheries are developed and to describe how the fisheries themselves might be structured to ensure that they do not develop faster than knowledge of their possible first- and second-order impacts. The report from this study, expected to be completed by mid-1992, will be used by the Commission, in consultation with its Committee of Scientific Advisors, to help determine what remedial actions are needed and how fisheries can be developed and structured without adversely affecting marine mammals and other non-target species.

Review of the Department of the Interior's Draft Report to Congress on the Impact of Potential Crude-Oil Spills on the Arctic Ocean on Alaska Natives

(Richard T. Townsend, Townsend Environmental, Otis, Oregon)

Section 8302 of the Oil Pollution Act of 1990 directs the Secretary of the Interior, in consultation with the Governor of Alaska, to prepare and provide to Congress a report on issues associated with the recovery of damages, contingency plans, and coordination of actions in the event of an oil spill in the Arctic Ocean. In the course of preparing the report, the Department of the Interior's Alaska Regional Office, Office of Environmental Affairs, provided a draft report to the Commission and others for comment. Because of the highly specialized nature of the subject area, the Commission contracted for a detailed review of the draft. The contractor's review was one of the bases for the Commission's comments on the draft report, which were sent to the Department of the Interior on 16 August 1991 and are discussed in Chapter VIII.

Symposium on the Northeast Atlantic Shelf Ecosystem: Stress, Mitigation, and Sustainability
(Kenneth Sherman, National Marine Fisheries Service, Northeast Fisheries Science Center, Narragansett Laboratory, Narragansett, Rhode Island)

The concept of ecologically defined marine ecosystems was discussed at the first meeting of the *ad hoc* Committee on Large Marine Ecosystems, held in Paris in March 1991. Meeting participants noted that where marine ecosystems overlap political boundaries, it is in the interest of affected states to work together to develop an understanding of compatible strategies for conserving fishery resources and other components of the system. As a follow-up to the Paris meeting, and with partial support from the Marine Mammal Commission, a symposium to assess the northeast shelf ecosystem as a Large Marine Ecosystem was convened at the University of Rhode Island Graduate School of Oceanography in August 1991. The symposium brought together experts with diverse backgrounds (*e.g.*, fisheries, marine mammals, plankton, eutrophication, pollution, biotoxins, coastal management, and restoration ecology) to review available information concerning the state of the northeast shelf ecosystem and provide an assessment of the measures needed to prevent or mitigate adverse changes resulting from overfishing, pollution, etc. The report of the symposium will be published in 1992 in the American Association for the Advancement of Science's Selected Symposia Series on large marine ecosystems.

Support for Amending the Bering Sea/Aleutian Islands Groundfish Fishery Management Plan
(William J. Wilson, LGL Alaska Research Associates, Inc., Anchorage, Alaska)

In 1989, the North Pacific Fishery Management Council recommended, and the National Marine Fisheries Service adopted, a two-year exclusion of commercial fisheries to protect walruses in parts of northern Bristol Bay. The measure was taken in response to a 50 percent decline in walruses at terrestrial haulouts in this area between 1986 and 1988. The decline coincided with the onset of yellowfin sole fishing in nearby waters, and the resulting noise and disturbance by trawlers was considered a likely cause. The closure, including waters from 3 to 12 miles around Round Island, the Twins, and Cape Peirce, was to expire at the end of 1991 unless action was taken to extend it. Late in 1990, the Council expressed interest in making the measure permanent. The Council, the Fish and Wildlife Service, and other responsible parties had insufficient staff, time, and funds to prepare the environmental assessment and other background documents required to accompany such an action. The Commission, therefore, contracted for the preparation of the environmental assessment and background documentation needed for the Council to proceed with considering the proposed action and alternatives. The contractor's report was provided to the North Pacific Fishery Management Council (see Chapter II for additional information).

Workshop To Identify Issues Meriting Priority Attention by the Newly Formed North Pacific Marine Science Organization (PICES)
(Edward L. Miles, Ph.D., Director, and Professor Warren S. Wooster, School of Marine Affairs, University of Washington, Seattle, Washington)

On 12 December 1990, representatives of Canada, Japan, the People's Republic of China, the Union of Soviet Socialist Republics, and the United States concluded the Convention for a North Pacific Marine Science Organization (PICES). The purpose of the Convention is to provide a forum for exchanging scientific and technical information and for coordinating research on the North Pacific marine ecosystem. The Convention is expected to enter into force in 1992, at which time the first meeting of the Governing Council established by the Convention is expected to be held. The purpose of this workshop, held 12-13 December 1991 at the National Marine Fisheries Service's Northwest Fisheries Science Center in Seattle, Washington, was to review the state of knowledge and identify research gaps and priorities related to four topic areas: (1) climate change; (2) the Bering Sea; (3) environmental quality; and (4) fishery oceanography. Workshop participants included scientists from the five signatory nations. The workshop report, to be completed and distributed early in 1992, will be used to help develop the agenda for the first meeting of the Governing Council.

Identification of Programs Needed To Meet the Monitoring Requirements of Section 101(a)(5) of the Marine Mammal Protection Act
(Bruce R. Mate, Ph.D., Marine Science Center, Oregon State University, Newport, Oregon)

On 18 July 1990, the National Marine Fisheries Service published in the *Federal Register* a final rule authorizing the non-lethal take of six species of marine mammals (bowhead, gray, and beluga whales and bearded, ringed, and spotted seals) incidental to oil and gas exploration activities in the Beaufort and Chukchi Seas from 1990 to 1995. Section 228.37 of the rule states, among other things, that applicants for letters of authorization must include a site-specific plan to monitor the effects on populations of marine mammals that are present during exploratory activities and that these plans must be approved by the National Marine Fisheries Service. Monitoring requirements were not specified in the rule and, therefore, on 25 February 1991, the National Marine Fisheries Service and the Minerals Management Service cooperatively sponsored a workshop to develop site-specific monitoring guidelines for the 1991 exploration season. The Marine Mammal Commission provided support for the contractor to attend and prepare a report on the major issues raised at the meeting. The contractor's report included suggestions and recommendations that served as the basis for follow-up actions described in Chapter VIII.

LIFE HISTORY STUDIES

Harbor Porpoise Age Determination by Tooth Sectioning
(Andrew J. Read, Ph.D., Dolphin Biology Research Institute, Sarasota, Florida)

In 1990, the subcommittee on small cetaceans of the International Whaling Commission's Scientific Committee concluded that, despite numerous indirect and direct catches of harbor porpoises, basic information on the life history of this species was not available. In particular, the age structure and reproductive parameters of regional populations were either poorly documented or unknown. As noted in Chapter II, large numbers of harbor porpoises strand or are taken incidentally in commercial fisheries within the U.S. Exclusive Economic Zone and in many other areas worldwide. The Commission provided partial support for this study to determine, by means of growth layers in teeth, the ages of stranded and incidentally taken harbor porpoises being held in collections maintained by the New England Aquarium and the Smithsonian Institution's National Museum of Natural History. The study is expected to determine whether certain age classes are under- or over-represented in the collections and whether the ages of incidentally caught stranded animals have changed over time. The latter may indicate the degree to which the harbor porpoise population off the northeastern coast of the United States has been and is being affected by incidental takes in commercial fisheries.

Energetic Studies of Manatee Calf and Mother
(Graham A.J. Worthy, Ph.D., Marine Mammal Research Program, Texas A&M University, Galveston, Texas)

Despite the highly endangered status of manatees, little is known of the species' energetic requirements and thermal tolerance. A manatee calf was born at the EPCOT Center in Orlando, Florida, on 13 September 1991. This provided an opportunity to begin studies of milk composition and energy transfer rates and average daily energetic expenditure of mother-calf pairs. The Commission provided funds to help support the study. The results should help provide an understanding of the effects of water temperature on manatee distribution, survival, and productivity.

Humpback Whale Calf Mortality Workshops
(Sally A. Mizroch, Ph.D., National Marine Mammal Laboratory, Seattle, Washington; C. Scott Baker, Ph.D., University of Wellington, Wellington, New Zealand; and John Calambokidis, Cascadia Research Collective, Olympia, Washington)

In 1989, the International Whaling Commission sponsored a workshop on the use of photo-identification techniques to estimate cetacean population parameters. The workshop report noted that it might be possible to estimate humpback whale calf mortality from photographs of individually recognizable mother-calf pairs and other whales in calving and feeding

areas. The purpose of these workshops is to estimate calf and juvenile mortality by comparing photographs of mother-calf pairs taken in the Hawaiian Islands breeding area with same-season photographs taken of whales on the Alaska feeding grounds. The first workshop, held 20-23 November 1991, focused on cataloguing photographs taken by researchers in Mexico, California, Canada, Alaska, Hawaii, and Japan, and identifying possible data biases (*e.g.*, calves missed on the Hawaiian breeding grounds, and post-sighting calf mortality on the Alaska feeding grounds). It was supported in part by funding from the Marine Mammal Commission. A second workshop, planned for April 1992, will compile lists of female humpback whales that were "matched" within a season in both Hawaii and Alaska, and estimate calf/juvenile mortality rates from these resighting records. The results of the workshops will be published by the International Whaling Commission.

Airship Surveys of Right Whale Mother-Calf Pairs
(James H.W. Hain, Ph.D., Associated Scientists at Woods Hole, Woods Hole, Massachusetts)

In 1989, the Marine Mammal Commission contracted for a pilot investigation of how existing and next-generation airships might be used in marine mammal research (see 1989 Annual Report). The results of that investigation indicated, among other things, that airships have great potential for studies of the effects of human activities on marine mammals, particularly cetaceans. In 1991, the Marine Mammal Commission provided partial support for airship surveys to observe and evaluate interactions between mother-calf right whales and ship traffic and other variables along the coast of Georgia and northern Florida. Additional support was provided by the Navy and the Minerals Management Service. The surveys are to be done in January 1992. The survey results are expected to further demonstrate the value of airships for doing cetacean studies and to indicate where and to what extent commercial shipping and other human activities may be affecting the distribution and behavior of endangered right whales on their presumed winter calving grounds.

Project YONAH (Years of the North Atlantic Humpback Whale)
(Phillip J. Clapham, Center for Coastal Studies, Provincetown, Massachusetts)

Project YONAH, or "Years of the North Atlantic Humpback Whale," is a three-year international collaborative research project to estimate the abundance and stock structure of North Atlantic humpback whale populations. Participants in the project will obtain and utilize photographs and biopsy samples to assess seasonal movements and stock identity of humpback whales that occur in summer in the Gulf of Maine, the Gulf of St. Lawrence, Newfoundland, Labrador, West Greenland, Iceland, and western Norway and in winter on the breeding grounds in the West Indies (*e.g.*, Silver Bank, Navidad Bank, Samana Bay, and Mona Passage). The Marine Mammal Commission provided funds to help administer and coordinate implementation of the project, scheduled to begin in 1992.

Workshop on the Rescue, Rehabilitation, and Release of Sick and Injured Marine Mammals
(David J. St. Aubin, Ph.D., and Joseph R. Geraci, V.M.D., Ph.D., Department of Pathology, University of Guelph, Guelph, Ontario, Canada)

Every year, regional stranding networks, which involve personnel from specialized facilities, local zoos, oceanaria, aquaria, and universities, recover and take into captivity live stranded marine mammals for rehabilitation. The number of such animals is increasing and may pose a risk to both captive and wild populations as well as to the people involved in these programs. It is possible, for example, that animals may be exposed to exotic diseases while being treated in captivity and may infect wild populations if they are returned to the wild. The purpose of this workshop, held in Chicago on 3-5 December 1991, was to review the available information and to recommend actions that should be taken to stop potentially dangerous and inhumane practices and to resolve uncertainties concerning the rescue, rehabilitation, and release of stranded marine mammals. Workshop participants included experts in the relevant scientific disciplines and representatives of the groups involved in rescue and rehabilitation programs. Funding for the work-

shop and publication of the workshop report was provided by a transfer of funds from the National Marine Fisheries Service to the Marine Mammal Commission.

Field Guide to Alaska Marine Mammals
(Ronald K. Dearborn, Ph.D., Alaska Sea Grant College Program, University of Alaska, Fairbanks, Alaska)

As noted in Chapter III, the 1988 amendments to the Marine Mammal Protection Act require that the National Marine Fisheries Service develop and implement an observer program to help obtain reliable information on the species and numbers of marine mammals being caught incidentally in commercial fisheries in U.S. waters. The effectiveness of this program will depend, in part, on the ability of observers to correctly identify animals taken. To assist in this effort, the Marine Mammal Commission provided partial support for production of an illustrated field guide to the pinnipeds and cetaceans of Alaska. The guide, designed specifically for training and field use by fisheries observers and commercial fishermen in Alaska, will be published by the University of Alaska Sea Grant Marine Advisory Program in Anchorage and the University of Alaska Sea Grant Program Public Information Service in Fairbanks. It is expected to be completed in 1992.

Selected International Agreements and Domestic Legislation Affecting Marine Resources, Marine Habitat, and Wildlife
(Debra L. Nail, Eckerd College, St. Petersburg, Florida)

The contractor is collecting and organizing all of the background information necessary to update the 1977 Congressional publication "Treaties and Other International Agreements on Fisheries, Oceanographic Resources, and Wildlife involving the United States." The contractor also is developing a computerized database of the documents that may be searched for subject key words and other parameters. The published report and the database should be of use to Congress, Federal and state agencies, and the general public. The Commission expects the report to be of value in identifying actions needed to better conserve marine living resources and habitats.

Survey of Federally-Funded Marine Mammal Research
(George H. Waring, Ph.D., Southern Illinois University, Carbondale, Illinois)

The Marine Mammal Commission is required to conduct a continuing review of marine mammal research conducted or supported by other Federal agencies. Information concerning marine mammal research conducted by other agencies in Fiscal Year 1991 and planned to be conducted in Fiscal Year 1992 was requested from agencies in November 1991 and will be provided to the contractor early in 1992. The contractor is to provide a draft report summarizing the information obtained by 1 May 1992. The draft will be sent to Federal agencies to verify the accuracy of the reported data. The final report, expected to be completed in the summer of 1992, will be provided to the agencies and will be available to other interested persons and organizations through the National Technical Information Service. It will be reviewed by the Commission, in consultation with its Committee of Scientific Advisors, to identify actions necessary to better develop, focus, and coordinate Federal marine mammal research programs.

Chapter X

PERMITS FOR MARINE MAMMAL RESEARCH, PUBLIC DISPLAY, AND ENHANCEMENT

The Marine Mammal Protection Act places a moratorium, with certain exceptions, on the taking and importing of marine mammals and marine mammal products. One exception provides for the issuance of permits by either the Secretary of Commerce or the Secretary of the Interior, depending upon the species of marine mammal involved, for the taking or importation of marine mammals for purposes of scientific research, public display, or enhancing the survival or recovery of a species or stock. Before acting on a permit application, the responsible regulatory agency is required to have the application reviewed by the Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals.

Permit Application Review

The permit application and review process involves four stages: (1) receipt and initial review of the application at either the Department of Commerce or the Department of the Interior; (2) publication in the *Federal Register* of a notice of the application, inviting public review and comment and transmittal to the Marine Mammal Commission; (3) review of the application by the Commission, in consultation with its Committee of Scientific Advisors, and transmittal of its recommendation to the Department; and (4) final processing by the Department, including consideration of all comments and recommendations of the Commission and the public, resulting in the issuance or denial of the permit. Figure 2 on the following page illustrates this process.

The total review time for a permit (from initial receipt of an application at the Service until final Departmental action) depends on many factors, including the sufficiency of the information provided by the applicant, any special requirements that must be satisfied before the application may be processed, and the efficiency and thoroughness of those responsible for the agency review.

During 1991, the Commission made recommendations on 44 permit applications submitted to the Department of Commerce (including three applications that were received in 1990 and on which final action was taken in 1991) and three applications submitted to the Department of the Interior. The Commission's average review time for complete applications was 34 days. Not included in the preceding statistics are recommendations on 12 applications awaiting final action by the Department of Commerce, 2 applications awaiting final action by the Department of the Interior at year's end, and 2 applications that were under Commission review at year's end. The Commission, in consultation with its Committee of Scientific Advisors, also made recommendations on 33 requests to modify permits and 2 requests for permit renewals during 1991. The average time required for Commission review of these requests was 28 days.

For the 28 applications processed by the Department of Commerce during 1991, it took an average of 144 days from the date the application was received by the Department until final action was taken. The

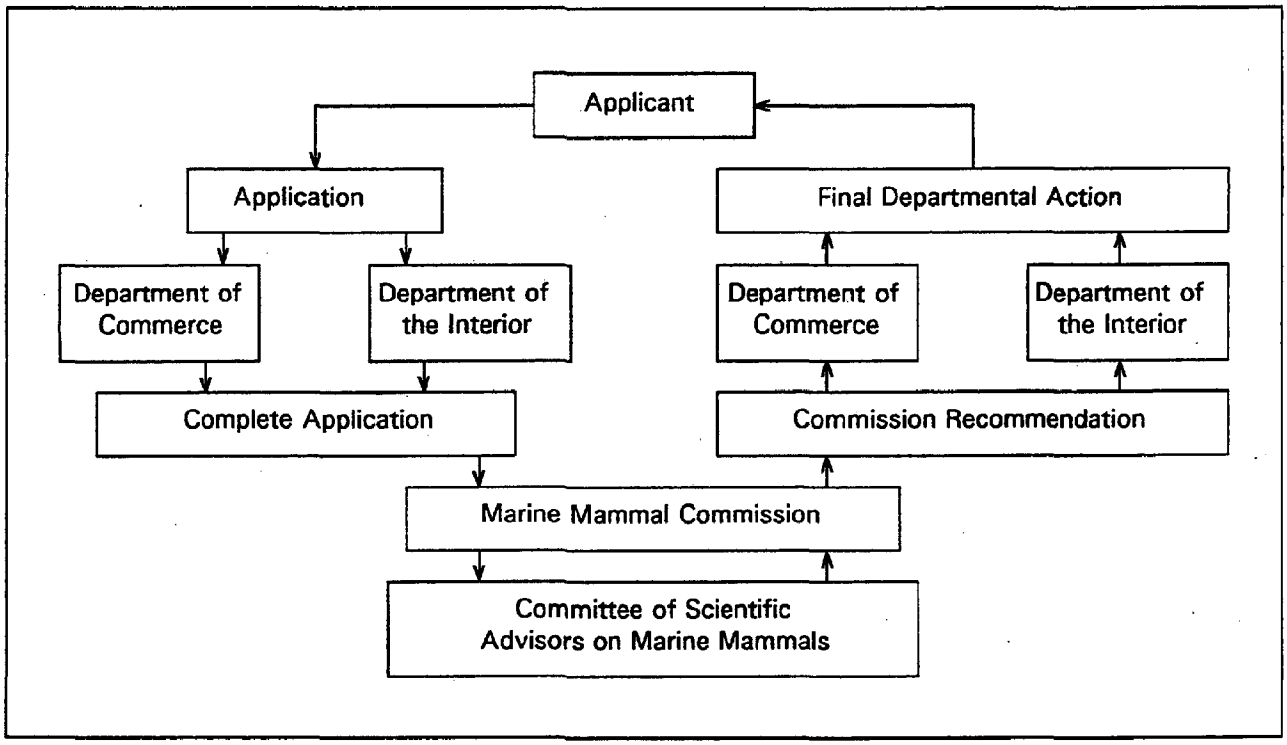

Figure 2. Process by which requests for permits to take marine mammals are reviewed.

Department of the Interior processed three permit applications during 1991, completing each in an average of 123 days. If calculated from the date that the application was considered by the Department to be complete, the average processing times for the Departments of Commerce and the Interior were 118 and 88 days, respectively, compared to 131 and 164 days, respectively, in 1990.

Review of the Permit System

During the 1988 reauthorization of the Marine Mammal Protection Act, considerable attention was given to revising the Act's permit provisions. As an outgrowth of the interest in permit issues and because of the need to update its regulations and implement the amendments, the National Marine Fisheries Service undertook a comprehensive review of its permit program in 1988.

The first formal step in the Service's permit review was publication, in March 1989, of a discussion paper entitled "Permit Policies and Procedures for Scientific Research and Public Display under the Marine Mammal Protection Act and the Endangered Species Act." The discussion paper described the applicable law and Service policies with respect to public display permits, scientific research permits, enhancement permits, and the relationship between permits and the National Environmental Policy Act.

As noted in the Annual Report for 1989, the Commission, by letter of 24 August 1989, provided extensive comments on the discussion paper. Among

other things, the Commission provided a possible definition of public display; recommended that the Animal and Plant Health Inspection Service's marine mammal care and maintenance regulations be reviewed and, as necessary, revised; provided comments on the Service's interim policy on education and conservation programs required of public display permit holders; suggested basic information requirements for scientific research permit applications and subsequent reports; proposed criteria for reviewing enhancement permits; recommended that the Service re-examine the legal status of the progeny of pre-Act marine mammals under the Marine Mammal Protection Act; recommended that the Federal agencies sharing responsibility for marine mammal management adopt more consistent administrative practices; and asked that the Service consider whether and when capture and temporary maintenance of marine mammals pending completion of a permanent facility might be appropriate.

In addition to soliciting written comments on its discussion paper, the Service convened a series of working sessions on various aspects of its permit program to secure additional public comment and to foster greater discussion of the major issues. In late 1989 and early 1990, workshops were held on the following topics: (1) the definition of public display; (2) scientific research permits; (3) care and maintenance standards for captive marine mammals; (4) public display education and conservation programs; and (5) application of the National Environmental Policy Act.

Based on its discussion paper, comments received, and information generated at the working sessions, the Service is revising its permit regulations. The Service originally had hoped to have a draft proposed rule available for interagency review in March 1990. A draft proposed rule is now expected to be completed for publication and review early in 1992.

Although the National Marine Fisheries Service has yet to publish its proposed revisions to the permit regulations, the Service has taken steps to institute some of the Commission recommendations noted above. As discussed in Chapter XI, the Service has agreed to participate in an interagency review of the Animal and Plant Health Inspection Service's marine mammal care and maintenance regulations.

As recommended by the Commission, the Service re-examined the applicability of the Marine Mammal Protection Act's pre-Act exception (section 102(e)) to the captive-born progeny of marine mammals held in captivity before 21 December 1972, the effective date of the Act. Under the Service's earlier interpretation, all offspring of marine mammals taken before that date, regardless of when they were born, were considered to be pre-Act animals. In a 5 September 1991 *Federal Register* notice, the Service published a revised interpretation of its regulations clarifying that the Act's pre-Act exception applies only to marine mammals "taken" before the effective date of the Act. Under the new interpretation "[a]ny person or facility that seeks to purchase, sell, or transport any marine mammal born in captivity after December 21, 1972, must obtain prior authorization...to do so." This interpretation is consistent with the long-held policy of the Fish and Wildlife Service for species under the jurisdiction of the Department of the Interior.

As discussed in the previous Annual Report, the Commission, on 12 March 1990, wrote to the Fish and Wildlife Service, noting that Service representatives had participated in most of the National Marine Fisheries Service's permit working sessions and recommending that the two agencies continue to work together to ensure consistent interpretation and implementation of the 1988 amendments to the Marine Mammal Protection Act and other permit requirements. The Fish and Wildlife Service has informed the Commission that it intends to defer adoption of revised permit regulations until the National Marine Fisheries Service has completed its review and published proposed regulations. At that time, it is expected that the Fish and Wildlife Service will propose regulations that are either similar or identical to those of the National Marine Fisheries Service.

Implementation of the 1988 Amendments to the Marine Mammal Protection Act

The Marine Mammal Protection Act provisions governing scientific research and public display permits were amended in 1988, and a new permit category was created allowing the Services to autho-

rize activities designed to enhance the survival or recovery of marine mammal populations. Also, under the amendments, marine mammals that were pregnant or nursing at the time of taking or less than eight months old may now be imported for public display if it is determined that such importation is necessary for the protection or welfare of the animal.

The amendments specify that public display permits may be issued only to an applicant that offers an acceptable education or conservation program, based upon professionally recognized standards of the public display community, and whose facility is open to the general public on a regularly scheduled basis. For scientific research permits, the amendment requires the Service to determine that the proposed taking is necessary to further a *bona fide* scientific research need and does not unnecessarily duplicate other research. Lethal research on marine mammals can be authorized only if the applicant demonstrates that non-lethal alternatives are not feasible. In the case of lethal research involving depleted marine mammals, a take also may be authorized only if the Service first determines that the research will directly benefit the affected species or stock or fulfills a critically important research need.

The amendments enable the National Marine Fisheries Service and the Fish and Wildlife Service to issue enhancement permits to authorize activities designed to contribute significantly to increasing or maintaining the distribution or size of a marine mammal population. Any such permit must be consistent with applicable conservation or recovery plans. Captive maintenance of depleted marine mammals under this authority is permitted only if the Service: (1) finds that such maintenance is likely to contribute to the survival or recovery of the species or stock; (2) determines that the expected benefit to the species or stock outweighs the likely benefit of alternatives that do not involve the removal of animals from the wild; and (3) requires that animals removed from the wild and their progeny be returned to their natural habitat as soon as feasible.

As discussed above, the National Marine Fisheries Service has undertaken a comprehensive review of its permit program. One issue being examined in the review is how to implement the 1988 amendments. For example, the Service is examining what constitutes an acceptable education or conservation program at a public display facility; how to determine if proposed research is *bona fide* and non-duplicative; and how to implement the new enhancement authority. The Service expects to publish proposed rules to implement these provisions early in 1992. The Fish and Wildlife Service continues to implement the 1988 amendments regarding permits on an *ad hoc* basis and intends to defer revision of its permit regulations until it has reviewed the proposed regulations being drafted by the National Marine Fisheries Service.

Permits have yet to be issued under the new enhancement permit authority enacted in 1988. However, certain activities previously characterized as research (*e.g.*, the Hawaiian monk seal head start program) may more appropriately be characterized as enhancement activities in the future. As such, the Commission expects that permits will soon be requested and issued under this authority.

Swim-with-the-Dolphin Programs

In 1985, the National Marine Fisheries Service authorized a facility maintaining bottlenose dolphins under a public display permit to conduct a program in which members of the public are allowed to enter the water and interact with the animals. Authorizations for two additional facilities to conduct swim-with-the-dolphin programs were issued in 1987 and another was issued in 1988. Because of possible health and safety risks to both dolphin and human participants, the Commission and the National Marine Fisheries Service have considered these swim-with-the-dolphin programs to be experimental, and the programs have been authorized by the Service on a provisional basis.

On 25 August 1988, the Service initiated a review of swim-with-the-dolphin program operations and their effects. On 30 September 1988, the Service advised all public display permit holders that specific authorization was needed to conduct swim-with-the-dolphin-programs and that such authorizations would be issued only until 31 December 1989, by which time the Service expected to have completed its review.

On 1 November 1989, the Service, in response to considerable public controversy generated by these programs, issued a Draft Environmental Impact Statement to evaluate the effects of continuing to use dolphins in swim programs. The Commission commented on the Draft Environmental Impact Statement by letter of 5 February 1990. The Commission recommended that, pending completion of the Service's review, no additional animals be removed from the wild for swim programs and no additional swim programs be authorized. The Commission also recommended that: new conditions be designed to mitigate potential adverse impacts of the existing programs on the well-being of dolphins and humans; substantially improved reporting requirements be established; the requirements be carefully structured to obtain, to the maximum extent possible, information useful in assessing the effects of swim programs; and thorough, consistent, and effective monitoring and enforcement of the four programs be established and carried out by the National Marine Fisheries Service to ensure that they are being conducted as responsibly and safely as possible and that required reports are submitted as specified.

A Final Environmental Impact Statement was published in April 1990. Under the Service's preferred alternative, the four existing swim-with-the-dolphin programs would be continued on an experimental basis while a one-year study on the effects of the programs was conducted. The four permits were subsequently extended until 31 December 1991.

On 9 August 1990, the Commission, at the request of the National Marine Fisheries Service, convened a workshop to develop recommended protocols for a study or studies to determine the relative risks and benefits of swim-with-the-dolphin programs. Workshop recommendations included, among other things, the close observation of and recording of the behavior of the dolphins involved, the conduct of quarterly site visits to each swim program facility by a behavioral observation team, to coincide with quarterly veterinary examinations of the dolphins involved in the swim program and control group animals; the establishment of an advisory panel of veterinarians to review the results of veterinary examinations and to consult with the behavioral observation team on the analysis and interpretation of medical data relative to behavioral data; and, prior to implementing any of the workshop recommendations, the Service's convening a meeting of the operators of swim-with-the-dolphin programs to discuss the findings and recommendations contained in the report.

In a 7 March 1991 letter to the National Marine Fisheries Service, the Commission concurred with the workshop recommendations. To expedite the review of swim-with-the-dolphin programs, the Commission recommended that medical and behavioral protocols and standardized reporting forms be drafted by the medical and behavioral teams in consultation with the responsible veterinarians at facilities operating experimental swim programs. If this were to be done prior to the Service's meeting with swim program operators, it would afford operators, attending veterinarians, and program staff the opportunity to review and comment on both the draft protocols and the study design. Toward this end, the Commission also recommended that the Service develop terms of reference for and constitute an advisory panel and behavioral observation team.

The Commission further recommended that, once drafts of the recommended medical and behavioral protocols were completed, the Service convene a meeting of the medical and behavioral teams, swim program operators, program veterinarians, and program staffs to discuss the findings and recommendations of the workshop report, and review and finalize the medical and behavioral monitoring protocols and the standardized checklists and reporting forms. The Commission recommended that, upon finalizing the protocols, the Service initiate an assessment program.

On 5 December 1991, the Service requested proposals from researchers interested in designing and conducting a study of swim-with-the-dolphin programs. The contractor selected would be expected to collect data on the behavior and health of dolphins participating in swim programs and to assess the effects of the programs. The Service expects to issue a contract for the study early in 1992. To enable the existing programs to continue on an experimental basis during the study, the Service, on 31 December 1991, extended authority under the four permits until 30 June 1993.

Feeding Wild Marine Mammals

In 1988, the Commission became aware that certain operators conducting commercial dolphin-watching trips in the Gulf of Mexico had begun feeding the dolphins as part of their tours. The Commission referred the matter to the National Marine Fisheries Service, noting that feeding wild dolphins was contrary to the provisions of the Marine Mammal Protection Act and could have adverse effects on the dolphins.

Recognizing that dolphin-feeding may constitute a "take" under the Marine Mammal Protection Act, one operator, on 25 January 1989, requested a public display permit to approach by boat, observe, and feed bottlenose dolphins in the Corpus Christi Ship Canal. After a thorough review of the issue, the Commission concluded that wild dolphin feeding programs, even those conducted with the utmost care and best of intentions, could adversely affect the dolphins. By letter of 21 December 1989, it therefore recommended that the permit be denied. Among the considerations that led to its conclusion were that feeding programs may (1) cause dolphins to be attracted to fishing boats and other vessels, increasing the likelihood that they will become entangled in fishing gear, be struck by vessels, or be shot, poisoned, or fed foreign objects; (2) cause animals to become dependent on such food sources and become less able to find and catch natural prey when feeding is discontinued; (3) alter migratory patterns, thereby subjecting animals to food shortages or inhospitable conditions that otherwise would be avoided; (4) condition animals to expect food from people, causing aggressive behavior when food is not offered; and (5) expose animals to and make them more susceptible to disease.

The Commission further recommended that the Service advise those conducting or contemplating programs in which wild marine mammals are fed that such programs constitute an unauthorized take under the Marine Mammal Protection Act. Tours that provide opportunities for observing dolphins, but which do not involve feeding, may, however, be conducted legally in ways that do not harass or otherwise take the animals. The Commission noted that guidance on such activities should be provided in whale-watching regulations currently being considered by the Service.

On 15 June 1990, the National Marine Fisheries Service denied the request for the dolphin feeding/public display permit, citing its belief that these programs are not consistent with the purposes and policies of the Marine Mammal Protection Act. In addition, on 29 August 1990, the Service published a policy statement in the *Federal Register* advising that it would no longer accept or review public display permit applications seeking authorization to feed marine mammals in the wild.

In light of its published policy statement, the Service, on 20 September 1990, returned an application from another tour operator who was seeking authority to conduct a dolphin-feeding program under a joint public display/scientific research permit. The Service advised the applicants that the joint permit request could not be processed and suggested that a revised application for the scientific research aspects might be submitted. A scientific research permit application was subsequently filed with the Service on 22 October 1990, but was found to be deficient. The applicants were advised that they had not provided sufficient information to demonstrate that the proposed taking would be necessary to further a *bona fide* scientific purpose and would not unnecessarily duplicate other research.

To avoid any possible misunderstanding as to whether feeding wild marine mammals constitutes a take and is therefore a violation of the Marine Mammal Protection Act, the Service, by *Federal Register* notice of 29 August 1990, proposed to revise its regulatory definition of the term "take." The proposed revision would clarify that taking includes "feeding or attempting to feed a marine mammal in the wild in any manner."

By letter of 11 December 1990, the Commission supported adoption of the rule as proposed. The Commission's letter noted that feeding wild marine mammals could be harmful to the animals and that the proposed regulatory definition was consistent with the underlying statutory definition of the term "take."

The Service issued a final rule on 20 March 1991 to amend the definition of the term "take" to include feeding or attempting to feed marine mammals in the wild. As promulgated, the rule applies to feeding all wild marine mammals under the jurisdiction of the National Marine Fisheries Service, not only dolphins. The rule also defined "feeding" to mean "offering, giving or attempting to give food or non-food items to marine mammals in the wild...including operating a vessel or providing other platforms from which feeding is conducted or supported." Feeding does not include the routine discard of bycatch during fishing operations or the otherwise legal, routine discharge of waste or fish by-products from fish processing plants. The Fish and Wildlife Service has not adopted comparable feeding regulations for species under its jurisdiction.

On 19 April 1991, the effective date of the new regulatory definitions, the tour operators who had requested authority to conduct a dolphin-feeding program under a scientific research permit filed suit in the U.S. District Court for the Southern District of Texas (*Strong* v. *United States*) seeking either to invalidate the new regulations or to compel issuance of a permit. Plaintiffs argued that broadening the regulatory definition of "take" to include feeding marine mammals was inconsistent with the statutory definition of the term, that the rule was arbitrary and capricious because there is no scientific evidence that feeding dolphins actually harms the animals, and that the Service acted arbitrarily by applying the feeding prohibition to them but not to commercial fishermen.

The court issued a temporary restraining order on 19 April 1991, enjoining enforcement of the ban on feeding wild marine mammals, but only as it pertains to the plaintiffs. In issuing the order, the court expressed doubt that the Marine Mammal Protection Act's prohibition on taking can be read to ban dolphin feeding and noted that the plaintiff's dolphin-feeding cruises are probably harmless to the dolphins, but are valuable to people. The temporary restraining order was extended pending a hearing on the merits of the case.

The Federal defendants filed a motion for summary judgment on 5 June 1991, arguing, among other things, that marine mammal feeding constitutes a form of harassment, is likely to alter marine mammal behavior, and poses significant risks to the animals. Plaintiffs filed a cross-motion for summary judgment on 18 June 1991. A hearing on the matter was held in Corpus Christi, Texas, on 19 December 1991 and a decision on the matter is expected in 1992.

Other Litigation

The Marine Mammal Protection Act allows both permit applicants and those opposed to issuance of a permit to seek judicial review of the terms and conditions of any permit issued under section 104 of the Act or of the denial of such a permit. In recent years, permit-related litigation has increased. In addition to *Strong* v. *United States*, the dolphin-feeding case discussed above, the following cases were pending at the end of 1991.

Animal Protection Institute v. *Mosbacher*

On 28 April 1989, the National Marine Fisheries Service issued a public display permit to the John G. Shedd Aquarium authorizing the importation of up to six false killer whales (*Pseudorca crassidens*) already held captive in Japan. The Sierra Club Legal Defense Fund, on behalf of the Animal Protection Institute and other environmental and animal welfare groups, filed suit on 12 June 1989 challenging issuance of that permit. The plaintiff's suit challenges some of the Service's basic interpretations of the Marine Mammal Protection Act with respect to public display permits. The Shedd Aquarium and the American Association of Zoological Parks and Aquariums filed for and, on 11 September 1989, were granted intervenor status in the case.

In a motion for summary judgment filed on 17 January 1990, plaintiffs alleged that issuance of the permit violated section 101(a)(3)(A) of the Marine Mammal Protection Act because the Service had not certified that the program for taking marine mammals in Japan is consistent with the provisions and policies of the Marine Mammal Protection Act. Plaintiffs also contended that, before a public display permit could properly be issued, the Service was required, through the formal rulemaking procedures of section 103, to

determine that the affected population was within its optimum sustainable population level and to establish a quota for allowable takes. In addition, the plaintiffs asserted that the Service, in violation of section 102(b) of the Act, failed to obtain sufficient information from the applicant to determine that the animals to be imported were not pregnant at the time of taking, nursing at the time of taking or less than eight months old, or taken in a manner deemed inhumane by the Secretary.

Federal defendants also filed a motion for summary judgment on 17 January 1990. In response to the plaintiff's claims, the defendants maintained that: section 101(a)(3)(A) applies only to waivers of the Act's moratorium on taking and importing marine mammals, and no certification of foreign consistency is required for public display permits; a formal determination of a stock's status relative to its optimum sustainable population is not a prerequisite for issuance of a public display permit; the Service properly determined that permit issuance would not adversely affect the wild false killer whale population, since the requested animals were already being maintained in captivity; and minimum size requirements and other conditions set forth in the permit assured that young, unweaned animals, pregnant or nursing females, and animals taken in an inhumane manner would not be imported.

Briefing of the case was completed in February 1990. The Shedd Aquarium has voluntarily agreed to provide all parties to the litigation at least 30 days' notice, should it decide to exercise its authority under the permit to import the whales. At the end of 1991 the U.S. District Court had yet to schedule oral argument in the case.

Kama v. *New England Aquarium*

Kama, a captive-born bottlenose dolphin formerly maintained at the New England Aquarium under a public display permit, was transferred to the U.S. Navy in 1987 under a letter of agreement issued by the National Marine Fisheries Service. The Navy, through a separate letter of agreement, was authorized to maintain the dolphin under the terms and conditions of its existing scientific research permit.

On 14 June 1991, Citizens to End Animal Suffering and Exploitation (CEASE) and other groups filed suit on behalf of Kama against the New England Aquarium, the Department of Commerce, and the Navy seeking to compel return of the dolphin to the Aquarium. Plaintiffs alleged that transfers of marine mammals between facilities could be authorized only by permit and that the Service's practice of authorizing such transfers under letters of agreement violated the Marine Mammal Protection Act. Similarly, allegations were made that the Service improperly authorized the taking and sale of beached and stranded marine mammals under letters of agreement. In addition, plaintiffs asserted that the Service had violated the National Environmental Policy Act by failing to analyze the impacts of authorizing the taking, purchase, sale, and transport of marine mammals under letters of agreement.

Plaintiffs also claimed that the National Marine Fisheries Service violated the Act by modifying permits without prior public notice when the modification would neither increase the number of marine mammals authorized to be taken nor pose increased risks to the animals. Based on this premise, plaintiffs are also seeking to invalidate the Service's two-year extension of a public display permit issued to the New England Aquarium to collect bottlenose dolphins.

The New England Aquarium filed a counterclaim on 17 September 1991, claiming abuse of process and defamation by the plaintiffs. The Aquarium has alleged that plaintiffs knew that its original claims were without merit and waited too long to bring their claims. It is seeking $3 million in damages for abuse of process. The Aquarium has also charged that plaintiffs have made false and defamatory statements regarding the Aquarium and is seeking an additional $2 million in damages.

At the end of 1991, Federal defendants were preparing a motion for summary judgment, which they expected to file early in 1992.

Chapter XI

MARINE MAMMALS IN CAPTIVITY

Under the Marine Mammal Protection Act, permits to take marine mammals for purposes of public display, scientific research, and species enhancement may be issued by either the Secretary of Commerce or the Secretary of the Interior, depending upon the species of marine mammal involved. Such permits are to specify the methods of capture, supervision, care, and transportation that must be followed during and after the taking, including requirements for maintaining the animals in captivity. In addition, the Department of Agriculture's Animal and Plant Health Inspection Service regulates the handling, care, treatment, and transportation of captive marine mammals under the Animal Welfare Act. Since its inception, the Marine Mammal Commission has tried to ensure the safety and well-being of marine mammals maintained in captivity. Activities regarding the development and possible revision of applicable standards are discussed below.

Animal Welfare Act

In 1979, the National Marine Fisheries Service, the Fish and Wildlife Service, and the Animal and Plant Health Inspection Service entered into a cooperative agreement to promote the effective implementation of standards governing the humane handling, care, treatment, and transportation of captive marine mammals. In particular, the agreement seeks to (1) ensure uniform application of the standards; (2) provide appropriate and consistent guidance to persons responsible for captive marine mammals; and (3) ensure the effective utilization of the personnel and unique capabilities of each agency, with minimal duplication of effort.

Also in 1979, the Animal and Plant Health Inspection Service issued Standards and Regulations for the Humane Handling, Care, Treatment, and Transportation of Marine Mammals under the authority of the Animal Welfare Act. The standards establish minimum requirements for the care, maintenance, and transportation of captive marine mammals that apply to dealers, exhibitors, researchers, carriers, and intermediate handlers. All persons or facilities maintaining marine mammals in captivity in the United States for purposes of public display, scientific research, or species enhancement must obtain licenses from the Animal and Plant Health Inspection Service; they must also maintain those marine mammals in compliance with the standards. A variance may be obtained to allow a limited time for modifying existing facilities, constructing new facilities, or taking other actions necessary to achieve full compliance.

The standards were last amended by the Service in 1984. Significant areas covered by the amendments included space requirements for primary enclosures for certain marine mammals, procedures for granting variances, construction requirements for marine mammal facilities, requirements for accompanying pinnipeds during transport, and specifications for holding areas for marine mammals temporarily maintained at airports or elsewhere during shipment.

Review and Revision of Marine Mammal Care and Maintenance Standards

On 29 May 1990, representatives of the Animal and Plant Health Inspection Service, the National Marine Fisheries Service, the Fish and Wildlife Service, and the Marine Mammal Commission met to discuss possible revisions of the Animal and Plant Health Inspection Service's standards governing the humane handling, care, treatment, and transportation of captive marine mammals. At the meeting, agency representatives agreed that a review of the standards was desirable and they adopted a general schedule as follows: (1) development of a discussion paper by the

Marine Mammal Commission to assist the Services in drafting revised regulations; (2) development of draft regulations by the Services and review by a working group consisting of representatives from the four Federal agencies and representatives of the research, public display, and environmental communities; and (3) publication of proposed regulations by the Services for a 60-day comment period.

As discussed in Chapter X, the National Marine Fisheries Service held a series of working sessions on permit-related issues in 1989. One session addressed care and maintenance standards for marine mammals. After considering the issues raised during this working session and identifying ambiguities in the existing standards, the Marine Mammal Commission prepared a discussion paper setting forth a number of questions to be addressed in the interagency review. These questions addressed both shortcomings in the existing standards and issues not previously dealt with in the standards.

On 31 July 1991, the Commission provided the Services with its discussion paper. In the transmittal letter to the Animal and Plant Health Inspection Service, the Commission noted that a prompt review of the standards and regulations was needed and it recommended that, if the Service's workload is such that a review could not proceed quickly, the National Marine Fisheries Service, under its authority over captive marine mammals as provided by the Marine Mammal Protection Act, should assume primary responsibility for undertaking the review.

On 11 September 1991, the Animal and Plant Health Inspection Service responded to the Commission's July letter. The Service indicated that an internal review of the standards was under way and that the Commission's discussion paper would be used to guide development of revised standards. The Commission replied to the Service's letter on 20 December 1991, expressing concern that the Service might not be aware of the agreement among the Service, the National Marine Fisheries Service, the Fish and Wildlife Service, and the Commission that the review be conducted as an interagency effort. The Commission stressed the need for prompt action, commencing with a meeting of representatives of the three Services and the Commission to establish a timetable and plan for carrying out the review. The Commission expects a response to its letter by the end of January 1992.

Lacey Act

As discussed above, the transport of marine mammals is regulated by the Animal and Plant Health Inspection Service under the Animal Welfare Act and by the National Marine Fisheries Service and the Fish and Wildlife Service under the Marine Mammal Protection Act. In addition, the Lacey Act Amendments of 1981 direct the Secretary of the Interior to prescribe requirements for the humane and healthful transport of wild animals and birds, including marine mammals, shipped to the United States. A final rule establishing transport standards for mammals and birds was published on 10 November 1987; it was to take effect 90 days later.

Before the final rule became effective, however, a significant number of adverse comments were submitted to the Service. Commentors noted that compliance with the regulations could result in inhumane treatment of some animals. It also was argued that the regulations would, in some cases, be difficult to enforce and, without good reason, would make it virtually impossible to transport some types of animals. On 8 February 1988, the date the regulations would have taken effect, the Service postponed the effective date until 1 August 1988 to provide time to thoroughly evaluate these assertions. On 1 March 1988, animal welfare groups brought suit against the Service, seeking to have the regulations take effect immediately. The District Court for the District of Columbia, on 18 April 1988, ruled that the delay in implementing the transport regulations was without good cause and issued a preliminary injunction establishing 8 February 1988 as the effective date of the rule.

Subsequently, the Service undertook a review of the regulations to identify those provisions that were in need of amendment or clarification. It published a notice of intent to amend the regulations and indicated those provisions of the rule that appeared to warrant change. Based upon that review, the Service published a *Federal Register* notice on 15 October 1990,

proposing amendments to the rules. With respect to the marine mammal section of the regulations, the proposed amendments were limited to editorial changes, including the elimination of duplicative provisions.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed and provided comments on the proposed regulations on 4 January 1991. The Commission supported adoption of the proposed rule with certain modifications, including a reduction in the length of time before departure that a marine mammal may be consigned to a carrier. The Commission strongly supported the requirement that marine mammals be accompanied in shipment by individuals knowledgeable in their care, and noted that the effectiveness of this requirement would be enhanced if the carrier were required to inform the caretaker of any unexpected delays during transport and, except as precluded by safety considerations, accommodate requests by the caretaker for access to the animal. In addition, the Commission recommended that Fish and Wildlife Service representatives participating in efforts to develop international animal transport standards pursuant to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) seek agreement on terms consistent with those issued under the Animal Welfare Act and the Lacey Act Amendments of 1981.

At the end of 1991, a final rule had been drafted and was undergoing legal review. Publication of the final rule is expected early in 1992.

APPENDIX A

COMMISSION RECOMMENDATIONS: CALENDAR YEAR 1991

4 January	Interior; commenting to Fish and Wildlife Service on proposed changes to regulations governing the humane and healthful transport of wild animals and birds in the United States; recommending adoption, subject to modifications to (1) reduce the allowed length of time which animals may be consigned to a carrier prior to departure and (2) require shipped animals to be accompanied by individuals knowledgeable in marine mammal care; and further recommending that the Service seek an international agreement on international transport standards for live animals pursuant to the Convention on International Trade in Endangered Species of Wild Fauna and Flora.
10 January	Commerce; modification of scientific research permit, Bernd Würsig and Salvatore Cercio.
16 January	Commerce; modification of scientific research permit, Daniel P. Costa.
17 January	Commerce; modification of scientific research permit, Walter H. Munk.
17 January	Commerce; modification of scientific research permit, James H.W. Hain.
17 January	Commerce; scientific research permit, Southwest Fisheries Center.
17 January	Commerce; public display permit, Mary A. Olson.
17 January	Commerce; modification of scientific research permit, James T. Harvey and Daniel P. Costa.
17 January	Interior; modification of scientific research permit, National Ecology Center, Fish and Wildlife Service.
7 February	Commerce; commenting to the National Marine Fisheries Service on the incidental take of Hawaiian monk seals by longline fishermen in the Northwestern Hawaiian Islands; and recommending that the Service (1) re-initiate consultations pursuant to section 7 of the Endangered Species Act on the impact of the fishery on monk seals, and (2) immediately suspend all longline fishing in areas where monk seals may be affected until it can ensure that such fishing is not likely to jeopardize the continued existence of the species.
8 February	Navy; commenting to the Division of Installations and Environment on the use of Sea Lion Rock as a site to practice bombing and low level approaches by Navy aircraft; and recommending that such uses of Sea Lion Rock be terminated due to effects on marine mammals, migratory birds, and other wildlife.
11 February	State of Florida; commenting to the Governor and other members of the Florida Cabinet on boat speed restrictions to protect manatees in Palm Beach County; and recommending adoption of proposed restrictions.
13 February	Interior; modification of scientific research permit, EBASCO Environmental.
13 February	Commerce; public display permit, John G. Shedd Aquarium.
14 February	Commerce; modification of scientific research permit, LGL Alaska Research Associates.
15 February	Interior; request for renewal of scientific research permit, Natural History Museum of Los Angeles County.
19 February	Commerce; scientific research permit, Dan R. Salden.

21 February	Commerce; commenting to the National Marine Fisheries Service on a draft report to Congress concerning U.S. actions to address large-scale high seas driftnet fishing pursuant to the Driftnet Act Amendments of 1990; expressing concern that all appropriate steps are not being taken to prepare for future international meetings in response to the United Nations General Assembly call for a moratorium on driftnet fisheries after 30 June 1992; and recommending, among other things, that a meeting of U.S. experts be convened to develop an agreed domestic position and approach to help implement the moratorium provisions.
21 February	Commerce; commenting to the National Marine Fisheries Service on the taking of Hawaiian monk seals incidental to longline fishing; supporting a Service decision to require observers on board all longline fishing vessels operating within a 50-mile study zone around the Northwestern Hawaiian Islands, and to initiate steps to prohibit fishing within that area; and recommending that (1) observers be required aboard fishing vessels operating between 50 and 100 nautical miles of the Northwestern Hawaiian Islands; (2) monk seal haulout beaches be monitored closely during the fishing season for evidence of interactions with the fishery; and (3) consideration be given to requiring longline fishing vessels to carry real-time vessel locating transmitters.
21 February	Commerce; modification of scientific research permit, North Gulf Oceanic Society.
22 February	Interior; modification of scientific research permit, Alaska Fish and Wildlife Research Center.
5 March	Commerce; modification of scientific research permit, C. Scott Baker, National Cancer Institute.
5 March	Commerce; modification of scientific research permit, Cetacean Research Unit.
6 March	Commerce; modification of scientific research permit, North Gulf Oceanic Society.
7 March	Commerce; commenting to the National Marine Fisheries Service on the report of a workshop to design a study of the risks and benefits of swim-with-the-dolphin programs; concurring with recommendations in the report; and recommending, among other things, that medical and behavioral protocols and standardized reporting forms be drafted and reviewed by program operators, attending veterinarians, and program staffs.
8 March	State; commenting to the Bureau of Oceans and International Environmental and Scientific Affairs on the draft Protocol to the Antarctic Treaty on Environmental Protection; noting substantive progress in the areas of environmental protection and conservation; and recommending certain specific textual changes.
13 March	Commerce; scientific research permit, Bernd Würsig and Graham A.J. Worthy.
13 March	Commerce; scientific research permit, Steven K. Katona.
15 March	Commerce; modification of scientific research permit, Southwest Fisheries Science Center.
15 March	Commerce; scientific research permit, All-Union Scientific Research Institute of Fisheries and Oceanography, U.S.S.R.
15 March	Commerce; public display permit, Singapore Zoological Gardens.
15 March	Commerce; modification of scientific research permit, Jan Straley.
15 March	Interior; modification of scientific research permit, Mote Marine Laboratory.
18 March	National Science Foundation; commenting to the Division of Polar Programs on the Draft Supplemental Environmental Impact Statement for the United States Antarctic Program; noting, among other things, that the statement does not describe or evaluate either the possible environmental impacts of the various program components or the Division's responsibilities for ensuring that non-governmental expeditions involving U.S. citizens comply with relevant measures such as the Antarctic Conservation Act or the

	Marine Mammal Protection Act; and recommending, among other things, that the statement address possible environmental impacts and describe procedures to assess and minimize possible adverse effects of research activities.
21 March	Commerce; scientific permit application, Northeast Fisheries Center.
22 March	State of Florida; commenting to the Marine Fisheries Commission on manatee deaths incidental to commercial shrimp fishing operations in inland waters of Florida and Georgia; and recommending that the Commission consider (1) closing certain manatee habitat areas to inland shrimp fisheries; (2) improving monitoring programs to identify locations, times, and frequency of lethal and non-lethal interactions between manatees and shrimpers and steps that might be taken to avoid them; and (3) the use of area, gear, season, and/or operating restrictions to help avoid the potential for manatee deaths due to shrimping.
25 March	Commerce; scientific research permit, Center for Coastal Studies.
26 March	Commerce; public display permit, Brookfield Zoo.
28 March	Commerce; scientific research permit, Department of Veterinary Pathology, Department of Defense.
28 March	Commerce; scientific research permit, James T. Harvey.
1 April	Commerce; commenting to the National Marine Fisheries Service on Amendment 4 to the Bottomfish Fishery Management Plan for the Western Pacific Region; and recommending, among other things, revising the proposed amendment to require observer coverage of at least 30 percent of the fishing trips to the Northwestern Hawaiian Islands until such time that it is clear that lethal taking of monk seals is avoided.
9 April	Commerce; commenting to the National Ocean Service on the Draft Environmental Impact Statement/Management Plan on the Proposed Stellwagen Bank National Marine Sanctuary; and recommending, among other things that (1) the Service proceed with efforts to implement the sanctuary management program, (2) the statement be expanded to provide a more thorough description of the possible effects of commercial and recreational fishing on marine mammals and other species, and (3) the sanctuary designation document be expanded to identify commercial and recreational fishing as activities that could be subject to regulation.
15 April	Interior; modification of scientific research permit, Southwest Fisheries Science Center.
18 April	Interior; commenting to the Fish and Wildlife Service on a proposed rule authorizing for five years the non-lethal take of walruses and polar bears incidental to oil and gas exploration activities in the Chukchi Sea; and recommending, among other things, that (1) the Service estimate the numbers of walruses and polar bears that may be taken and explain its rationale for determining that they constitute "small numbers," as required by the Marine Mammal Protection Act, and (2) the proposed rule be amended to provide the Commission and the public an opportunity to review and comment on specific proposed exploratory activities and monitoring programs before letters of authorization are issued.
19 April	Commerce; scientific research permit, Southwest Fisheries Science Center.
19 April	Commerce; public display permit, Sea World, Inc.
19 April	Commerce; commenting to the National Marine Fisheries Service on the proposed Amendment 2 to the Fishery Management Plan for the Pelagic Fisheries of the Western Pacific Region; and recommending, among other things, that (1) the proposed Amendment be changed to incorporate an emergency measure proposed by the Western Pacific Fishery Management Council to ban longline fishing within 50 nautical miles of the Northwestern Hawaiian Islands; (2) the proposed Amendment's protected species study area be expanded; (3) fishing permit renewals be contingent in part upon compliance with provisions for the area closure; and (4) consideration be given to a new provision requiring that all fishing vessels carry satellite-linked radio transmitters for real-time vessel tracking.

22 April	Commerce; scientific research permit, National Marine Mammal Laboratory.
23 April	Commerce; commenting to the National Marine Fisheries Service on an emergency closure of waters within 50 nautical miles of the Northwestern Hawaiian Islands to pelagic longline fishing; and recommending that the Service takes steps to make the emergency closure permanent.
29 April	Commerce; public display permit, Mount Desert Oceanarium.
29 April	Commerce; scientific research permit, Frank T. Awbrey.
29 April	Commerce; scientific research permit, Southeast Fisheries Science Center.
7 May	Interior; modification of scientific research permit, Alaska Regional Office, Fish and Wildlife Service.
7 May	Commerce; modification of scientific research permit, Southwest Fisheries Science Center.
8 May	Interior; commenting to the Fish and Wildlife Service on a proposed list of species protected under the Cartagena Convention Protocol on Specially Protected Areas and Wildlife; and recommending that marine mammal species be listed individually and that the Service take steps to encourage development of a manatee recovery plan for the Wider Caribbean region under the Protocol.
9 May	Interior; commenting to the Fish and Wildlife Service on use of Sea Lion Rock for practice bombing by the Navy; and recommending that the Service no longer allow such uses.
10 May	Commerce, scientific research permit, California Marine Mammal Center.
10 May	Commerce; commenting to the National Marine Fisheries Service on a request by Shell Western E&P Inc. for a letter of authorization to allow non-lethal takes of bowhead, gray, and beluga whales and bearded, ringed, and spotted seals incidental to exploratory offshore oil and gas drilling operations in the Chukchi Sea; and recommending, among other things, that the applicant be asked to convene an independent group of experts to review and provide advice on design and proposed methods for collecting and analyzing data from aerial surveys and other studies being planned as part of the program to monitor marine mammals and possible interactions between them and oil and gas exploratory activities.
13 May	Commerce; commenting to the National Marine Fisheries Service on the die-off of several species of seals along Long Island, New York; and recommending, among other things, that a medical director be appointed to oversee investigation of the die-off and that a team of experts be convened to meet with the medical director and the Stranding Coordinator to review and evaluate circumstances surrounding the seal deaths.
13 May	Commerce; commenting to the National Marine Fisheries Service on the Technical Draft Recovery Plan for the Steller Sea Lion; and recommending, among other things, that the Service (1) complete, adopt, and implement the plan as soon as possible and (2) take steps to (a) appoint or hire a full-time coordinator for Steller sea lion activities; (b) reconvene the Recovery Team; and (c) develop an implementation plan and strategy for assigning priorities and defining involvement of other agencies in the implementation process.
14 May	Interior; modification of scientific research permit, Fish and Wildlife Enhancement Division, Fish and Wildlife Service.
20 May	Interior; Request for renewal of scientific research permit, EBASCO Environmental.
23 May	Interior; scientific research permit, Alaska Fish and Wildlife Research Center.
24 May	Commerce; commenting to the National Marine Fisheries Service on a request by ARCO Alaska, Inc. for a letter of authorization to take bowhead, gray, and beluga whales and bearded, ringed, and spotted seals incidental to oil and gas exploration activities during 1991-1992; and recommending, among other

things, that the Service advise the applicant that, if walruses and polar bears may be taken, the applicant must also obtain a letter of authorization from the Fish and Wildlife Service.

31 May — Commerce; commenting to the National Marine Fisheries Service on a petition to designate three areas as critical habitat for right whales under the Endangered Species Act; providing a report assessing the justification for doing so; and recommending, among other things, that the Service proceed with actions to formally propose and designate all three areas.

31 May — State of Florida; commenting to the Department of Natural Resources on its proposed rules to restrict boat speeds in Volusia County and parts of adjacent counties; and recommending adoption of the proposed rule.

3 June — Commerce; scientific research permit, National Marine Mammal Laboratory.

12 June — Commerce; modification of scientific research permit, Randall S. Wells.

12 June — Commerce; commenting to the National Marine Fisheries Service on an emergency Endangered Species Act permit request to authorize euthanizing a male Hawaiian monk seal responsible for the deaths of four weaned monk seal pups at French Frigate Shoals; noting that the proposed taking is authorized under the Marine Mammal Protection Act, and recommending that the request be granted.

14 June — North Pacific Fisheries Management Council; commenting on the proposed Amendments 17 and 22 to the Groundfish Fishery Management Plans for the Bering Sea/Aleutian Islands and Gulf of Alaska; supporting an alternative area closure to protect walrus haulouts that include all waters between Cape Peirce and Cape Constantine; and recommending that all alternative actions concerning the closure, including the no-action alternative, be modified to ensure that each reflects the need for research to assess its effectiveness in protecting walruses.

14 June — Commerce; modification of scientific research permit, Thomas F. Albert.

14 June — Commerce; modification of scientific research permit, National Marine Mammal Laboratory.

17 June — Commerce; scientific research permit, Randall W. Davis and Patrick J. Butler.

17 June — Commerce; modification of scientific research permit, Southwest Fisheries Science Center.

18 June — Interior; commenting to the Minerals Management Service on a Draft Environmental Impact Statement for Gulf of Mexico Sales 139 and 141; and recommending, among other things, that the Service establish a long-term monitoring program to meet its statutory requirements for post-lease monitoring under the Outer Continental Shelf Lands Act

27 June — Commerce; commenting to the National Marine Fisheries Service on a request by Chevron U.S.A. Inc. for a letter of authorization to take bowhead, gray, and beluga whales and ringed, bearded, and spotted seals incidental to oil and gas exploratory operations in Alaskan waters in 1991; and recommending, among other things, that (1) the Service consult with the Alaska Department of Fish and Game and its own scientists to determine the adequacy of existing data and programs to detect potential changes in the status of affected species; and (2) the applicant be asked to constitute an independent group of experts to review and provide advice on the design of its monitoring program.

28 June — Commerce; commenting to the National Marine Fisheries Service on the "Joint Petition to Amend Regulations Governing the Taking of Marine Mammals Incidental to Oil and Gas Exploration Activities in Alaska"; noting that it is unclear whether several of the proposed amendments could or would result in changes in the traditional ways whereby Natives hunt bowhead whales; and recommending, among other things, that most of the proposed amendments be addressed in a memorandum of understanding among the petitioners.

2 July — Commerce; scientific research permit, Southwest Fisheries Science Center.

2 July	Interior; public display permit, Homer Society of Natural History.
2 July	Commerce; modification of scientific research permit, Steven K. Katona.
2 July	Commerce; modification of scientific research permit, C. Scott Baker.
3 July	Interior; commenting to the Minerals Management Service on possible effects of an offshore oil and gas lease sale in the Cook Inlet area on marine mammals; and recommending, among other things, that the Service consult with the National Marine Fisheries Service, pursuant to section 7 of the Endangered Species Act, to determine whether the proposed sale could negatively affect endangered or threatened marine mammals.
3 July	Commerce; modification of scientific research permit, Southeast Fisheries Science Center.
3 July	Commerce; scientific research permit, James D. Gilardi.
11 July	Commerce; commenting to the National Marine Fisheries Service on a request by BP Exploration (Alaska) Inc. for a Letter of Authorization to take bowhead, gray, and beluga whales and ringed, bearded, and spotted seals incidental to surveys for geohazards in the Beaufort Sea; and recommending that the request be approved, provided that a marine mammal monitoring program is undertaken to document any interactions between bowhead whales or other marine mammals and the survey operations.
11 July	Commerce; commenting to the National Marine Fisheries Service on a request by the Amerada Hess Corporation for a letter of authorization to take bowhead, gray, and beluga whales and ringed, bearded, and spotted seals incidental to seismic exploration operations in the Beaufort Sea; and recommending that the request be approved, provided that the Service is satisfied that a marine mammal monitoring program will be undertaken to accurately document any interactions with marine mammals.
17 July	Commerce; modification of scientific research permit, R.H. Defran.
17 July	Commerce; modification of scientific research permit, National Marine Mammal Laboratory.
17 July	Interior; modification of scientific research permit, Alaska Fish and Wildlife Research Center.
18 July	Interior; commenting to the National Park Service on vessel entry levels and related restrictions to protect humpback whales in Glacier Bay; and recommending that the Service (1) re-initiate consultations with the National Marine Fisheries Service pursuant to section 7 of the Endangered Species Act before circulating for review a proposal to change the existing regulations and (2) append the results of that consultation to any proposed changes circulated for public review.
18 July	Commerce; public display permit, Jenkinson Seaquarium Corporation.
24 July	State; commenting to the Bureau of Oceans and International Environmental and Scientific Affairs on a draft U.S. policy statement on large-scale high seas driftnets to be submitted to the United Nations Office of Ocean Affairs and the Law of the Sea; expressing concern about the adequacy of: (1) the discussion of uncertainties regarding the effects of large scale driftnet fisheries on marine food chains and the stability of marine ecosystems; (2) the failure to define "sound principles of resource management"; (3) the failure to take cognizance of assessments done and knowledge gained at a recent international meeting of researchers in Sidney, British Columbia; and recommending changes to better reflect those issues before the statement is submitted to the United Nations.
25 July	Interior; commenting to the Fish and Wildlife Service on the results of a Commission-sponsored December 1990 workshop on the Bering Sea/Gulf of Alaska and Antarctic marine ecosystems; forwarding to the Service copies of the final workshop report; and recommending that the Service (1) continue and expand its seabird assessment and monitoring programs in the Bering Sea and Gulf of Alaska and (2) work with the National Marine Fisheries Service, the National Science Foundation, and

other agencies and organizations to make use of national and international fora to assist in planning, coordinating, and analyzing the results of multi-disciplinary research programs in the Bering Sea and Gulf of Alaska.

25 July — National Science Foundation; commenting on the results of a Commission-sponsored workshop on the Bering Sea/Gulf of Alaska and Antarctic marine ecosystems; forwarding copies of the final workshop report; and recommending that the Foundation and other appropriate Federal agencies work cooperatively to implement the workshop recommendations.

25 July — Commerce; commenting to the National Marine Fisheries Service on the results of a Commission-sponsored workshop on the Bering Sea/Gulf of Alaska and Antarctic marine ecosystems; forwarding copies of the final workshop report; and recommending that the Service (1) give attention to the workshop recommendations that concern matters under its jurisdiction; (2) initiate consultations with the Fish and Wildlife Service, the Minerals Management Service, the National Science Foundation, the Alaska Department of Fish and Game, and other organizations to determine if there is interest in developing an integrated geographic information system; and (3) take steps to organize and hold a workshop or workshops before the end of January 1992 to identify and evaluate possible procedures for assessing interactions between fisheries and marine mammals.

29 July — Commerce; modification of scientific research permit, Washington Department of Fish and Game.

30 July — State; commenting to the Bureau of Oceans and International Environmental and Scientific Affairs on the draft U.S. policy on large-scale pelagic driftnets; restating the general comments in its 24 July letter; and recommending modifications in the text of the policy statement to better reflect ecosystem impacts from driftnet fishing and the need to reflect new principles for the management of living marine resources.

31 July — Agriculture; commenting to the Animal and Plant Health Inspection Service on standards for the humane handling, care, treatment, and transportation of captive marine mammals; noting that, at a 29 May 1990 interagency meeting, representatives of the Animal and Plant Health Inspection Service, the National Marine Fisheries Service, the Fish and Wildlife Service, and the Marine Mammal Commission agreed that the standards needed to be revised and adopted a general schedule for the review as follows: (1) development of a discussion paper by the Commission to assist the Services in drafting revised regulations; (2) convening a working group made up of representatives of the research, public display, and environmental communities and government agencies to review the Services' revised draft regulations; and (3) publication of proposed regulations by the Services for a 60-day comment period; transmitting a discussion paper describing questions to be addressed in the revised regulations, when they are developed; and recommending that the Services obtain assistance from individuals experienced in the fields of marine mammal medicine, husbandry, and behavior.

31 July — Commerce; commenting to the National Marine Fisheries Service on a status review of endangered whales and a proposal to proceed with steps to remove the eastern North Pacific (California) gray whale population from the endangered species list; noting that some of the information and conclusions in the report are misleading and do not reflect the best available information; and recommending, among other things, that the Service revise the report to describe and evaluate the best available information on the status of and potential threats to each whale stock listed under the Endangered Species Act.

5 August — Commerce; commenting to the National Marine Fisheries Service on a final rule published by the Fish and Wildlife Service to authorize the unintentional take of walruses and polar bears incidental to oil and gas exploration activities in the Chukchi Sea; and recommending, among other things, that the Service (1) initiate rulemaking to amend its definition of "small numbers" for the purposes of defining allowable incidental take and (2) organize and convene a workshop to further develop site-specific monitoring guidelines.

5 August — Interior; commenting to the Fish and Wildlife Service on its Final Rule governing the take of small numbers of walruses and polar bears incidental to offshore oil and gas exploration activities in the Chukchi Sea; noting, among other things, that the rule does not provide an estimate of the numbers of

walruses and polar bears that may be taken or explain how the Service determined those numbers to be "small"; and recommending, among other things, that the Service (1) initiate a rulemaking to amend its definition of "small numbers"; (2) prepare a proposal for legislation to implement the International Agreement on the Conservation of Polar Bears and forward it to Congress as soon as possible; and (3) as a matter of practice, publish notice of applications for letters of authorization and provide at least a 30-day public comment period.

9 August — Commerce; commenting to the National Marine Fisheries Service on the need for reviews of the Hawaiian monk seal and tuna-porpoise programs; recommending that the reviews be held in October; and forwarding copies of draft agendas for both reviews.

9 August — Commerce; scientific research permit, Howard E. Winn and Richard O. Petricig.

9 August — Commerce; commenting to the National Marine Fisheries Service on Amendment 3 to the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region; noting that the amendment does not adequately address protection needs for Hawaiian monk seals; and recommending, among other things, that the Service return the amendment to the Western Pacific Fishery Management Council to add language to better protect monk seals from adverse interactions with fisheries.

14 August — Commerce; commenting to the National Marine Fisheries Service on the final draft paper "U.S. Policy Concerning Large Scale Pelagic Driftnets and Comments on the North Pacific Scientific Driftnet Review Meeting Held in Sidney, British Columbia, on 11-13 June, 1991"; noting that the final draft addresses concerns raised in previous Commission comments; and recommending certain changes to the text regarding long-term marine resource management strategies.

15 August — Commerce; scientific research permit, Elizabeth A. Mathews.

15 August — Commerce; scientific research permit, Gerald L. Kooyman.

16 August — Interior; commenting to the Office of Environmental Affairs on a draft "Report to Congress on the Impact of Potential Crude-Oil Spills in the Arctic Ocean on Alaskan Natives"; noting, among other things, that the report does not include all impact assessments requested by Congress, nor describe all relevant provisions of the Marine Mammal Protection Act and the Endangered Species Act; and recommending revisions to address the deficiencies.

16 August — Commerce; commenting to the National Marine Fisheries Service on a proposed rule to implement Amendment 3 to the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region; noting that the proposed rule indicates changes may be made by the Regional Director in the size of the protected species zone in the Northwestern Hawaiian Islands and other protected species conservation measures; and recommending that (1) the protected species zone include waters out to 100 nautical miles; (2) waters within 50 nautical miles and between the islands be established as a no-fishing zone as presently proposed; and (3) waters between 50 and 100 nautical miles be subject to a notification requirement to allow the Service an opportunity to place observers aboard some boats fishing in that area.

16 August — Commerce; commenting to the National Marine Fisheries Service on the effect on Hawaiian monk seals of derelict lightsticks used in the pelagic longline fishery; noting that disposal at sea of such items is expressly prohibited under U.S. law; and recommending further steps to investigate and prevent the discarding of lightsticks by fishermen at sea.

19 August — Commerce; scientific research permit, National Marine Fisheries Service.

21 August — Commerce; commenting to the National Marine Fisheries Service on necropsy reports of one common dolphin and one long-finned pilot whale; noting that the Commission is unable to judge the validity of conclusions regarding the causes of death from the information provided; and recommending that the Service ask if more complete medical histories are available, and if not, that record keeping, necropsy, and reporting requirements be reviewed to ensure that necessary data for determining cause of death of captive marine mammals are routinely compiled and reported.

21 August	Commerce; commenting to the National Marine Fisheries Service on a proposal to remove the eastern North Pacific (California) gray whale stock from its List of Threatened and Endangered Species; and recommending, among other things, that the Service (1) identify and assess present and foreseeable threats to the gray whale stock; and (2) review all past biological opinions issued pursuant to section 7 of the Endangered Species Act that pertain to gray whales to determine how de-listing or down-listing might affect implementation of any conservation measures contained therein.
28 August	Commerce; commenting to the National Marine Fisheries Service on the collection and possibly lethal taking of a harbor seal at Seal Island, Prince William Sound, Alaska, to retrieve a non-functioning telemetry package; recommending that the collection be authorized only if reasonable efforts made to recapture the animal alive prove unsuccessful; and further recommending that the Service's Permit Office consult the National Marine Mammal Laboratory to determine the most humane and effective methods for attaching radio tags.
31 August	Commerce; commenting to the National Marine Fisheries Service on proposed changes to the List of Fisheries defining the level of incidental take of marine mammals and noting that, for certain fisheries, there is poor documentary evidence of the rate of incidental take for fisheries placed in Category I; and recommending that the Service should use the best available information when categorizing a fishery whether or not the level of take has been documented.
10 September	Interior; commenting to the Fish and Wildlife Service on the need to develop boat speed regulations to protect manatees in the Lake Woodruff National Wildlife Refuge; noting that the Florida Governor and Cabinet approved proposed boat speed regulations for Volusia County, including the Lake Woodruff area but that these were being challenged and therefore delayed; and recommending that the Service propose comparable boat speed regulations for the Refuge as quickly as possible.
11 September	Commerce; scientific research permit, Thomas Ford, Jr.
11 September	Interior; scientific research permit, Caribbean Aquatic Animal Health Department.
16 September	Commerce; commenting to the National Marine Fisheries Service on the protection needs for humpback whales in Hawaiian waters; forwarding a Commission-sponsored report on the conservation and protection needs of humpback whales in Hawaii; and recommending that, when the Humpback Whale Recovery Plan is completed, the Service immediately take steps to develop area-specific implementation plans and consider the recommendations in the report when doing so.
17 September	Commerce; public display permit, John G. Shedd Aquarium.
17 September	Commerce; public display permit, Shelley L. Brandau, Milwaukee County Zoo.
17 September	Interior; responding to a request that the Marine Mammal Commission review whether oil and gas development in the Arctic National Wildlife Refuge would conflict with the need to protect the Beaufort Sea polar bear population and U.S. obligations under the 1976 International Agreement on the Conservation of Polar Bears; noting that (1) activities in the Refuge may have greater effects than in other areas because of polar bear denning in the Refuge; (2) cumulative effects could adversely affect polar bears throughout the Arctic; and (3) therefore, the U.S. could be in violation of the 1976 Agreement if it does not take proper action to resolve the uncertainties surrounding oil and gas development in polar bear habitat; and recommending that the Service advise it as to, among other things, what it is doing to identify important polar bear denning areas and how oil and gas development might affect those areas and the bears that use them.
20 September	Commerce; commenting further to the National Marine Fisheries Service on Amendment 3 to the Fishery Management Plan for Pelagic Fisheries in the Western Pacific Region; noting that its response to the Commission's 9 and 16 August 1991 letters did not address the recommendation regarding the placement of observers aboard vessels fishing between 50 and 100 nautical miles of the Northwestern Hawaiian Islands to document interactions between the fishery and the endangered Hawaiian monk seal; and restating its recommendation that the Service do so.

20 September	Commerce; commenting to the National Marine Fisheries Service on Amendment 4 to the Fisheries Management Plan for Pelagic Fisheries of the Western Pacific Region; and recommending that a proposed rule to limit entries into the Hawaii-based longline fishery for pelagic fish species be adopted.
23 September	Commerce; commenting to the National Marine Fisheries Service on the draft proposed regime to govern interactions between marine mammals and commercial fishing operations after October 1993; noting that, in some cases, the draft proposal does not adequately explain criteria for determining the allowable biological removal level or what would be done to address the take of marine mammals whose carrying capacity has been reduced by overharvesting of prey species or other types of habitat degradation; and recommending, among other things, that the proposal be expanded to (1) specify the criteria, minimum data requirements, and procedures to be used to make qualitative judgments on current population status relative to carrying capacity level; (2) indicate how human-caused changes in marine mammal carrying capacity and take by harassment would be taken into account when determining allowable removal levels; and (3) describe the program that would be undertaken to reduce marine mammal mortalities and injuries incidental to commercial fishing operations to as near zero as practicable.
23 September	Interior; commenting to the Minerals Management Service on the Alaska Regional Studies Plan for Fiscal Years 1993-1994; and recommending certain additions and revisions with regard to Steller sea lions, bowhead whales, and other endangered and threatened species.
27 September	State of Florida; commenting to the Department of Natural Resources on proposed rules to protect manatees by regulating vessel speed and access in Dade County; expressing concurrence with the Department that vessel speed and access restrictions are the only way to effectively accommodate the increasing number of power boats and manatees in State waterways; and recommending that the Department forward its proposal to the Governor and Cabinet with a request that it be adopted as soon as possible.
9 October	Commerce; modification of scientific research permit, Audrey Diane Kopec and James T. Harvey.
10 October	Commerce; modification of scientific research permit, Salvatore Cercio.
16 October	Interior; scientific research permit, Mote Marine Laboratory.
22 October	Commerce; scientific research permit, National Marine Mammal Laboratory.
25 October	Commerce; scientific research permit, Marsha L. Green.
25 October	Commerce; public display permit, Oregon Coast Aquarium.
25 October	Commerce; commenting to the National Marine Fisheries Service on the export of dolphins caught in U.S. waters; noting that (1) care and maintenance standards are made applicable to foreign facilities only as a special condition of permits issued under the Marine Mammal Protection Act and (2) foreign facilities are not subject to Animal and Plant Health Inspection Service inspections; recommending that the Service review, among other things, (a) foreign facilities holding marine mammals obtained from U.S. waters since the Marine Mammal Protection Act was enacted and (b) foreign government's standards for inspecting public display facilities; and further recommending that no further permits be issued to agents of facilities outside the United States until the reviews have been completed.
1 November	Commerce; commenting to the National Marine Fisheries Service on the status of the vaquita; noting, among other things, that it is one of the rarest and most endangered of all cetaceans, and the primary threat to its survival is entanglement in fishing gear, particularly gillnets used to catch totoaba, an endangered species of fish found in the Gulf of California; and recommending that the Service, in cooperation with the Fish and Wildlife Service, (1) coordinate efforts to develop a test to identify imported processed totoaba and (2) establish a cooperative program with Mexico to enforce the Mexican prohibition on totoaba fishing and the entry of totoaba into the United States.

1 November	Interior; commenting to the Fish and Wildlife Service on the status of the vaquita, noting concerns raised in the Commission's 1 November 1991 letter to the National Marine Fisheries Service, and recommending that both Services work together to detect and eliminate illegal trade in endangered totoaba to address conservation needs of both totoaba and vaquita.
4 November	Commerce; commenting to the National Marine Fisheries Service on a proposed rule to designate the coastal-migratory stock of bottlenose dolphins along the mid-Atlantic U.S. coast as depleted under the Marine Mammal Protection Act; noting that the justification for listing was based on a number of assumptions that would be difficult, if not impossible, to verify, and that there would be no quantifiable or theoretical basis for judging when the population has recovered; and recommending that the final rule address, among other things, how the Service will determine when the affected population is no longer depleted.
5 November	Commerce; public display permit, Boudewijnpark-Dolphinarium Brugge.
5 November	Commerce; public display permit, New Jersey Academy for Aquatic Sciences.
5 November	State of Florida; commenting to the Governor and other members of the Florida Cabinet on proposed boat speed regulations in Dade County to protect manatees and recommending the regulations be adopted.
6 November	Commerce; scientific research permit, Marsha L. Green.
8 November	Interior; commenting to the Fish and Wildlife Service on the Draft Southern Sea Otter Recovery Plan; noting, among other things, that the draft plan does not adequately describe the full range of factors threatening recovery of the southern sea otter population; and recommending that a revised draft of the recovery plan be prepared and provided to the Commission and others for review and comment before it is considered for adoption by the Service.
8 November	Interior; commenting to the National Park Service on proposed regulations to allow commercial fishing in non-wilderness portions of Glacier Bay National Park through 1997; noting that, in 1983, the Service adopted regulations prohibiting commercial fishing in all national parks except where specifically authorized by statute, and that eliminating fishing activities in Glacier Bay could benefit humpback whales that utilize the park; and recommending that the Service reconsider the proposed regulations and refrain from final rulemaking until better information is provided regarding commercial fishing activities that would be allowed.
15 November	State of Florida; commenting to the Department of Natural Resources on proposed rules to regulate vessel speeds to protect manatees in Citrus County; and recommending that the proposed rules be modified and submitted to the Governor and other members of the Florida Cabinet for adoption.
18 November	State; commenting to the Bureau of Oceans and International Environmental and Scientific Affairs on a United Nations draft report to the Secretary General on large-scale driftnet fisheries; noting that the report fails to identify all significant points raised in the United States' comments to the United Nations on the issue of high seas driftnet fishing; and recommending that additional language be added to the report to reflect ecosystem impacts of large-scale high seas driftnet fisheries.
19 November	Interior; commenting to the Fish and Wildlife Service on developing boat speed regulations to protect manatees in the Lake Woodruff National Wildlife Refuge; noting that the Service's reply to the Commission's 17 October 1991 letter indicates an intent to prepare rules to create manatee protection areas in the Refuge; and recommending that the Service (1) expedite review of its notice of intent to propose rulemaking and (2) immediately begin developing proposed rules that include measures at least as strong as the rules adopted by the Florida Governor and Cabinet for Volusia County.
20 November	Commerce; commenting to the National Marine Fisheries Service on the Western Pacific Fishery Management Council's report assessing the feasibility of real-time fishing satellite-linked radio vessel tracking equipment; and recommending that the Service immediately review the report with a view towards developing a strategy to require longline vessels and certain other vessels fishing off Hawaii

and elsewhere to carry such equipment at the earliest possible date to help ensure compliance with closures.

21 November — Commerce; commenting to the National Marine Fisheries Service on a February 1991 workshop to develop guidelines for monitoring programs required to document site-specific impacts from offshore oil and gas exploration; reiterating the Commission's 5 August 1991 letter recommending a follow-up workshop to review the results of 1991 monitoring programs and to better identify how best to satisfy site-specific monitoring requirements; and requesting that the Service advise the Commission on its response to the Commission's recommendation.

3 December — Commerce; scientific research permit, Graham A.J. Worthy.

5 December — Commerce; commenting to the U.S. Commissioner to the International Whaling Commission on critical issues concerning the future of the International Whaling Commission; noting the intentions of some nations to resume commercial whaling under agreed IWC procedures and other issues bearing upon the anticipated move to resume commercial whaling and concluding, among other things, that: (1) the creation of a separate new pro-whaling organization is being contemplated by some nations and this would signal the end of the IWC as an international regulatory body and would not be in the best interests of whale conservation; (2) the conservation of whales would be best accomplished by maintaining the IWC; and (3) the International Convention for the Regulation of Whaling should be revised to reflect modern principles of marine living resource conservation including non-consumptive uses of whales; recommending, among other things, that the National Oceanic and Atmospheric Administration, in consultation with appropriate Federal agencies and the environmental and scientific communities: (1) seek to renegotiate the International Whaling Convention; (2) adopt the position that non-consumptive values of whales may be of equal, if not of greater importance, than their consumptive values; (3) develop and present at the 1992 IWC meeting a proposal for implementing revisions to the IWC conservation program to bring it into conformance with the modern principles of living marine resource conservation that have developed in recent years; and (4) take such actions as may be necessary to encourage continued participation of member nations in the IWC; and further recommending that the United States continue to oppose resumption of commercial whaling pending renegotiation of the Convention.

6 December — Commerce; commenting to the National Marine Fisheries Service on Amendment 7 to the Lobster Fishery Management Plan for the Western Pacific Region; noting that the proposed amendment was needed to protect lobster stocks in the Northwestern Hawaiian Islands from further overfishing; and recommending that (1) the proposed actions be adopted and implemented promptly and (2) the Service initiate formal consultations with the Fishery Management Council under section 7 of the Endangered Species Act to assess possible relationships between concurrent decline in monk seals and lobster stocks in the Northwestern Hawaiian Islands and the possible need to redefine the optimum yield of lobsters to account for monk seal recovery needs.

13 December — Commerce; commenting to the National Marine Fisheries Service on the Marine Entanglement Research Program Plan for Fiscal Year 1992; and recommending that the Service take steps to implement the plan.

17 December — Commerce; commenting to the National Marine Fisheries Service on research and management needs for Hawaiian monk seals in the Northwestern Hawaiian Islands; noting the need to address issues regarding interactions between monk seals and pelagic fisheries in the Northwestern Hawaiian Islands; further noting that monk seals leave their coastal habitat for long periods of time to forage and that there are no studies that define at-sea distribution of monk seals; and recommending that the Service immediately design a program of tagging monk seals with satellite-linked radio tags for implementation in 1992.

17 December — Interior; scientific research permit, Donald B. Siniff.

17 December — Commerce; scientific research permit, National Zoological Park, Smithsonian Institution.

18 December — Commerce; public display permit, Cape Cod Aquarium.

20 December	Commerce; scientific research permit, Deborah Glockner-Ferrari and Mark J. Ferrari.
20 December	Commerce; commenting to the National Marine Fisheries Service on Hawaiian monk seal research and management needs; noting a need to shift program emphasis from population monitoring to restoration; and recommending, among other things, that the Service (1) continue population monitoring studies this coming field season subject to such modifications as may be possible to reduce costs and personnel commitments; (2) implement a satellite-linked radio tagging program to gather data on monk seal foraging and distribution; (3) re-examine observer programs for commercial fishing vessels operating in monk seal habitat; (4) evaluate whether declines in monk seal and lobster populations are related and if optimum yield levels for the lobster fishery should be reduced to promote monk seal recovery; (5) expand the Monk Seal Recovery Team to include additional behavioral scientists, a physical oceanographer, and a representative of the Fish and Wildlife Service; (6) assemble background information and a recommended approach to address the male mobbing problem for review by the Recovery Team; and (7) coordinate interagency work to speed the repair and stabilization of Tern Island and other areas of important monk seal habitat.
20 December	Commerce; commenting to the National Marine Fisheries Service on its Revised Draft Proposed Regime to Govern Incidental Taking of Marine Mammals in Commercial Fishing Operations after October 1993; noting that the revised draft is less adequate than the previous draft; and recommending, among other things, that the Service (1) revise the proposal to include the legislative language that it will propose to establish the regime; (2) specify what is meant by the term "sound principles of wildlife management"; (3) redefine appropriate levels of allowable take; (4) consider the effect of habitat degradation on marine mammal survival and productivity; (5) describe how it proposes to move toward its goal of zero mortality; and (6) provide an estimate of funding required to implement proposed programs.
23 December	Interior; commenting to the Fish and Wildlife Service on research and management needs for walruses in Alaska; forwarding a preliminary draft conservation plan for Pacific walrus; and recommending that the Service circulate the preliminary draft plan to its walrus advisory team, use the plan and the team's comments as a basis for preparing a final draft plan; and circulate the final draft plan to the Commission and other agencies for review as soon as possible; and further recommending, among other things, that the Service (1) immediately begin planning for another walrus census to be conducted as soon as possible; (2) re-instate the Native harvest monitoring program suspended in 1990; (3) ensure to the extent possible that Federal and State regulations to protect walrus haulouts in Bristol Bay are comparable and effectively prevent disturbance by commercial fishermen; and (4) evaluate whether bilateral agreements with the former Soviet Union might further the objectives of the walrus conservation plan.

APPENDIX B

REPORTS OF COMMISSION-SPONSORED ACTIVITIES AVAILABLE FROM THE NATIONAL TECHNICAL INFORMATION SERVICE (NTIS)[1]

Ainley, D.G., H.R. Huber, R.P. Henderson, and T.J. Lewis. 1977. Studies of marine mammals at the Farallon Islands, California, 1970-1975. Final report for MMC contract MM4AC002. NTIS PB-274 046. 42 pp. (A03)

Ainley, D.G., H.R. Huber, R.P. Henderson, T.J. Lewis, and S.H. Morrell. 1977. Studies of marine mammals at the Farallon Islands, California, 1975-1976. Final report for MMC contract MM5AC020. NTIS PB-266 249. 32 pp. (A03)

Ainley, D.G., H.R. Huber, S.H. Morrell, and R.R. LeValley. 1978. Studies of marine mammals at the Farallon Islands, California, 1976-1977. Final report for MMC contract MM6AC027. NTIS PB-286 603. 44 pp. (A03)

Allen, S.G. 1991. Harbor seal habitat restoration at Strawberry Spit, San Francisco Bay. Final report for MMC contract MM2910890-9. NTIS PB91-212332. 45 pp. (A03)

Allen, S.G., D.G. Ainley, and G.W. Page. 1980. Haul out patterns of harbor seals in Bolinas Lagoon, California. Final report for MMC contract MM8AC012. NTIS PB80-176 910. 31 pp. (A03)

Anderson, D.M., and A.W. White. 1989. Toxic dinoflagellates and marine mammal mortality: Proceedings of an expert consultation held at Woods Hole Oceanographic Institution. Final report for MMC contract T6810848-1. NTIS PB90-160755. 71 pp. (A04)

Baker, C.S., J.M. Straley, and A. Perry. 1990. Population characteristics of humpback whales in southeastern Alaska: summer and late-season 1986. Final report for MMC contract MM3309822-5. NTIS PB90-252487. 23 pp. (A03)

Balcomb, K.C., J.R. Boran, R.W. Osborne, and N.J. Haenel. 1980. Observations of killer whales (*Orcinus orca*) in greater Puget Sound, State of Washington. Final report for MMC contract MM1300731-7. NTIS PB80-224 728. 42 pp. (A03)

Bean, M.J. 1985. United States and international authorities applicable to entanglement of marine mammals and other organisms in lost or discarded fishing gear and other debris. Final report for MMC contract MM2629994-7. NTIS PB85-160471. 65 pp. (A04)

Beddington, J.R., and H.A. Williams. 1980. The status and management of the harp seal in the north-west Atlantic. A review and evaluation. Final report for MMC contract MM1301062-1. NTIS PB80-206 105. 127 pp. (A07)

Bengtson, J.L. 1978. Review of information regarding the conservation of living resources of the Antarctic marine ecosystem. Final report for MMC contract MM8AD05/5. NTIS PB-289 496. 148 pp. (A08)

Bishop, J.B. 1985. Summary report of gill and trammel net (set-net) observations in the vicinity of Morro Bay, California, 1 November 1983 - 31 August 1984. Final report for MMC contract MM2629900-2. NTIS PB85-150076. 18 pp. (A02)

Bockstoce, J. 1978. A preliminary estimate of the reduction of the western Arctic bowhead whale (*Balaena mysticetus*) population by the pelagic whaling industry: 1848-1915. Final report for MMC contract MM7AD111. NTIS PB-286 797. 32 pp. (A08)

Brownell, R.L., Jr., C. Schoenwald, and R.R. Reeves. 1978. Preliminary report on world catches of marine mammals 1966-1975. Final report for MMC contract MM6AC002. NTIS PB-290 713. 353 pp. (A16)

Buckland, S.T., and K.L. Cattanach. 1990. Review of current population abundance estimates of small cetaceans in the Black Sea. Final report for MMC contract T75133135. NTIS PB91-137257. 7 pp. (A02)

Chapman, D.G., L.L. Eberhardt, and J.R. Gilbert. 1977. A review of marine mammal census methods. Final report for MMC contract MM4AC014. NTIS PB-265 547. 55 pp. (A04)

Contos, S.M. 1982. Workshop on marine mammal-fisheries interactions. Final report for MMC contract MM207934-1-0. NTIS PB82-189 507. 64 pp. (A04)

Cornell, L.H., E.D. Asper, K.N. Osborn, and M.J. White, Jr. 1979. Investigations on cryogenic marking procedures for marine mammals. Final report for MMC contract MM6AC003. NTIS PB 291 570. 24 pp. (A03)

Dayton, P.K., B.D. Keller, and D.A. Ven Tresca. 1980. Studies of a nearshore community inhabited by sea otters. Final report for MMC contracts MM6AC026 and MM13-00702-9. NTIS PB81-109 860. 91 pp. (A06)

DeBeer, J. 1980. Cooperative dedicated vessel research program on the tuna-porpoise problem: overview and final report. Final report for MMC contract MM8AC006. NTIS PB80-150 097. 43 pp. (A03)

Dohl, T.P. 1981. Remote laser branding of marine mammals. Final report for MMC contract MM4AC011. NTIS PB81-213 449. 34 pp. (A03)

Erickson, A.W. 1978. Population studies of killer whales (*Orcinus orca*) in the Pacific Northwest: a radio-marking and tracking study of killer whales. Final report for MMC contract MM5AC012. NTIS PB-285 615. 34 pp. (A03)

Fay, F.H., H.M. Feder, and S.W. Stoker. 1977. An estimation of the impact of the Pacific walrus population on its food resources in the Bering Sea. Final report for MMC contracts MM4AC006 and MM5AC024. NTIS PB-273 505. 38 pp. (A03)

[1] **Price codes for printed reports (including postage) are shown in parentheses at the end of each citation. The key to the codes and order information can be found at the end of Appendix B.**

Fay, F.H., B.P. Kelly, and B.A. Fay (eds). 1990. The ecology and management of walrus populations – report of an international workshop. Final report for MMC contract T 68108850. NTIS PB91-100479. 198 pp. (A09)

Forestell, P.H. 1989. Assessment and verification of abundance estimates, seasonal trends, and population characteristics of the humpback whale in Hawaii. Final report for MMC contract MM2911014-6. NTIS PB90-190273. 74 pp. (A04)

Foster, M.A. 1981. Identification of ongoing and planned fisheries in the Northwestern Hawaiian Islands. Final report for MMC contract MM1801069-7. NTIS PB81-207 516. 90 pp. (A05)

Foster, M.S., C.R. Agegian, R.K. Cowen, R.F. Van Wagenen, D.K. Rose, and A.C. Hurley. 1979. Toward an understanding of the effects of sea otter foraging on kelp forest communities in central California. Final report for MMC contract MM7AC023. NTIS PB-293 891. 60 pp. (A04)

Fowler, C.W., W.T. Bunderson, M.B. Cherry, R.J. Ryel, and B.B. Steele. 1980. Comparative population dynamics of large mammals: a search for management criteria. Final report for MMC contract MM7AC013. NTIS PB80-178 627. 330 pp. (A15)

Fowler, C.W., R.J. Ryel, and L.J. Nelson. 1982. Sperm whale population analysis. Final report for MMC contract MM8AC009. NTIS PB82-174 335. 35 pp. (A03)

Fox, W.W., Jr., and Other Concerned Scientists. 1990. Statement of concerned scientists on the reauthorization of the Magnuson Fishery Conservation and Management Act. NTIS PB91-127647. 6 pp. (A02)

Freeman. J., and H. Quintero. 1990. The distribution of West Indian manatees (*Trichechus manatus*) in Puerto Rico: 1988-1989. Final report for MMC contract T5360348-3. NTIS PB 91-137240. 42 pp. (A03)

Gaines, S.E., and D. Schmidt. 1978. Laws and treaties of the United States relevant to marine mammal protection policy. Final report for MMC contract MM5AC029. NTIS PB-281 024. 668 pp. (A99)

Gard, R. 1978. Aerial census, behavior, and population dynamics study of gray whales in Mexico during the 1974-75 calving and mating season. Final report for MMC contract MM5AC006. NTIS PB-274 295. 18 pp. (A02)

Gard, R. 1978. Aerial census and population dynamics study of gray whales in Baja California during the 1976 calving and mating season. Final report for MMC contract MM6AC014. NTIS PB-275 297. 20 pp. (A03)

Geraci, J.R., and D.J. St. Aubin. 1979. Biology of marine mammals: insights through strandings. Final report for MMC contract MM7AC020. NTIS PB-293 890. 343 pp. (A16)

Geraci, J.R., S.A. Testaverde, D.J. St. Aubin, and T.H. Loop. 1978. A mass stranding of the Atlantic white sided dolphin, *Lagenorhynchus acutus*: a study into pathobiology and life history. Final report for MMC contract MM5AC008. NTIS PB-289 361. 141 pp. (A08)

Gerrodette, T. 1983. Review of the California sea otter salvage program. Final report for MMC contract MM2629677-5. NTIS PB83-262 949. 23 pp. (A03)

Gilbert, J.R., V.R. Schurman, and D.T. Richardson. 1979. Gray seals in New England: present status and management alternatives. Final report for MMC contract MM7AC002. NTIS PB-295 599. 40 pp. (A03)

Glockner-Ferrari, D.A., and M.J. Ferrari. 1985. Individual identification, behavior, reproduction, and distribution of humpback whales, *Megaptera novaeangliae*, in Hawaii. Final report for MMC contract MM262975-5. NTIS PB85-200772. 41 pp. (A03)

Gold, J. 1981. Marine mammals: a selected bibliography. Final report for MMC contract MM1801254-3. NTIS PB 82-104 282. 91 pp. (A05)

Gonsalves, J.T. 1977. Improved method and device to prevent porpoise mortality: application of polyvinyl panels to purse seine nets. Final report for MMC contract MM6AC007. NTIS PB-274 088. 28 pp. (A03)

Goodman, D. 1978. Management implications of the mathematical demography of long lived animals. Final report for MMC contract MM8AD008. NTIS PB-289 678. 80 pp. (A05)

Green, K.A. 1977. Antarctic marine ecosystem modeling revised Ross Sea model, general Southern Ocean budget, and seal model. Final report for MMC contract MM6AC032. NTIS PB-270 375. 111 pp. (A06)

Green-Hammond, K.A. 1980. Fisheries management under the Fishery Conservation and Management Act, the Marine Mammal Protection Act, and the Endangered Species Act. Final report for MMC contract MM1300885-3. NTIS PB80-180 599. 186 pp. (A09)

Green-Hammond, K.A. 1981. Requirements for effective implementation of the Convention on the Conservation of Antarctic Marine Living Resources. Final report for MMC contract MM2079173-9. NTIS PB82-123 571. 36 pp. (A03)

Green-Hammond, K.A. 1982. Environmental aspects of potential petroleum exploration and exploitation in Antarctica: forecasting and evaluating risks. Final report for MMC contract MM2079173-9. NTIS PB82-169 772. 28 pp. (A03)

Green-Hammond, K.A., D.G. Ainley, D.B. Siniff, and N.S. Urquhart. 1983. Selection criteria and monitoring requirements for indirect indicators of changes in the availability of Antarctic krill applied to some pinniped and seabird information. Final report for MMC contract MM2324753-6. NTIS PB83-263 293. 37 pp. (A03)

Hatfield, B.B. 1991. Summary report of observations of coastal gill and trammel net fisheries in central California - October 1, 1984 - March 31, 1985. Final report for MMC contract MM2910891-2. NTIS PB91-191908. 22 pp. (A03)

Heneman, B., and Center for Environmental Education. 1988. Persistent marine debris in the North Sea, northwest Atlantic Ocean, wider Caribbean area, and the west coast of Baja California. Final report for MMC contract MM3309598-5. NTIS PB89-109938. 161 pp. (A08)

Henry, M.E. 1987. Observations of gill and trammel net fishing activity between Pt. Buchon and Pt. Sur, California, June-October 1985. Final report for MMC contract MM3309511-8. NTIS PB87-184024. 32 pp. (A03)

Herman, L.M., P.H. Forestell, and R.C. Antinoja. 1980. The 1976/77 migration of humpback whales into Hawaiian waters: composite description. Final report for MMC contracts MM7AC014 and MM1300907-2. NTIS PB80-162 332. 55 pp. (A04)

Hofman, R.J. (ed). 1979. A workshop to identify new research that might contribute to the solution of the tuna-porpoise problem. Proceedings of a Marine Mammal Commission-sponsored workshop held on 8-9 December 1975 at the University of California, Santa Cruz. NTIS PB-290 158. 17 pp. (A02)

Hofman, R.J. 1982. Identification and assessment of possible alternative methods for catching yellowfin tuna. NTIS PB83-138 993. 243 pp. (A11)

Hofman, R.J. (ed). 1985. Workshop to assess methods for regulating the distribution and movements of sea otters. Report of a Marine Mammal Commission-sponsored work-

shop held 25-26 October 1984 in San Francisco, California. NTIS PB85-229250. 39 pp. (A03)

Huber, H.R., D.G. Ainley, R.J. Boekelheide, R.P. Henderson, and B. Bainbridge. 1981. Studies of marine mammals at the Farallon Islands, California, 1979-1980. Final report for MMC contract MM1533599-3. NTIS PB81-167 082. 51 pp. (A04)

Huber, H.R., D.G. Ainley, S.H. Morrell, R.J. Boekelheide, and R.P. Henderson. 1980. Studies of marine mammals at the Farallon Islands, California, 1978-1979. Final report for MMC contract MM1300888-2. NTIS PB80-178 197. 46 pp. (A04)

Huber, H.R., D.G. Ainley, S.H. Morrell, R.R. LeValley, and C.S. Strong. 1979. Studies of marine mammals at the Farallon Islands, California, 1977-1978. Final report for MMC contract MM7AC025. NTIS PB-111 602. 50 pp. (A04)

Hui, C.A. 1978. Reliability of using dentin layers for age determination in *Tursiops truncatus*. Final report for MMC contract MM7AC021. NTIS PB-288 444. 25 pp. (A03)

Irvine, A.B., M.D. Scott, R.S. Wells, J.H. Kaufmann, and W.E. Evans. 1979. A study of the activities and movements of the Atlantic bottlenosed dolphin, *Tursiops truncatus*, including an evaluation of tagging techniques. Final report for MMC contracts MM4AC004 and MM5AC018. NTIS PB-298 042. 54 pp. (A04)

Jameson, G.L. 1986. Trial systematic salvage of beach-cast sea otter, *Enhydra lutris*, carcasses in the central and southern portion of the sea otter range in California: one year summary of results: October 1983-September 1984. Final report for MMC contract MM2629849-8. NTIS PB87-108288. 60 pp. (A04)

Jeffries, S.J. 1986. Seasonal movement and population trends of harbor seals in the Columbia River and adjacent waters of Washington and Oregon, 1976-1982. Final report for MMC contract MM2079357-5. NTIS PB86-200 243. 41 pp. (A03)

Jeffries, S.J., and M.L. Johnson. 1990. Population status and condition of the harbor seal, *Phoca vitulina richardsi*, in the waters of the State of Washington: 1975-1980. Final report for MMC contract MM7AC030. NTIS PB90-219197. 76 pp. (A05)

Johnson, B.W., and P.A. Johnson. 1978. The Hawaiian monk seal on Laysan Island: 1977. Final report for MMC contract MM7AC009. NTIS PB-285 428. 38 pp. (A03)

Johnson, B.W., and P.A. Johnson. 1981. Estimating the Hawaiian monk seal population on Laysan Island. Final report for MMC contract MM1533701-4. NTIS PB82-106 113. 29 pp. (A05)

Johnson, B.W., and P.A. Johnson. 1981. The Hawaiian monk seal on Laysan Island: 1978. Final report for MMC contract MM8AC008. NTIS PB82-109 661. 17 pp. (A02)

Johnson, M.L., and S.J. Jeffries. 1977. Population evaluation of the harbor seal (*Phoca vitulina richardi*) in the waters of the State of Washington. Final report for MMC contract MM5AC019. NTIS PB-270 376. 27 pp. (A03)

Johnson, M.L., and S.J. Jeffries. 1983. Population biology of the harbor seal (*Phoca vitulina richardsi*) in the waters of the State of Washington: 1976-1977. Final report for MMC contract MM6AC025. NTIS PB83-159 715. 53 pp. (A04)

Jones, M.L., and S.L. Swartz. 1986. Demography and phenology of gray whales and evaluation of human activities in Laguna San Ignacio, Baja California Sur, Mexico, 1978-1982. Final report for MMC contract MM2324713-8. NTIS PB86-219 078. 69 pp. (A05)

Kasuya, T., and Y. Izumizawa. 1981. The fishery-dolphin conflict in the Iki Island area of Japan. Final report for MMC contract MM1533791-7. NTIS PB81-171 357. 31 pp. (A03)

Katona, S.K. 1983. The Gulf of Maine whale sighting network: 1976. Final report for MMC contract MM6AC018. NTIS PB83-151290. 32 pp. (A03)

Katona, S.K., and S. Kraus. 1979. Photographic identification of individual humpback whales (*Megaptera novaeangliae*): evaluation and analysis of the technique. Final report for MMC contract MM7AC015. NTIS PB-298 740. 29 pp. (A03)

Kooyman, G.L. 1982. Development and testing of a time-depth recorder for marine mammals. Final report for MMC contract MM6AC019. NTIS PB82-257 932. 10 pp. (A02)

Kraus, S.D. 1986. A review of the status of right whales (*Eubalaena glacialis*) in the western North Atlantic with a summary of research and management needs. Final report for MMC contract MM2910905-0. NTIS PB86-154 143. 61 pp. (A04)

Kraus, S.D., and R.D. Kenney. 1991. Information on right whales (*Eubalaena glacialis*) in three proposed critical habitats in United States waters off the western North Atlantic Ocean. Final report for MMC contracts T75133740 and 75133753. NTIS PB91-194431. 71 pp. (A04)

Lefebvre, L.W., and J.A. Powell. 1990. Manatee grazing impacts on seagrasses in Hobe Sound and Jupiter Sound in southeast Florida during the winter of 1988-89. Final report for MMC contracts T62239152, T68108782. NTIS PB90-271883. 39 pp. (A03)

Lentfer, J.W. (ed). 1988. Selected marine mammals of Alaska: species accounts with research and management recommendations. Final report for MMC contract MM2910798-4. NTIS PB88-178462. 275 pp. (A013)

Lentfer, J.W. 1990. Workshop on measures to assess and mitigate the adverse effects of arctic oil and gas activities on polar bears. Final report. NTIS PB91-127241. 43 pp. (A03)

Loughlin, T. 1978. A telemetric and tagging study of sea otter activities near Monterey, California. Final report for MMC contract MM6AC024. NTIS PB-289 682. 64 pp. (A04)

Marine Mammal Commission. 1974. Annual report of the Marine Mammal Commission, calendar year 1973. Report to Congress. NTIS PB-269 708. 14 pp. (A03)

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Marine Mammal Commission. 1978. Annual report of the Marine Mammal Commission, calendar year 1977. Report to Congress. NTIS PB-281 564. 101 pp. (A06)

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Marine Mammal Commission. 1981. Annual report of the Marine Mammal Commission, calendar year 1979. Report to Congress. NTIS PB81-247 892. 100 pp. (A06)

Marine Mammal Commission. 1981. Annual report of the Marine Mammal Commission, calendar year 1980. Report to Congress. NTIS PB81-247 884. 114 pp. (A06)

Marine Mammal Commission. 1982. Annual report of the Marine Mammal Commission, calendar year 1981. Report to Congress. NTIS PB82-221 425. 102 pp. (A06)

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Marine Mammal Commission. 1986. Habitat protection needs for the subpopulation of West Indian manatees in the Crystal River area of northwest Florida. NTIS PB86-200 250. 46 pp. (A04)

Marine Mammal Commission. 1986. Annual report of the Marine Mammal Commission, calendar year 1985. Report to Congress. NTIS PB86-216 249. 180 pp. (A09)

Marine Mammal Commission. 1987. Annual report of the Marine Mammal Commission, calendar year 1984. Report to Congress. NTIS PB87-209573. 173 pp. (A09)

Marine Mammal Commission. 1987. Annual report of the Marine Mammal Commission, calendar year 1986. Report to Congress. NTIS PB87-154092. 193 pp. (A09)

Marine Mammal Commission. 1988. Annual report of the Marine Mammal Commission, calendar year 1987. Report to Congress. NTIS PB88-168984. 209 pp. (A10)

Marine Mammal Commission. 1989. Preliminary assessment of habitat protection needs for West Indian manatees on the east coast of Florida and Georgia. Final report for MMC contracts T6223950-5, T6223954-7, T6223970-9, and T6224008-6. NTIS PB89-162 002. 120 pp. (A06)

Marine Mammal Commission. 1989. Annual report of the Marine Mammal Commission, calendar year 1988. Report to Congress. NTIS PB89-166 524. 237 pp. (A11)

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Marmontel, M., T.J. O'Shea, and S.R. Humphrey. 1990. An evaluation of bone growth-layer counts as an age-determination technique in Florida manatees. Final report for MMC contract T6223918-1. NTIS PB91-103564. 104 pp. (A06)

Mate, B.R. 1977. Aerial censusing of pinnipeds in the eastern Pacific for assessment of population numbers, migratory distributions, rookery stability, breeding effort, and recruitment. Final report for MMC contract MM5AC001. NTIS PB-265 859. 67 pp. (A04)

Mate, B.R. 1980. Workshop on marine mammal-fisheries interactions in the northeastern Pacific. Final report for (A04)

Mathiesen, O.A. 1980. Methods for the estimation of krill abundance in the Antarctic. Final report for MMC contract MM7AC032. NTIS PB80-175 151. 26 pp. (A03)

Matkin, C.O., and F.H. Fay. 1980. Marine mammal-fishery interactions on the Copper River and in Prince William Sound, Alaska, 1978. Final report for MMC contract MM8AC013. NTIS PB80-159 536. 71 pp. (A05)

Mayo, C.A. 1982. Observations of cetaceans: Cape Cod Bay and southern Stellwagen Bank, Massachusetts 1975-1979. Final report for MMC contract MM1800925-5. NTIS PB82-186 263. 68 pp. (A05)

Medway, W. 1983. Evaluation of the safety and usefulness of techniques and equipment used to obtain biopsies from free-swimming cetaceans. Final report for MMC contract MM2324809-8. NTIS PB83-263 269. 14 pp. (A02)

Miller, L.K. 1978. Energetics of the northern fur seal in relation to climate and food resources of the Bering Sea. Final report for MMC contract MM5AC025. NTIS PB-275 296. 27 pp. (A03)

Montgomery, S. 1986. Workshop on measures to address marine mammal/fisheries interactions in California. Final report for MMC contract MM3309746-2. NTIS PB86-219 060. 123 pp. (A07)

Montgomery, S. 1987. Report on the 24-27 February 1987 workshop to assess possible systems for tracking large cetaceans. Final report for MMC contract MM4465764-2. NTIS PB87-182135. 61 pp. (A04)

Nolan, R.S. 1981. Shark control and the Hawaiian monk seal. Final report for MMC contract MM1801065-5. NTIS PB81-201808. 45 pp. (A03)

Norris, K.S., and J.D. Hall. 1979. Development of techniques for estimating trophic impact of marine mammals. Final report for MMC contract MM4AC013. NTIS PB-290 399. 16 pp. (A02)

Norris, K.S., and R.R. Reeves (eds). 1978. Report on a workshop on problems related to humpback whales (*Megaptera novaeangliae*) in Hawaii. Final report for MMC contract MM7AC018. NTIS PB-280 794. 90 pp. (A05)

Norris, K.S., W.E. Stuntz, and W. Rogers. 1978. The behavior of porpoises in the eastern tropical Pacific yellowfin tuna fishery: preliminary studies. Final report for MMC contract MM6AC022. NTIS PB-283 970. 86 pp. (A05)

Odell, D.K. 1979. A preliminary study of the ecology and population biology of the bottlenose dolphin in southeast Florida. Final report for MMC contract MM4AC003. NTIS PB-294 336. 26 pp. (A03)

Odell, D.K., and J.E. Reynolds, III. 1980. Abundance of the bottlenose dolphin, *Tursiops truncatus*, on the west coast of Florida. Final report for MMC contract MM5AC026. NTIS PB-80-197 650. 47 pp. (A04)

Odell, D.K., D.B. Siniff, and G.H. Waring. 1979. *Tursiops truncatus* assessment workshop. Final report for MMC contract MM5AC021. NTIS PB-291 161. 141 pp. (A04)

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APPENDIX C

SELECTED LITERATURE PUBLISHED ELSEWHERE RESULTING FROM COMMISSION-SPONSORED ACTIVITIES

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