ANNUAL REPORT OF THE

MARINE MAMMAL COMMISSION

CALENDAR YEAR 1990

A REPORT TO CONGRESS

Marine Mammal Commission

1825 Connecticut Avenue, N.W.

Washington, D.C. 20009

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Executive Summary

The Annual Report of the Marine Mammal Commission, a comprehensive review of domestic and international activities affecting marine mammals, is published to provide timely information to Congress, private citizens, public interest groups, government agencies, and the international community on events of the past year. To ensure factual accuracy, a draft of the Report is provided to Federal and State agencies and others involved in the described activities for review and comment before publication.

Every year, the Marine Mammal Commission devotes special attention to certain marine mammal species or populations that face urgent conservation problems. As discussed in Chapter II, some of the most critical needs in 1990 involved West Indian manatees, Hawaiian monk seals, northern right whales, humpback whales, the population of sea otters in California, Steller sea lions, the Gulf of California harbor porpoise, and river dolphins.

In just the past two years, 390 dead West Indian manatees were recovered in the southeastern United States. This loss is enormous since the total population may number little more than 1,200 animals. More than 100 of the deaths were vessel-related, a record for any two-year period. Another 50 animals died following a severe cold snap late in 1989. It is likely that such losses exceed the population's replacement rate. If this mortality rate continues, manatees will disappear from much, if not most, of their current U.S. range. Irresponsible boating is not the only source of human-caused impacts upon manatees. Habitat throughout Florida is being degraded and destroyed by intensive development. As noted in Chapter II, substantial steps, actively supported by the Commission, have been taken by the State of Florida and others to regulate boat speeds in important manatee habitat and to incorporate parts of the species' remaining undisturbed habitat into refuge and reserve systems. Although progress is being made, it is questionable whether the progress will come fast enough and be sufficiently comprehensive to save the United States' population.

The Hawaiian monk seal, a species found almost entirely in the Northwest Hawaiian Islands National Wildlife Refuge, also faces an uncertain future. Numbering slightly more than 1,000 animals, the species is vulnerable to human disturbance on pupping beaches, entanglement in marine debris, incidental take in commercial fisheries, and possible die-offs from disease and naturally occurring biotoxins. In recent years, the National Marine Fisheries Service, through its efforts to increase pup survival, has helped rebuild declining populations at the western end of the species' range. However, funding support to sustain

and strengthen this and other program elements has not been adequate. In addition, the future of the field station at Tern Island, essential to ongoing research and management programs, is uncertain because the integrity of the island itself and its facilities is threatened by the disintegration of its seawall. As with manatees, the Commission places great importance on forcing efforts to protect this species and its habitats.

The most endangered marine mammal in U.S. coastal waters and the world's most endangered large whale is the northern right whale. The largest remaining population, about 350 animals, occurs off the east coast of North America. Only a few rare sightings have been made in recent years off the west coast. Right whales are killed by collisions with ships and entanglement in commercial fishing gear, and the species' normal behavior patterns may be disrupted by vessel traffic in essential habitats. Endangered humpback whales also occur off both east and west coasts of the United States. While more abundant than right whales, they too are subject to entanglement in fishing gear, disturbance by vessel traffic in essential habitats, and other human activities. As discussed in Chapter II, the Commission has worked with the National Marine Fisheries Service and others to help develop recovery plans for both species and to ensure that special management needs are met in habitat areas of particular importance.

The small population of sea otters along the central California coast was designated threatened under the Endangered Species Act in 1977 because of the increasing risk of oil spills. From perhaps a few tens of animals in the early 1900s, the population has increased to perhaps 1,800 animals today. Its recovery slowed, however, late in the 1970s as incidental take in commercial gillnet fisheries increased. As discussed in Chapter II, steps have been taken to address these threats by curtailing gillnet fishing within sea otter habitat and undertaking efforts to start a "reserve" sea otter colony at San Nicolas Island off Southern California. The latter effort is in its fourth year and, while only a few individuals remain at the island, it is too soon to judge the ultimate success of the project.

Steller sea lions, which occur around the rim of the North Pacific Ocean, have declined precipitously throughout most of their range and, in 1990, were designated as threatened under the Endangered Species Act. The cause of the decline is uncertain. Incidental taking in commercial fisheries and effects of fishing on prey species are among the possible causes. The Commission has urged the National Marine Fisheries Service to undertake responsive research and management actions and in 1990 significant progress was made.

Among the most endangered of the world's small cetaceans are the Gulf of California harbor porpoise and the several species of

river dolphins. Although these species occur outside U.S. waters, the Commission has assisted in efforts to identify and solve critical conservation problems. In Chapter II, these and other species that received particular attention from the Commission in 1990 are discussed. The latter include harbor seals, walruses, North Pacific fur seals, bowhead whales, harbor porpoise, bottlenose dolphins, and polar bears.

Marine mammals affect and are affected by a number of commercial and recreational fisheries. In 1990, as required by the 1988 amendments to the Marine Mammal Protection Act, the Commission provided to the Secretary of Commerce recommended guidelines to govern the incidental taking of marine mammals in the course of commercial fishing operations after 1 October 1993. Until that time, incidental take is legislatively authorized by an interim exemption. The Commission also continued to review and provide advice on efforts to reduce the incidental take of porpoise in the tuna purse seine fishery in the eastern tropical Pacific Ocean. These and other efforts are described in Chapter III.

As directed by the Marine Mammal Protection Act, the Commission reviews and provides advice to Federal agencies on U.S. participation in international programs affecting marine mammal conservation. As discussed in Chapter IV, the Commission devoted particular attention in 1990 to actions concerning the management of commercial whaling by the International Whaling Commission, high seas driftnet fisheries, and conservation of marine resources of the Southern Ocean.

Under the International Whaling Commission's conservation program, a worldwide moratorium on commercial whaling has been in place since 1986. In 1990, the Whaling Commission began a comprehensive assessment of whale stocks to determine whether and under what conditions commercial whaling might be resumed. As in recent years, the killing of whales for research purposes continued to be a contentious issue of concern to the International Whaling Commission, the United States, and the Marine Mammal Commission.

One of the greatest threats to marine mammals and many other marine species has been the development of large-scale pelagic driftnet fisheries. Much of this fishing takes place in international waters over which there is little or no control. During the past two years, many nations, including the United States, have banned large-scale driftnet operations in their waters. In addition, the United Nations, the International Whaling Commission, and others have taken steps to document effects of driftnet fishing and to determine how to avoid or reduce them. With the Departments of Commerce and State, the Marine Mammal Commission worked in 1990 towards international

control of these fisheries that have such broad and indiscriminate impacts.

The Marine Mammal Commission also continued to work with the Department of State and other Federal agencies to develop and implement international agreements for conserving whales, seals, and other living resources of the Southern Ocean. Of particular importance in 1990 was the Special Antarctic Treaty Consultative Meeting held to begin negotiating an agreement on comprehensive measures for protecting the antarctic environment.

As indicated in past Annual Reports, there appears to have been an increase in the occurrence of unusual marine mammal mortalities since the late 1970s. The reasons for the apparent increase are not clear, but it may be due in part to environmental pollution or other factors that weaken the ability of marine mammals to ward off natural diseases. This is of great concern to the Commission and, as described in Chapter V, it has devoted substantial efforts to identify, and ensure that the responsible agencies undertake, needed response measures.

In the early 1980s, it became apparent that lost and discarded fishing nets and other persistent marine debris were killing and injuring significant numbers of marine animals. Affected species included both endangered and non-endangered marine mammals, seabirds, sea turtles, and fish. The Commission has played a major role in forcing recognition of the significance of this form of marine pollution and in encouraging and assisting efforts to address it. As discussed in Chapter VI, the Commission continued to work closely in 1990 with the National Marine Fisheries Service to identify and implement priority research and management tasks. The Commission also continued to work closely with the U.S. Coast Guard to strengthen domestic and international programs to regulate routine disposal of garbage from ships at sea and to ensure that convenient port disposal facilities are available.

Marine mammal conservation is particularly challenging in Alaska because of the many marine mammal species occurring there, their use for subsistence purposes by Alaska Natives, and their interactions with commercial fisheries and offshore oil and gas exploration and development. In 1988, the Commission completed and provided appropriate State and Federal agencies with status reports containing research and management recommendations for ten marine mammal species commonly found off Alaska. Chapter VII discusses the efforts made in 1990 to follow up on those recommendations, particularly as they relate to developing conservation plans or recovery plans for walruses, polar bears, sea otters, and Steller sea lions. It also discusses efforts to determine how to answer critical questions concerning the causes of the devastating declines in Steller sea lions, North Pacific fur seals, harbor seals, and other species in the Bering Sea and

the Gulf of Alaska. In addition, it discusses efforts to develop a marking, tagging, and reporting program to obtain better information on the numbers of animals being taken in Alaska for subsistence and handicraft purposes and to help control illegal trade in marine mammal parts.

In March 1989, the worst oil spill in U.S. history occurred when the tanker Exxon Valdez ran aground in Prince William Sound, Alaska. Eleven million gallons of crude oil were spilled. Sea otters were the marine mammal species most immediately affected, and substantial efforts were undertaken to mitigate effects on that species. Work also was started to identify long-term effects on sea otters and other marine mammals. The results of sea otter rehabilitation efforts and efforts to continue marine mammal impact studies in 1990 are described in Chapter VIII.

Activities and events, like oil spills, that are associated with offshore oil, gas, and hard mineral exploration and development can affect marine mammals and their habitats. The Minerals Management Service has primary responsibility for managing these activities in Federal waters and for ensuring that they do not have significant adverse effects on marine mammals or the ecosystems of which the animals are a part. To assist the Service, the Commission reviews environmental impact statements for proposed lease sales and provides advice on assessment and monitoring studies that should be conducted as part of the Service's Environmental Studies Programs. Efforts undertaken in this regard are discussed in Chapter IX.

The Marine Mammal Protection Act directs the Marine Mammal Commission to undertake or cause to be undertaken studies which it considers necessary or desirable to protect and conserve marine mammals. The research and studies undertaken by the Commission in 1990 in response to this directive are described in Chapter X. Other research-related activities, such as the annual survey of federally funded marine mammal research, also are described. The results of research activities which the Commission has supported over the years have been published in the more than 350 papers and books listed in Appendices B and C.

Chapter XI discusses the issuance of permits to take marine mammals for scientific research, public display, and species enhancement. During 1990, the National Marine Fisheries Service's review of the permit process continued. Chapter XII discusses the efforts of the Commission, the Animal and Plant Health Inspection Service, the National Marine Fisheries Service, and the Fish and Wildlife Service to review for possible revision the standards and regulations for the humane handling, care, treatment, and transportation of marine mammals.

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CHAPTER I

INTRODUCTION

Background

This is the eighteenth Annual Report of the Marine Mammal Commission, covering the period from 1 January through 31 December 1990. 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 the responsibility for developing, reviewing, and making recommendations on actions and policies for all Federal agencies with respect to marine mammal protection and conservation and for carrying out a research program.

Personnel

The Commission consists of three part-time Commissioners who are 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 1990, the Commissioners were: Paul K. Dayton, Ph.D., Scripps Institution of Oceanography, La Jolla, California; Robert Elsner, Ph.D., (Chairman), Institute of Marine Science, University of Alaska, Fairbanks, Alaska; and Francis H. Fay, Ph.D., Institute of Marine Science, University of Alaska, Fairbanks, Alaska. In January 1990, William W. Fox, Jr., Ph.D., former Chairman of the Commission, resigned in anticipation of his being appointed Director of the National Marine Fisheries Service.

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

The Commission Chairman, with the concurrence of the other Commissioners, appoints the nine members of the Committee of Scientific Advisors on Marine Mammals, a committee of scientists statutorily required to be knowledgeable in marine ecology and marine mammal affairs. At the end of 1990, its members were:

Douglas G. Chapman, Ph.D., University of Washington; Murray L. Johnson, M.D., Burke Museum, University of Washington; Burney J. LeBoeuf, Ph.D., University of California, Santa Cruz; Jack W. Lentfer, Homer, Alaska; Marc Mangel, Ph.D., University of California, Davis; William Medway, D.V.M., Ph.D., University of Pennsylvania; William F. Perrin, Ph.D., National Marine Fisheries Service, La Jolla, California; John E. Reynolds, III, Ph.D., (Chairman), Eckerd College, St. Petersburg, Florida; and Tim D. Smith, Ph.D., National Marine Fisheries Service, Woods Hole, Massachusetts. During 1990, Robert L. Brownell, Jr., Ph.D., U.S. Fish and Wildlife Service, completed his term of service on the Committee.

Funding

The Marine Mammal Commission started operations during the second half of Fiscal Year (FY) 1974 and was appropriated $412,000 for that period. Subsequent appropriations were: FY 75, $750,000; FY 76, $900,000; FY 77, $1,000,000; FY 78, $900,000; FY 79, $702,000; FY 80, $940,000; FY 81, $734,000; FY 82, $672,000; FY 83, $822,000; FY 84, $929,000; FY 85, $929,000; FY 86, $861,000; FY 87, $900,000; FY 88, $953,000; FY 89, $953,000; FY 90, $960,000; and FY 91, $1,153,000.

CHAPTER II

SPECIES OF SPECIAL CONCERN

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, reviews the status of marine mammal populations and makes recommendations to the Departments of Commerce and the Interior on research and management actions needed to achieve the purposes of the Marine Mammal Protection Act and the Endangered Species Act. During 1990, the Commission continued to devote special attention to marine mammals designated as endangered or threatened, including West Indian manatees, California sea otters, Hawaiian monk seals, Steller sea lions, right whales, humpback whales, bowhead whales, Gulf of California harbor porpoise, and river dolphins. Given serious conservation issues involving certain other marine mammal species or populations, the Commission also focused attention on North Pacific fur seals, Pacific walruses, harbor porpoise, bottlenose dolphins, and polar bears. A review of Commission activities regarding these species and populations follows.

West Indian Manatee (Trichechus manatus)

West Indian manatees occur from the southeastern United States to northern Brazil. Their habitat includes rivers and coastal waters along the east coasts of North, Central, and South America and in the Greater Antilles. The population in the southeastern United States is one of the most endangered marine-mammal populations in coastal waters of the United States. It is estimated to number at least 1,200 animals and is the species' largest known concentration. The U.S. population is classified as a separate sub-species and is isolated from the rest of the species' range by the Gulf of Mexico to the west and the Florida Strait to the south. The northern rim of the Gulf of Mexico is exposed to winter weather too cold for manatees to survive, and the open water of the Florida Strait, through which the Gulf Stream passes, is too broad and swift for this slow coastal species to cross.

Most remaining populations outside of Florida are thought to be small and declining in size due to poaching, incidental take in gillnets, habitat degradation, and other threats. The capability and effectiveness of programs to address these problems in other countries are questionable in many, if not most, areas. Thus, the species' long-term survival may well depend on the success of efforts to protect it in the southeastern United States.

The capability and effectiveness of manatee protection programs in the southeastern United States, however, also are in grave doubt. In the past two years alone, 390 dead manatees have

been recovered through a manatee salvage and necropsy program in Florida and adjacent states. The principal threats include: (1) the killing and injury of animals by vessels on Florida waterways; (2) degradation of remaining manatee habitat by intense coastal development; and (3) periodic episodes of high natural mortality usually associated with intense cold weather.

As shown in Table 1, total known manatee mortality in the southeastern United States has increased significantly. Much, if not most, of the increased mortality over the past 10 years is attributable to increasing vessel-related deaths and dependent calf deaths. Increases in the latter category also may be vessel-related. That is, at least some nursing calves unable to fend for themselves probably die after their mothers are killed or seriously injured by vessel collisions or after they become separated from their mothers during confusion caused by dodging heavy boat traffic. The increase in dependent calf deaths also may be related somehow to increasing pollution levels although evidence for this is lacking.

Table 1. Known Manatee Mortality in the United States Reported Through the Manatee Salvage and Necropsy Program from 1978-1990*

Year	Total No. of Deaths in U.S.	Vessel-Related Deaths	Dependent Calf Deaths	All Other Deaths	Deaths Inside Florida	Deaths Outside Florida
1978	86	21	10	55	86	0
1979	78	24	9	45	77	1
1980	67	16	13	38	63	4
1981	119	25	13	81	116	3
1982	120	20	14	86	114	6
1983	81	15	18	48	81	0
1984	131	34	26	71	128	3
1985	128	35	25	68	119	9
1986	125	33	27	65	122	3
1987	118	39	30	49	114	4
1988	134	43	30	61	133	1
1989	174	51	37	86	166	8
1990**	216	50	45	121	206	10

* Numbers may differ slightly from those in previous Annual Reports because of corrections to data base over past few years.

** Totals provided by the Florida Department of Natural Resources for 1990 are preliminary.

The increase in manatee mortality was particularly alarming in 1989 and 1990, when annual death totals reached record levels of 37 percent and 70 percent, respectively, above the average annual mortality for the preceding five-year period (i.e., 1984-1988). This sharp increase was due, in part, to record numbers of vessel deaths and dependent calf deaths. In addition, in late December 1989 and January 1990, at least 46 animals died apparently from cold stress brought on by exceedingly cold weather during Christmas week 1989. Preliminary results of a Commission-sponsored study to age manatee bones indicates that almost all of the animals killed by the cold spell were less than four years of age. This is likely to seriously reduce recruitment of new animals into the breeding population over the next few years.

A second major threat to manatees is degradation and loss of remaining habitat due to coastal development. Florida's net population growth rate has increased to about 1,000 people per day. Accompanying this growth has been an unprecedented increase in development, particularly along rivers and coastal shorelines. Development in or adjacent to important manatee habitat can cause siltation, other forms of water pollution, and direct removal or pre-emption of natural vegetation. This, in turn, can reduce manatee food supplies and eliminate natural secluded areas preferred for calving, nursing, and mating. In the long term, loss of habitat to coastal development and environmental pollution may well be a more serious threat to manatees than vessel traffic.

Background on Recovery Activities

As discussed in previous Annual Reports, the Commission played a major role in helping develop cooperative Federal, State, and private efforts to address manatee conservation needs early in the 1980s. Among other things, the Commission allocated a special FY 1980 Congressional appropriation of $100,000 to critically needed manatee research and management tasks. It also provided detailed comments to the Fish and Wildlife Service on developing a Recovery Plan for West Indian manatees pursuant to provisions of the Endangered Species Act. These efforts contributed to the development of a well-conceived manatee research program, adoption by the Fish and Wildlife Service of a Recovery Plan in 1980, and approval of a related Comprehensive Work Plan in 1982. In 1984, the Commission also completed a report on habitat protection needs for manatees in the Crystal River area of northwest Florida (see Appendix B, Marine Mammal Commission 1986). The report helped encourage and coordinate land acquisition efforts aimed at establishing a network of key manatee habitats within an expanding regional system of Federal and State refuges, reserves, parks, and preserves.

By 1986, it became apparent that the cooperative efforts being undertaken were still not sufficient to address the scale of the problems causing vessel-related deaths or degradation of manatee habitats. Therefore, in December 1987, the Commission held its annual meeting in Florida, devoting most of its attention to a review of the manatee recovery program. Representatives of the principal Federal and State agencies, private organizations, and public interest groups involved in manatee recovery were invited to attend.

The meeting produced general agreement on the need to significantly expand recovery program efforts. In particular, there was agreement on the need to: reconstitute and reconvene the Manatee Recovery Team; update the West Indian Manatee Recovery Plan and Comprehensive Work Plan; aggressively pursue manatee-related land acquisitions in the Crystal River and Homosassa River areas; strengthen the system of boat speed regulatory zones; limit the development of new boating facilities in essential manatee habitat; and undertake priority manatee research.

In the three years since that meeting, substantial progress has been made to follow up on some of these actions. The Fish and Wildlife Service: reconstituted the manatee Recovery Team and began holding periodic meetings to coordinate recovery actions; completed and adopted a revised Recovery Plan for manatees in Florida in July 1989; took steps to acquire additional manatee habitat for incorporation into National Wildlife Refuges in the Crystal River area; and devoted substantial effort to reviewing applications for Federal dredge and fill permits for marinas and boating facilities in manatee habitat. The State of Florida initiated efforts to: substantially expand authority, funding, and staff for the Department of Natural Resources' manatee recovery activities; require county manatee protection plans for 13 counties where manatees occur most frequently; expand its boat speed regulatory system; limit development of new boating facilities in manatee habitat; strengthen the manatee salvage and necropsy program; and develop a State-wide geographic information system for manatee-related data.

The Commission and its Committee of Scientific Advisors on Marine Mammals played a major role in assisting these efforts. The results of its 1987 annual meeting were incorporated into a Commission-sponsored report on the status and needs of the cooperative Federal-State manatee recovery program in Florida (see Appendix B, Reynolds and Gluckman 1988). That report was distributed widely among involved parties to help focus attention on priority actions. In addition, the Commission initiated a study of habitat protection needs for manatees on the east coast of Florida and Georgia. The study report (see Appendix B, Marine Mammal Commission 1989) was completed and distributed in December

1988. Among other things, it recommended: establishing 22 new boat speed regulatory zones along the east coast of Florida, thereby adding approximately 195 miles of waterway to the existing 70-mile system of manatee speed zones along the East Coast; giving high priority to the purchase of certain properties on the Florida Conservation and Recreation Lands Acquisition List; acquiring undeveloped lands along the St. Johns River near Blue Spring; restoring a manatee travel corridor severed by development of the Kennedy Space Center at Cape Canaveral; and undertaking a pilot project to enhance manatee feeding and resting opportunities along the east coast manatee migratory corridor.

The Commission also devoted most of its Fiscal Year 1988 research budget to manatees. Funds were applied to studies that either could not be initiated by other agencies due to funding constraints or which required supplemental funding. Among the projects supported were: a workshop to identify steps for developing a computer-based geographic information system to speed access to and analyses of data for management and research purposes; an investigation of the feasibility of determining the age of manatees from bone growth layers; an assessment of the use of DNA fingerprinting to determine genetic variability, kinship, and reproductive success of manatees; an assessment of manatee grazing on seagrass beds in Hobe Sound; and support for meetings of the Florida Department of Natural Resources' Manatee Technical Advisory Council. In 1989, the Commission provided additional funding for work on aging manatee bones and for equipment to help expand Fish and Wildlife Service radio-tagging studies.

West Indian Manatee Recovery Plan and Recovery Team

On 24 July 1989, the Fish and Wildlife Service adopted a revised Recovery Plan for manatees in Florida. The revision, which replaced the initial Recovery Plan and Comprehensive Work Plan, completed in 1980 and 1982 respectively, included several basic changes in scope and approach. Among other changes, it focused exclusively on manatees in Florida (the 1980 Plan also addressed manatees in Puerto Rico, where problems and issues are quite different) and it combined the Recovery Plan and the more detailed Comprehensive Work Plan into a single document.

The Revised Recovery Plan includes more than 70 tasks to help restore manatees in Florida. Key parts include tasks to: define manatee habitat use patterns and key population parameters; identify areas where manatees are most likely to be struck by boats; implement site-specific protection measures to reduce vessel-related deaths; reduce potentially hazardous development in essential manatee habitat; and acquire additional manatee habitat for incorporation into Federal and State refuges, reserves, preserves, and parks.

Carrying out all tasks is beyond the authority and financial resources of any one agency or group. Therefore, as the Service developed the revised Plan, it did so in close cooperation with other agencies and parties having related or partial responsibility. To facilitate and coordinate their active participation in the recovery program, the Plan provides an Implementation Schedule identifying the cooperating agencies and estimated funding needs for each task over the next five years. There was broad concurrence with the Plan's provisions and, in addition to the Commission, representatives of the following agencies and groups signed the final Plan: the Army Corps of Engineers; the Florida Department of Natural Resources; the Florida Game and Fresh Water Fish Commission; the Florida Department of Environmental Regulation; the Florida Department of Community Affairs; the Florida Power & Light Company; the Georgia Department of Natural Resources; the Marine Industries Association of Florida; the Save the Manatee Club; Sea World Enterprises; and the Sierra Club.

During 1990, efforts to implement the revised Plan were accelerated. To coordinate and oversee recovery activities, the Service convened four meetings of the Manatee Recovery Team, which includes representatives of the above agencies. Among other things, the participants took steps to prepare participation schedules detailing the commitments and activities related to tasks in which they were cooperating.

Activities in Support of the Revised Manatee Recovery Plan

During 1990, the Commission continued to provide assistance and advice as described below to help with tasks in the revised Manatee Recovery Plan.

Research and Management Funding -- As noted in the previous Annual Report, Fish and Wildlife Service funding levels were not sufficient to meet the Service's research and management obligations as set forth in the revised Recovery Plan. Therefore, on 1 August 1989 and again on 10 October 1989, the Commission wrote to the Service recommending a minimal level of increased support necessary to carry out a useful manatee recovery program. On 15 November 1989, the Service responded, noting that the Commission's recommendations would be taken into consideration and, early in 1990, the Commission learned that the Service had provided an additional $80,000 to address manatee management needs and an additional $50,000 for manatee research in FY 1990.

The additional funding, however, was below levels set forth in the Recovery Plan and those recommended by the Commission. In view of the continuing shortfall, and recognizing that the alarming increase in cold-related manatee deaths early in 1990 would further aggravate an already critical situation for the species, the Commission reviewed the tasks and funding estimates

in the revised Recovery Plan. On 2 March 1990, the Commission wrote to the Service providing further recommendations. In its letter, the Commission, in consultation with its Committee of Scientific Advisors, recommended that the Service commit itself to a five-year program of increased support for both research and management beginning with FY 1991.

Regarding essential research tasks in the Recovery Plan, the letter recommended a funding level of $583,000 for FY 1991. The total reflected cost projections for radio telemetry studies, geographic information system development and data transfer, studies to estimate and monitor population trends, studies of manatee life history and ecology, staff salaries, and operational support. For manatee management, the letter recommended a funding level of $315,000 in FY 1991. These funds reflected costs for staff and operational support to: help State and local officials develop local manatee protection plans; carry out section 7 consultations required by the Endangered Species Act; identify and pursue federally designated manatee sanctuaries; and implement protection needs in key manatee habitats. The latter total also included costs for developing contingency arrangements to rescue distressed manatees, improving enforcement capabilities, and expanding public education efforts.

Uncertain of the Service's response to its recommendations, the Commission wrote to the Service on 20 November 1990. It asked to be advised of the immediate and longer term funding levels the Service expected to provide for manatee work and how those levels compared to the recommendations in its 2 March letter. Subsequently, the Commission learned that Congress, as part of its broader concern for the inadequacy of support for research on a number of endangered species, had provided the Service $200,000 for research on manatees in FY 1991 through an add-on appropriation for work on a number of endangered species. As of the end of 1990, the Commission was looking forward to the Service's response to its letter.

Land Acquisition -- The Manatee Recovery Plan identifies land acquisition for the purpose of protecting essential manatee habitat as a high priority. As noted in previous Annual Reports, both the Fish and Wildlife Service and the State of Florida have acquired important manatee habitat and added them to their various refuge, reserve, preserve, and park systems. To help these efforts, the Commission has prepared reports on manatee habitat protection needs, including acquisition priorities, in the Crystal River area of northwest Florida and along the east coast of Florida and Georgia (see Appendix B, Marine Mammal Commission 1986 and 1988).

The Crystal River area is particularly important for manatees in Florida. Crystal River is about 60 miles north of Tampa on the State's west coast. The region around the river

supports a relatively discrete population of manatees that is one of only two such groups in the State that are known to have increased steadily in number over the past decade. During winter, the survival of the animals depends on natural warm-water springs in Kings Bay at the head of Crystal River and at the head of the Homosassa River. In spring, manatees leave the warm-water refuges and move into the lower portions of rivers, principally along a 50 to 60-mile stretch of undeveloped or lightly developed coast from the Suwannee River to the north to the Chassahowitzka River to the south.

The Commission's 1984 report on habitat protection needs for the area recommended that the Fish and Wildlife Service and the State of Florida cooperate in a long-term effort to expand the regional network of protected areas to include certain key manatee habitats. In March 1986, the report's recommendations were reviewed at a meeting of representatives of the Service, the Florida Department of Natural Resources, and the Commission. During the meeting, participants agreed on a cooperative approach to pursue certain acquisitions in the area. As discussed in previous Annual Reports, significant progress has been made to place areas on acquisition lists and acquire important habitats.

One of the agreed recommendations involved purchasing a site on Kings Bay to serve as a headquarters and visitor center for the Crystal River National Wildlife Refuge. The Refuge included islands in Kings Bay purchased early in the 1980s, but had no mainland area from which to base its refuge management operations. In addition to a considerable number of recreational boaters, increasing numbers of recreational divers travel to Kings Bay during the winter to dive in the bay's warm, clear, spring-fed waters and observe manatees. The increase in diving has raised concern regarding harassment of manatees. A refuge headquarters and manatee interpretive center on the bay near the warm-water springs is needed as a base from which to educate the public on manatee protection needs and assure compliance with harassment regulations.

In May 1990, the Service purchased a 3.3-acre site on the bay. The site, adjacent to a commercial marina and hotel, includes a private residence with a direct line of sight to the bay's main warm-water spring. Following purchase of the site, the Crystal River City Council expressed concern that use of the site as a visitor center would create traffic levels that would disturb the surrounding residential neighborhood. Therefore, on 19 June 1990, the Service wrote to advise the City Council that it would use the site as a staff headquarters only beginning in the fall and would reevaluate its plan to locate the proposed manatee interpretive and education center on the property.

On 13 July 1990, the Commission wrote to the Service noting that acquisition of the property was a notable and important step

in developing the envisioned regional network of refuges and reserves and expressing support for the Service's decision. In its letter, the Commission noted the importance of moving into the site in time for the coming winter manatee season. It also noted that, through thoughtful planning, landscaping, and site design, it should be possible to use the site as a modest visitor information center that could meet the pressing need for distributing brochures and answering basic questions from the public without intruding on the ambiance of the surrounding neighborhood. In 1991, the Service, in cooperation with the City, will be examining alternatives for meeting visitor information needs in the Crystal River area.

During 1990, the State of Florida also took further steps to strengthen the regional network of protected areas around Crystal River by adding a new acquisition proposal to its Conservation and Recreation Lands acquisition list. The proposed project, called the Homosassa Reserve, includes more than 8,800 acres of undeveloped wetlands and hardwood hammocks along the inland boundary of the Chassahowitzka National Wildlife Refuge. Although the area does not include streams used by manatees and thus is of lesser importance to manatees than other projects along the Crystal, Homosassa, and Salt Rivers already on the State's acquisition list, it includes wetlands and hardwood hammocks whose drainage is important for maintaining the regional ecosystem upon which manatees depend. Therefore, its acquisition offers a valuable opportunity to complement and consolidate other ongoing land acquisition efforts in the region.

On 27 November 1990, the Commission, in consultation with its Committee of Scientific Advisors, wrote to the chairman of the State's Land Acquisition Advisory Council commenting on the proposal. In its letter, the Commission urged the Advisory Council to accord the project a high ranking and expressed hope that all of the listed acquisition projects in the area would be pursued with vigor and haste. The Commission subsequently learned that the Council had ranked the project number 14 on a list of 93 acquisition projects.

Seagrass Grazing Studies -- Survival and recovery of manatees in Florida will depend, in part, on efforts to protect seagrasses on which manatees feed. Seagrasses near warm-water refuges are particularly important because of the large numbers of animals near those sites in winter. Seagrass beds in Hobe Sound and Jupiter Sound on Florida's southeast coast provide important feeding areas for manatees using a warm-water refuge created by a power plant at Riviera Beach. The refuge attracts one of the largest winter manatee concentrations in the State. Seagrass beds throughout much of Florida have declined significantly in recent decades. To help assess conservation needs for seagrass beds in the Hobe Sound and Jupiter Sound area, the Fish and Wildlife Service, the National Marine Fisheries Service, and

the Florida Department of Natural Resources initiated a multi-year study in 1987 to monitor seagrass beds and ambient water quality, particularly water clarity, that could affect plant growth.

To help distinguish between possible effects of water quality and manatee grazing on area seagrass beds, the Commission provided computer hardware and funds to assess manatee distribution, feeding locations, feeding impacts, and recovery of grazed seagrass patches during and following the winter of 1988-1989. The Commission provided partial support for a similar study in the area during the winter of 1980-1981 (see Appendix C, Packard 1981 and 1984). The report of the 1988-89 field work was completed in 1990 (see Appendix C, Lefebvre and Powell 1990). The winter of 1988-1989 was exceptionally mild and manatees did not disturb large areas of seagrass as they had during the severe winter of 1980-1981. The study documented significant recovery of seagrasses in grazed areas in the following spring. The results will be considered with those from other seagrass studies ongoing in the area.

Development of a Geographic Information System -- In the mid-1980s, the Florida Marine Research Institute of the Department of Natural Resources began a pilot effort to develop a computerized geographic information system to map, integrate, analyze, and quickly retrieve site-specific data on manatees and manatee habitat. The pilot effort was begun to enable better access and use of the large and growing amounts of data scattered among various reports and agencies. To help refine the system, the Commission sponsored a workshop convened by the Department and Eckerd College on 21-22 March 1989. Its purpose was to review new technology and experience related to computer-based geographic information systems and to consider geographic information system design options that best addressed the day-to-day research and management needs of the parties involved in the manatee recovery program. Accordingly, workshop participants included scientists familiar with manatee data sets, computer specialists familiar with geographic information system capabilities, and resource managers directly involved in manatee conservation.

During the workshop, participants agreed that the Florida Marine Research Institute's pilot geographic information system should be expanded into a State-wide centralized data base run by hardware and software capable of performing complex analytical tasks. They also agreed that the system should be designed to allow access to the central data base by a network of less powerful field terminals located at offices of agencies and research centers throughout Florida and Georgia. During 1990, a final report of the workshop and papers presented at the meeting was completed and printed by the Florida Department of Natural Resources (see Appendix C, Reynolds and Haddad 1990).

As of the end of 1990, the Department's Marine Research Institute had made substantial progress in developing a central data base as discussed at the workshop. Digitized maps of all major manatee habitats had been prepared and much of the existing data on manatee distribution, mortality, and related factors had been entered. Among other things, the system is already being used to provide counties in Florida information with which to develop county manatee protection plans. In 1991, work on entering relevant data and expanding access to the centralized data base through a network of field terminals is expected to continue.

Age Determination Studies -- In 1988, the Commission provided support for a study to determine whether the age of manatees could be determined from growth layers in manatee bones. A technique for doing so had not been developed and it was recognized that information on the age of animals recovered in the manatee salvage and necropsy program could provide a valuable basis for assessing the status of the manatee population, as well as for understanding age-specific mortality and reproduction. During the study, bones from 61 manatees were examined. The animals included some known-age, minimum known-age, and tetracycline-marked animals. Work was completed in 1990 (see Appendix B, Marmontel *et al*. 1990). The results demonstrated that portions of manatee ear bones can be sectioned and read to provide useful estimates of an individual's age at time of death.

Based on the results, the Commission provided additional funds to examine the backlog of bones from animals collected by the Florida manatee carcass salvage and necropsy program since 1974. The additional work, expected to be completed in 1992, should provide age estimates for up to 1,500 animals and a valuable data base for further analyses regarding the population status and trends.

Other Issues -- During 1990, the Commission also reviewed and provided advice on a number of manatee protection matters.

On 14 May 1990, the Commission wrote to the Navy regarding the deaths of three manatees killed at the Kings Bay Nuclear Submarine Base in southern Georgia. The manatees had been killed in three separate incidents by the propellers of tugs maneuvering submarines. The letter urged that every possible effort be made to cooperate with a Fish and Wildlife Service team traveling to the Base to investigate the accidents and to ensure that further mortalities are avoided. On 22 May, the Navy responded to the Commission's letter, noting that it was cooperating fully with the Fish and Wildlife Service to address the problem. It noted that the Service had advised Base personnel where manatees were likely to congregate, that signs were being posted at those sites warning of the presence of manatees, and that investigations were being conducted into the use of shrouding around tug propellers.

On 27 April 1990, the Commission wrote to the Florida Public Service Commission regarding a finding that public education materials produced by the Florida Power & Light Company on manatees and other endangered species were "image enhancement advertisements" whose costs should not be passed on to utility rate payers. In its letter, the Commission expressed the view that the company's manatee publications were valuable contributions to the manatee recovery program and that they were appropriate and legitimate costs, helping ensure that company operations did not adversely affect manatee survival. It also noted that the publications admirably filled an urgent public education need and helped forge a responsible industry-customer stewardship of sensitive natural resources. The Public Service Commission subsequently reversed its finding.

On 5 November 1990, the Commission wrote to the Commander of the Seventh District of the U.S. Coast Guard about authorization of an Offshore World Cup Boat Race to be held in Tampa Bay late in November near a warm-water refuge for manatees. Both the participating boats and spectator boats associated with the race would have posed a risk to manatees attracted to the area by the warm-water refuge. In its letter, the Commission expressed support for a recommendation provided to the Coast Guard on 2 November 1990 by the Fish and Wildlife Service to move the race to an offshore location outside Tampa Bay. The Coast Guard agreed and authorization to hold the race at the planned location was denied. The race was relocated to a site in the Florida Keys that did not pose a risk to manatees.

Actions To Strengthen Florida's Manatee Recovery Efforts

Since late in the 1970s, the State of Florida has assumed an increasingly prominent role in carrying out manatee research and management actions. In 1978, the State Legislature passed the Florida Manatee Sanctuary Act which, among other things: designated the Florida Department of Natural Resources as the primary State agency responsible for protecting manatees; set forth State prohibitions against harming manatees; and established 12 seasonal boat speed regulatory zones to allow animals in those areas time to avoid oncoming boats. The Department later received authority to establish new zones through regulatory action, and by 1988 the system had been expanded to 21 areas.

In addition, in 1984, the State Legislature acted to secure an annual funding base for the Department's manatee program. It did so by authorizing allocations of $250,000 per year from revenues generated by State boat registration fees and by adding a box to boat registration forms inviting boat owners to contribute an additional $1.00 voluntary donation (later raised to $2.00) to supplement the State's manatee recovery work. Among other things, the funds allowed the Department to expand its

research program, assume responsibility from the Fish and Wildlife Service for the manatee salvage and necropsy program, and begin working with local officials on county manatee protection plans.

As noted above, total manatee mortality and vessel-related deaths continued to increase despite these and other efforts to improve manatee protection. Concerned about the trends, the Florida Governor and Cabinet asked the Florida Department of Natural Resources in mid-1989 to develop recommendations to come to grips with the problems. The Department's recommendations were presented to the Governor and Cabinet later that year.

The Department proposed special attention to actions in 13 counties where manatees are most abundant or where vessel-related mortality is very high. It recommended that officials of those counties develop interim manatee protection speed zone systems to take effect pending completion of county manatee protection plans. It also recommended an interim boating facility siting policy to conditionally limit new development to one power boat slip per 100 feet of shoreline in the 13 counties, accelerating development of the geographic information system for manatee-related data, adopting emergency slow speed limits in certain areas, and approving overtime pay for enforcement officers. The Department also recommended seeking further legislative authority to establish new speed zones, protect manatee habitat, and increase manatee program staff and funding. As noted in the previous Annual Report, representatives of the Commission addressed the Florida Governor and Cabinet at meetings in late 1989 expressing strong support for the recommendations.

In the final months of 1989, the Governor and Cabinet acted on many of the recommended actions. They approved actions to move ahead on interim boat speed rules in the 13 counties of special concern, approved an emergency rule for boat speed restrictions in Brevard County, authorized overtime pay for Florida Marine Patrol officers to strengthen enforcement of manatee-related regulations, adopted the interim boating facility siting policy, and approved rules for two additional slow speed zones and one year-round motorboat exclusion area at a warm-water outfall used by manatees at Port Everglades.

During 1990, the State continued to pursue the course of actions begun in 1989. Major efforts were devoted to developing and adopting interim boat speed regulatory systems in the 13 counties of special concern to manatees and to strengthening the legislative authority for its expanding manatee protection efforts.

With respect to developing interim county rules for boat speed zones, a two-step approval process is being followed. The process involves close cooperation between county and State

officials at each stage. Proposed rules first are developed for each county based on local manatee distribution and occurrence and local boating patterns. Initial proposals are evaluated during one or more public hearings, modified as warranted, and then adopted by county governments.

County rules are then submitted to the Florida Governor and Cabinet for review and incorporation into the State regulatory code. The rules adopted by the Governor and Cabinet may differ from those of the county; however, when different restrictions apply to the same area, the more restrictive rule applies. By overlaying State and county rules, local ordinances receive the benefit of State enforcement capabilities. Action by the Governor and Cabinet on some county systems began in June 1990. By March 1991, it is expected that the Governor and Cabinet will have acted on systems for each of the 13 counties. As of the end of 1990, proposed rules had been developed by all 13 counties of special concern for manatee protection and the Governor and Cabinet had taken action to adopt State rules for four of those counties.

The interim rules, with some possible adjustments, are expected to become basic elements of county manatee protection plans. These plans are being required for each of the 13 counties as elements of local growth management plans mandated by the State's Local Government Comprehensive Planning and Land Development Regulation Act of 1985. The interim rules will substantially expand the amount of manatee habitat covered by slow and idle speed restrictions. Because the work that remains to be done to approve and adjust the interim rules, post new signs along designated waterways, indicate the presence of speed zones on nautical charts, advise boaters of the new restrictions, phase in enforcement efforts, etc., it may be several years before the new systems' effectiveness in reducing collisions between vessels and manatees can be assessed.

In parallel with these efforts, the Florida Legislature amended certain State statutes, including the Florida Manatee Sanctuary Act, in June 1990. Among other things, the amendments authorize local governments to regulate boat speeds in any area where manatees occur frequently except in the marked channel of the Florida Intracoastal Waterway and waters within 100 feet of that channel. They also require that, before becoming effective, local ordinances be reviewed and approved by the Florida Department of Natural Resources. The amendments charge the State's Inland Navigation Districts with responsibility for posting regulatory signs along all designated speed zones that are adopted.

Other amendment provisions clarify or confer new authority for the Florida Department of Natural Resources to: regulate new construction or expansion of marinas involving more than five

boat slips in manatee habitats; protect important manatee habitats, such as seagrass feeding areas, from human activities other than vessel traffic; limit boat access in certain locations to create safe havens where manatees can feed, rest, calve, or nurse their young undisturbed by humans; adjust the times and seasons when boat speed restrictions apply in certain designated regulatory areas; require the use of bumpers along certain piers to prevent manatees from being crushed between bulkheads and the hulls of moored vessels; and conduct a study of underwater noise levels that may deter manatees from crossing in front of oncoming boats.

To carry out the new provisions, the amendments authorize nine new staff positions for the Department of Natural Resources and provide a supplemental appropriation of $324,300 from the Save The Manatee Trust Fund for the coming fiscal year. Long-term funding needs also are addressed by increasing the share of funds to be applied to manatee work from State boat registration fees. The previous limit of $250,000 per year is replaced by a limit of one dollar per registered boat per year (there are currently more than 750,000 boats registered in Florida).

Conclusion

For the third year in a row, known manatee mortality in the southeastern United States reached record levels. The trends clearly indicate that recovery efforts over the past several years have been insufficient despite significant, diligent efforts by numerous Federal, State, private, and industry groups. While past efforts appear to have been directed towards appropriate measures, their scope and scale have been too limited. In 1989 and 1990, the Fish and Wildlife Service, the Commission, the Save the Manatee Club, and particularly the State of Florida have moved aggressively to address the deficiencies in ways that, it is hoped, will be neither too little nor too late.

The California Sea Otter Population (Enhydra lutris)

Before being hunted commercially, sea otters inhabited the coastal waters of the North Pacific Ocean from central Baja California north along the coasts of California, Oregon, Washington, British Columbia, and southern Alaska; west around the Aleutian, Pribilof, and Commander Islands; and south along the Kamchatka Peninsula, the Kurile Islands, and the islands of northern Japan. Commercial exploitation of sea otters for their fur began in the mid-1700s shortly after the discovery of the Commander Islands by Vitus Bering. Exploitation continued, largely unregulated, until 1911 when the species was protected by the North Pacific Fur Seal Convention, signed by the United States, Great Britain, Russia, and Japan. By that time, however,

the species was nearly extinct throughout most of its historic range.

Small groups of sea otters survived in remote areas in the Soviet Union, Alaska, and central California. In California, the remnant population occupied a few miles of the rocky Point Sur coast and may have numbered fewer than 50 animals in 1911. Protected by the Fur Seal Treaty and later by the State of California, the population grew slowly until, by the mid-1970s, it inhabited nearshore areas extending about 160 miles along the central California coast. The population at that time was estimated to number fewer than 1,800 animals. At the same time, the risk of oil spills in and near the population's range was increasing, due largely to increased tanker traffic transporting oil from the recently completed Alaska pipeline.

Because of its small size, its limited distribution, and the increasing threat of oil spills and other catastrophic events, the California sea otter population was designated as threatened under the Endangered Species Act in January 1977. The Marine Mammal Commission recognized the need to protect the California sea otter population while at the same time minimizing possible adverse effects on commercial and recreational fisheries. To meet both these needs, the Commission in December 1980 recommended that the Fish and Wildlife Service adopt and implement a "zonal" management strategy for sea otters and that it establish one or more sea otter colonies at a site or sites not likely to be affected by an oil spill in or near the population's current range. 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. As described in previous Annual Reports, the Service subsequently developed, adopted, and began implementing a program to establish a "reserve" sea otter colony at San Nicolas Island in the California Channel Islands.

Summary of Translocation Efforts To Date

Capture of sea otters for translocation to San Nicolas Island began on 24 August 1987. From that time until 11 August 1989, biologists from the Fish and Wildlife Service and the California Department of Fish and Game caught a total of 228 sea otters along the central California coast. Of these, 134 were judged to be healthy and of the right age and sex for translocation. They were transported by van to the Monterey Bay Aquarium, tagged, screened for possible health abnormalities, and prepared for shipment to San Nicolas Island. Five otters died while at the Aquarium and four others were returned to the original capture site and released. The remaining 125 sea otters (29 males and 96 females) were flown to San Nicolas Island in groups of 1 to 24 animals.

During the third year of this effort (August 1989 to July 1990), 23 sea otters were captured, of which 14 met the sex and age-class criteria for translocation. One animal died as a result of complications associated with attempts to surgically implant a radio transmitter. The remaining 13 sea otters, 2 males and 11 females, were translocated to San Nicolas Island. Nine of the translocated animals were adults and four were sub-adults.

At the end of 1990, only 14 of the 139 animals taken to San Nicolas Island were known to still be there. Of the remaining animals, 30 were known to have returned to the existing California sea otter range, and three had been recaptured in the "no-otter" Management Zone, an area outside the translocation zone from which sea otters are excluded (discussed in previous Annual Reports). Another nine sea otters were known to have died, and the remaining 83 were unaccounted for. Nine sea otters have been born on San Nicolas since the translocation effort began in August 1987, with seven of these births having occurred since July 1989.

Containment -- From September 1987 through July 1988, there were 37 reports and 15 verified sightings of sea otters within the designated Management Zone. During the second year of the translocation, reports of sea otters sighted in the Management Zone dropped by about 50 percent. From August 1988 through June 1989, there were 19 reports and 8 verified sightings of groups of one to three animals, all of which were located just inside the northern end of the Management Zone at Point Conception. From August 1989 through June 1990, there were 30 reports and 14 verified sightings of sea otters in the Management Zone. As was the case during the previous years, sea otters sighted in the Management Zone apparently did not remain there. Monitoring by the Fish and Wildlife Service has verified that no new sea otter colonies have been established in the Management Zone.

At the annual meeting of the Marine Mammal Commission and its Committee of Scientific Advisors in Hawaii in March 1990, Fish and Wildlife Service officials reported on the translocation program. The Service indicated that the program had not been as successful as anticipated but that it still had the potential to succeed. In particular, the Service noted that the experience to date at San Nicolas Island was similar to those of other, ultimately successful, sea otter translocation efforts. For example, 59 sea otters were translocated from Alaska to sites off Washington State in 1969 and 1970 and, while only 18 animals were found during a 1977 survey, the most recent survey indicates that the population now numbers more than 500 animals.

Continuation of the Translocation Project

In August 1987, the Fish and Wildlife Service and the California Department of Fish and Game signed a memorandum of understanding setting up the translocation program. The memorandum provides that the California Department of Fish and Game can, upon 60 days' written notice, terminate the agreement on the grounds that the Fish and Wildlife Service has violated a provision of the agreement.

On 15 August 1990, the California Fish and Game Commission wrote to the Fish and Wildlife Service Regional Office advising the Service that the Commission, as the policy-setting body for the California Department of Fish and Game, had, at its 3 August 1990 meeting, declined to renew the memorandum of understanding for the translocation of sea otters to San Nicolas Island. In its letter, the Commission noted that its decision was based on the fact that, after translocating 139 sea otters to San Nicolas Island during the past three years, only 15 to 18 animals were known to be present.

In response to the Commission's letter, the Fish and Wildlife Service asked the Sea Otter Recovery Team to review the translocation effort to date, the status of the colony at San Nicolas Island, the proposed research, the relevance of the research to sea otter recovery, and other pertinent information. On 18 October 1990, the Service wrote to the Fish and Game Commission with the review results. The Service noted that Recovery Team members were unanimous in recommending that up to 18 additional sea otters implanted with radio transmitters be translocated to San Nicolas Island to obtain additional information important to the Service's efforts to encourage the recovery of and manage the sea otter population in California.

In its letter, the Service also noted that, under the terms of the agreement, the State can terminate the memorandum if it determines that the Service has violated a provision of the agreement. The Service pointed out that it had not violated any part of the agreement and, therefore, did not consider termination appropriate. The Service further advised the Fish and Game Commission that it planned to proceed with the translocation of up to 18 otters during the next plan year (August 1990-August 1991).

The original Fish and Wildlife Service proposal to translocate sea otters constituted a major Federal action under the Coastal Zone Management Act and required a determination of consistency with the California Coastal Management Plan. The California Coastal Commission made a consistency determination in October 1987. In November 1990, the Fish and Wildlife Service met with the Coastal Commission to report on results of the translocation program as of that date. At its 12 December

meeting, the Coastal Commission adopted a resolution calling for suspension of the Southern Sea Otter Translocation Program. In its resolution, the Coastal Commission noted that its 1987 consistency determination was based on the understanding that the proposed program would benefit sea otters in California by establishing a second population, thus reducing the risk of loss of the entire population from a large oil spill or similar catastrophe. However, the Coastal Commission noted in its resolution that the loss of animals taken to the island has been substantially higher than expected; that a continued loss of a significant percentage of any otters taken to the island could be expected; and that there is additional concern that the mainland population may be decreasing.

The Coastal Commission had serious reservations about the program's ability to establish a separate sea otter population at San Nicolas Island; the Coastal Commission also believed that suspending translocation efforts was necessary to provide time to evaluate the probability of success. The resolution requested that the Fish and Wildlife Service: (1) delay moving any more sea otters to San Nicolas Island for at least 12 months; (2) delay moving any more sea otters until counts indicate that the central coast population is growing at a steady and acceptable rate; and (3) submit an updated report in July 1991 reviewing the status of the mainland and San Nicolas sea otter populations, including all otter pups born at San Nicolas. By the end of 1990, the Coastal Commission has not formally transmitted the resolution to the Fish and Wildlife Service.

Incidental Take of Sea Otters

When the California sea otter population was listed as threatened in January 1977, it was assumed that the population was increasing and would continue to increase at about five percent per year for the foreseeable future. However, as noted in previous Annual Reports, subsequent studies indicated that substantial numbers of sea otters were being caught and killed in coastal gill and trammel net fisheries and that the incidental take may have been sufficient to stop and reverse the population increase. Thousands of seabirds and non-target fish species, as well as other marine mammals, also were being caught and killed in gill and trammel net fisheries along the central California coast.

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 2, subsequent surveys indicate that the population has

Table 2. Sea Otter Population Counts by the Fish and Wildlife Service and the California Department of Fish and Game, 1982-1990

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
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	(no count taken)		
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*

* Surveys conducted since implementation of State bans on use of entanglement nets beginning in January 1985.

been increasing. However, the restrictions did not eliminate the incidental mortality of sea otters in gillnets and, in 1990, the State of California enacted legislation to further limit the use of gillnets (see Chapter III). Under this legislation, waters shallower than 30 fathoms throughout most of the sea otter range have been closed to gill and trammel nets. Fishermen using this gear in waters between 30 and 40 fathoms must notify the

California Department of Fish and Game prior to fishing and must carry an observer if requested.

As Table 2 shows, the California sea otter population seems to have grown steadily from the mid-1980s to 1989. However, the spring 1990 count showed an unexplained 10-percent decline in the number of animals found in the survey area, and this gave rise to concern that the trend in abundance might have reversed. One possible explanation for the reduced count could be that there was more kelp in the survey area, making it more difficult to see otters. Most of the decline was noted in the central portion of the range in waters off Monterey County. Counts north of Monterey and south of Morro Bay increased by 26 percent and 8 percent, respectively.

The fall 1990 sea otter count was approximately two percent greater than the 1989 fall count. This increase was not as much as anticipated, but did reduce concerns that something had happened to stop or reverse the population's recovery.

Observer Coverage Under the Interim Exemption

In 1988, the Marine Mammal Protection Act was amended to, among other things, provide a limited five-year exemption from the Act's incidental-take prohibitions for most fisheries (see Chapter III). Under the exemption provisions, commercial fisheries have been categorized according to the frequency with which marine mammals are incidentally taken. Fisheries that frequently take marine mammals have been placed in Category I, those with occasional marine mammal takes have been placed in Category II, and fisheries that rarely take marine mammals have been placed in Category III. Fishermen operating in Category I or Category II fisheries must have registered with the Service and have obtained an exemption certificate by 21 July 1989 in order to fish legally. The amendments also required the National Marine Fisheries Service to establish an observer program under which 20 to 35 percent of the fishery operations by category I vessels will be monitored, or to establish an alternative observer program if less than 20 percent of the operations in a Category I fishery will be observed.

As discussed above, California sea otters are taken incidentally in gillnets off central California. Although the halibut gillnet fishery has been classified as a Category I fishery by the National Marine Fisheries Service, the incidental take of any California sea otters is not permitted under the interim exemption, and any such take is a violation of the Marine Mammal Protection Act's moratorium on taking.

As discussed in Chapter III, the National Marine Fisheries Service did not have enough money to provide 20 to 35 percent observer coverage for all Category I fisheries in 1989 or 1990.

As a result, the Service allocated its resources among Category I fisheries, in some cases setting observer coverage targets of less than 20 percent. Although the halibut/angel shark gillnet fishery was targeted for 15-percent observer coverage for the last two months of FY 1989, because of delays in implementing the program, no observers were placed that season. On 5 April 1990, Friends of the Sea Otter wrote to the Fish and Wildlife Service, the National Marine Fisheries Service, the Marine Mammal Commission, and the California Department of Fish and Game expressing its concern that observer programs had not yet been implemented for the gill and trammel net fishery off central California. In its letter, the group noted that, on 12 February 1990, a California Department of Fish and Game land-based observer had detected four dead sea otters in the nets of a boat fishing off the coast at Big Sur. Friends of the Sea Otter urged that high priority be placed on establishing an observer program in this fishery.

In July 1990, the National Marine Fisheries Service put observers on a subset of fishing boats in this fishery. By year's end, the Fisheries Service had received reports of two dead otters in Morro Bay. Late in 1990, the Service was compiling data on observer coverage and mortality levels; it hoped to have details available by the end of January 1991.

The Southern Sea Otter Recovery Plan and Recovery Team

As noted earlier, the Southern Sea Otter Recovery Plan was adopted by the Fish and Wildlife Service in 1982. Some of the Plan's recommended research and management actions have been fully implemented, others partially implemented, and some not implemented at all. Therefore, the Service and the Marine Mammal Commission agreed there was a need to review and update the Plan.

On 20 April 1989, the Service wrote to the Commission, describing plans to update the Southern Sea Otter Recovery Plan. It indicated that an important first step would be to obtain the latest information, including that derived from translocation efforts, on the biology and ecology of the southern sea otter population. Believing that a reconstituted southern sea otter recovery team could best provide an update and evaluation of available information concerning the biology and ecology of the southern sea otter, the Service said it had formed a reconstituted team and asked it to review and provide updated information on the biology and ecology of the southern sea otter population.

The reconstituted Recovery Team met on 6-7 July 1989. It discussed, among other things, the merits of continuing to try to establish a sea otter colony on San Nicolas Island. Recovery Team members indicated that their thinking on the translocation question had been affected by the extent and duration of the

Exxon Valdez oil spill (see Chapter IV) and its impact on sea otters and other marine species. Specifically, the team noted that a spill of similar magnitude along the California coast could affect the coastline from Point Reyes to the U.S.-Mexican border.

While acknowledging the limited success of the translocation effort to date, the team also took into account the scope and effect of the Exxon Valdez oil spill and past successes elsewhere in eventually establishing new colonies where there was poor initial survival. With these and other factors in mind, the Recovery Team recommended that additional sea otters be moved to San Nicolas Island in order to determine experimentally the optimal composition and number of otters to translocate in order to establish new colonies.

During 1990, the Recovery Team met several times to consider revisions to the Recovery Plan and to more clearly describe what would constitute "recovery" of the population. An updated draft plan, with recommendations on future translocation projects, is expected early in 1991. The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, will review the draft plan and provide comments and recommendations based on that review.

Hawaiian Monk Seal (Monachus schauinslandi)

Hawaiian monk seals are one of three species of tropical seals belonging to the genus Monachus. The species is the most endangered seal in U.S. waters and is limited almost entirely to the 1,100-mile chain of small, mostly uninhabited islets and atolls that make up the Northwest Hawaiian Islands. The largest concentration of animals and the one which produces more than half of the species' annual pup production is at French Frigate Shoals midway along the chain. In recent years, however, a few individuals also have been seen around Kauai, the westernmost of the main Hawaiian Islands. The species is listed as endangered under the Endangered Species Act.

The other two species of monk seals are the Caribbean monk seal and the Mediterranean monk seal. The Caribbean species is probably already extinct. The last reliable sighting was reported in the 1950s. Mediterranean monk seals are widely scattered in small groups along the coasts of the Aegean Sea, the western Mediterranean Sea, and the Atlantic Ocean off northwest Africa. They are subject to incidental taking and malicious shooting by fishermen, loss of essential habitats to coastal development, and pollution. Probably no more than 500 animals remain. The future of the genus, therefore, may well rest on the fate of the Hawaiian species.

Hawaiian monk seals were brought close to extinction in the 19th century by harassment and over-exploitation. When the first systematic counts were made in the 1950s, monk seals were thought to be increasing in number. Beach counts in 1983, however, were roughly half those made in 1958. Lower counts were particularly noticeable in the western end of the species' range. In 1987 and 1988, counts of the number of pups born and of the total number of animals were greater than those in 1983. Because the National Marine Fisheries Service was unable to support field work needed to continue the surveys and to develop data for such assessments in 1989 or 1990, it is not known whether the population is increasing, decreasing, or stable. Based on data collected at the five major haulouts, however, the number of births recorded in 1990 declined by 23 percent from the average annual levels recorded between 1983 and 1989.

In addition to protection afforded by provisions of the Marine Mammal Protection Act and the Endangered Species Act, Hawaiian monk seals are protected by virtue of their distance from inhabited areas and because most of their terrestrial habitat lies within the Hawaiian Islands National Wildlife Refuge of the Fish and Wildlife Service. Nevertheless, monk seals are vulnerable to: human disturbance at pupping and haulout beaches; entanglement in lost and discarded fishing gear and other marine debris; entrapment in the disintegrating seawall and other debris at Tern Island in French Frigate Shoals; interactions with commercial fishermen; potential die-offs caused by disease or naturally occurring biotoxins; and shark predation. In recent years, an additional source of concern has been abnormal mobbing behavior by adult male seals at some islands, which has caused the death or serious injury of adult females and young animals.

Hawaiian Monk Seal Program Oversight and Direction

While significant progress has been made over the past several years in the Hawaiian monk seal recovery program, it also has been apparent that the National Marine Fisheries Service has not, until recently, even attempted to provide a level of support and oversight commensurate with the species' critical status. Progress has relied instead upon special appropriations by Congress and the generous but unpredictable contributions of other agencies, organizations, and committed volunteers.

To help refocus efforts, the Commission held a monk seal program review on 4-5 December 1989. The review was scheduled shortly before a 12-14 December 1989 meeting of the Hawaiian Monk Seal Recovery Team. At that time, the Recovery Team was newly reconstituted and was meeting for the first time since 1984. The purpose of the Commission's review was to ensure that the Recovery Team, as well as the Service, had a careful review of the critical issues and program needs to help focus deliberations.

The results of the Commission's review were provided to the Service by letter of 11 December 1989. The letter also was made available to the Recovery Team for its meeting. As discussed in last year's Annual Report, it provided a wide range of recommendations for improving program performance and organization. Included were recommendations for: updating the Recovery Plan and reconstituting the Recovery Team; stabilizing support for research and promptly analyzing research data; addressing specific research issues; complying with permit requirements; establishing an animal care committee and meeting the needs of captive monk seals; staffing; and program funding. On 1 February 1990, the Service provided a careful response to each of the Commission's recommendations.

Regarding the Commission's recommendations for revising the Monk Seal Recovery Plan and strengthening the Recovery Team, the Service indicated that the Recovery Team had been directed to develop a revised monk seal recovery plan by 1 March 1990, which would be used by the Service to draft a three-year comprehensive work plan by 15 March. The Service also advised the Commission that it would: appoint as the Recovery Team leader someone not affiliated with the National Marine Fisheries Service; convene meetings of the Recovery Team early in December for at least the next four years to ensure timely advice on priority needs for the coming field season; and provide support for consultations with a veterinarian, reproductive physiologist, and reproductive behaviorist to assist in reviewing and developing advice on issues such as animal care and research on the male mobbing problem.

Regarding the Commission's recommendations for supporting research and analyzing field data, the Service noted that most of the research priorities identified in the Commission's letter would be addressed in the three-year comprehensive work plan and that the work plan would serve as the mechanism whereby funding needs would be identified and incorporated into its budget process. The Service also noted that increased effort was being made to analyze the backlog of data, although this effort was being made at the expense of field activities; a number of articles had recently been submitted for publication in peer-reviewed journals and others would soon be submitted; and the Service would continue to seek outside expert advice in developing program work plans, especially for research on the male mobbing problem.

The Service's February letter also responded to Commission recommendations on specific research issues. Regarding the male mobbing problem, the Service noted that: it agreed preliminary studies of the male mobbing problem must be completed before implementing a broader solution and it had been working on them since 1985; the Recovery Team believes it is critical that some method of controlling males be available for field use in 1991;

and if field treatment is not possible, the team is recommending that the Service begin removing problem males in 1991. Regarding population censuses, the Service agreed that annual censuses were a priority need and noted that this would be addressed in its three-year work plan. Regarding recommendations to consider expanding the Head Start Project to Midway Island, the Service noted that work at Kure Atoll would be continued at least through 1990 and that, before expanding efforts to Midway, the Recovery Team was recommending that certain seal haulout beaches be cleared of debris and that a survey be conducted for ciguatoxin in seal prey species at the island.

The Commission's 11 December 1989 letter also addressed concerns related to compliance with permit requirements. The Service's 1 February 1990 reply noted that field teams reviewed the permit provisions prior to departure into the field each season and that, beginning in 1990, instructions clearly stating the permit requirements and the importance of complying with them would be included with field permit packets. The Service also agreed with the Commission's recommendation to seek permit authority for certain recovery activities under the Marine Mammal Protection Act's new section authorizing "enhancement" permits (see Chapter XI) and to take steps to expedite permit reviews involving monk seals and other endangered, threatened, and depleted species.

With regard to Commission recommendations on the Animal Care Committee and the maintenance of seals in captivity, the Service noted that: a marine mammal veterinarian had been added to its Animal Care Committee; it was attempting to arrange training sessions for staff involved in the care and maintenance of captive seals by Animal and Plant Health Inspection Service personnel; facilities and procedures were being improved to ensure that seals can be isolated from one another when necessary; it has no plans to return monk seals to former holding facilities at Kewalo Basin; guidelines for the reintroduction of captive seals back into the wild had been approved and additional health care procedures would be developed; and arrangements with a qualified laboratory were being developed to routinely work up necropsy specimen materials.

Regarding staff and funding recommendations, the Service noted that it hoped to hire a full-time data manager in March 1990, but would be unable to hire an administrative assistant or undertake other high-priority research within the present budget. It also noted that based on the three-year work plan, it would prepare a budget plan for submission in the 1992-1994 budget cycles.

In late February, the Recovery Team submitted its recommendations to the Service based on its 12-14 December 1989 meeting. In doing so, the team addressed most of the points in

the Commission's 11 December 1989 letter. It also provided numerous additional comments and recommendations on future Recovery Team and Advisory Group meetings, research program funding, data analyses, the Kure Atoll Head Start Project, the male mobbing problem, population monitoring, recovery actions at Midway Island, the repair of facilities at Tern Island, defining the point at which monk seals may be considered recovered, and priorities for the 1990 field season.

The Recovery Team met again on 3-5 December 1990 to review plans for the coming field season and discuss other important issues. Following the meeting, the team wrote to the Director of the Southwest Region regarding the need to place observers aboard long-line swordfish fishing vessels operating near the Northwest Hawaiian Islands (see below). As of the end of 1990, the Commission had not been advised as to other results of the meeting.

Hawaiian Monk Seal Interactions with Commercial Fisheries

In late April, the Commission became aware of unconfirmed reports of Hawaiian monk seals and albatross being killed incidentally by the growing fleet of long-line swordfish fishermen operating off French Frigate Shoals in the Northwest Hawaiian Islands. The reports suggested that some fishing operations were being conducted as close as one mile from shore and that seals were being attracted to the lights or large squid used for bait. In response to the reports, the Commission wrote to the National Marine Fisheries Service on 4 May 1990 urging that the reports be investigated promptly, that an emergency long-line fishing closure in nearshore waters be considered, and that observers be placed on boats to document the nature and level of any take of monk seals.

On 18 May 1990, the Service responded, confirming that the fleet operating around the Northwest Hawaiian Islands had increased and that some of the 10-20 vessels had moved into areas frequented by monk seals. It also noted that: Service staff had been sent to French Frigate Shoals to look for evidence on island beaches of interactions between monk seals and fishing operations; enforcement agents were interviewing all long-line, lobster, and bottomfish fishermen returning from fishing trips in the Northwest Hawaiian Islands about monk seal interactions; a press release had been issued asking fishermen to cooperate in reporting interactions with monk seals and to avoid fishing in waters near islands in the Northwest Hawaiian Islands chain; and the Western Pacific Fishery Management Council would consider needed management actions regarding the issue at its next meeting in mid-June.

On 11 June 1990, the Commission replied to the Service, noting that, while all the actions should be helpful, they were

not likely to provide dispositive information on the extent to which seals had been or were being killed or injured incidental to the fishery. Therefore, the Commission recommended that the Service place observers aboard a sufficient number of vessels in the swordfish and bottomfish fisheries to obtain meaningful information on the nature and extent of interactions with monk seals.

On 7 August 1990, the Service advised the Commission that the Western Pacific Fishery Management Council had proposed an emergency action under its Bottomfish and Pelagic Fisheries Management Plans. An emergency interim rule was published by the Service on 26 November 1990. The emergency action required that any fishing vessel operating within 50 miles of the Northwest Hawaiian Islands must first notify the Service's Southwest Regional Director, who would determine whether that vessel should carry an observer. It also required that long-line vessels obtain permits from the National Marine Fisheries Service and submit daily fishing logs containing information on interactions with monk seals and other protected species. As an emergency action, the measures were effective for 180 days, at the end of which time the results were to be reviewed and a determination made regarding their continuation.

At its 3-5 December meeting, the Hawaiian Monk Seal Recovery Team reviewed the status of observer efforts. It noted that only two observers were available to monitor fishing activities in the Northwest Hawaiian Islands and that, of the six trips observed in the summer of 1990, only one vessel fished near the Northwest Hawaiian Islands. Therefore, to provide a sufficient basis for documenting any incidental take of monk seals or other protected species in the long-line swordfish fishery, the Recovery Team asked the Service to expand its observer coverage of area fishing operations by adding four more observers. At the end of 1990, the Commission had not been advised as to the Service's intent regarding the expansion of the observer coverage for the Northwest Hawaiian Islands swordfish and bottomfish fisheries.

Kure Atoll Head Start Project

As indicated above, monk seal numbers declined significantly in the western end of the Northwest Hawaiian Islands between the late 1950s and early 1980s. At Kure Atoll, the westernmost of the Northwest Hawaiian Islands, the decline appears to have been caused, at least in part, by U.S. Coast Guard occupation of the Atoll in 1961 and subsequent human disturbance of seals on pupping beaches. It also appears to have been caused by very low pup survival through the first year of life. The gradual decline in births reached a low point at the atoll in 1986, when only one pup was born.

To address the problem, the Coast Guard and the National Marine Fisheries Service have cooperated in making certain haulout beaches at the Atoll off limits to Coast Guard personnel. In addition, to help rebuild a breeding population, the National Marine Fisheries Service began a Head Start Project in 1981. The program 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 of life in the protective enclosure, and then releasing them back into the wild at Kure. From 1981 to 1989, 25 pups were so treated. In 1990, three additional pups were collected and released.

To supplement these efforts, emaciated pups unlikely to have survived on their own were taken from French Frigate Shoals, rehabilitated at facilities in Honolulu, and released at Kure. Eleven rehabilitated pups were released at Kure between 1985 and 1989 and three more animals were released in 1990. In addition, five healthy female pups were taken from French Frigate Shoals after weaning and released at Kure in 1990.

These efforts to rebuild the Kure population have been successful. All but two of the 13 seals taken and released during the first five years of the Head Start Project have been resighted annually at Kure through 1990, and one of the two seals not resighted at Kure was seen in 1990 at nearby Midway Island. The resightings indicate a high survival rate for seals in the Head Start Project. Also, in 1987, the first birth to a female released through the Head Start Project was recorded. By the end of 1990, 13 births to females from the project had been recorded, and more than half the births at Kure in 1990 were to such females. Regarding the 11 pups taken from French Frigate Shoals, rehabilitated, and released at Kure prior to 1990, six were resighted in 1990 at Kure and five had disappeared. The success of the program also is indicated by average beach counts at Kure, which have increased significantly from approximately 22 animals per count in 1981 to 31 animals per count in 1990.

Kilauea Marine Life Conservation District

As noted above, Hawaiian monk seals have been sighted with increasing regularity in recent years around Kauai, the westernmost of the main Hawaiian Islands. The sightings have been most frequent on the island's north coast around the small Kilauea Point National Wildlife Refuge, a refuge whose boundaries do not extend seaward of the shoreline. In addition to serving as monk seal habitat, the refuge area is important for other species. The lava cliffs, for example, are important nesting and roosting habitat for several species of seabirds, and the nearshore waters provide habitat for green sea turtles, spinner dolphins, corals, and coral reef fishes.

To help protect marine areas adjacent to the refuge, a proposal was submitted in March 1990 to the Hawaii Department of Land and Natural Resources to designate approximately 650 acres of the nearshore waters off Kilauea Point as a State Marine Life Conservation District. The proposed area included nearshore waters to about one and a half miles in either direction from the Point. As part of the proposal, management recommendations were made regarding boating, swimming, fishing, research, education, and enforcement. The Commission, in consultation with its Committee of Scientific Advisors, reviewed the proposal and, by letter of 26 March 1990, wrote to the Hawaii Department of Land and Natural Resources noting that the proposal provided an excellent basis for strengthening cooperative State-Federal efforts in support of marine mammal protection and urging that it be adopted.

As of the end of 1990, it was the Commission's understanding that the Hawaii Department of Land and Natural Resources would pursue steps in the designation process in 1991 and that public hearings on the proposal would be scheduled on the island of Kauai early in the year.

Hawaiian Islands National Wildlife Refuge Field Station at Tern Island in French Frigate Shoals

Since 1979, the Fish and Wildlife Service staff has occupied Tern Island as a permanent field station for the Hawaiian Islands National Wildlife Refuge. The island, located midway along the Northwest Hawaiian Islands chain, is about 500 miles northwest of Honolulu. It is the only permanent field station within the Hawaiian Islands National Wildlife Refuge and the only location with an aircraft runway between the main Hawaiian Islands and Midway Island near the western end of the chain.

Most of Tern Island is a hard-packed sand runway built in 1942 by the U.S. Navy. The original 11-acre island was expanded to its present 37 acres by installing a sheet-metal bulkhead and backfilling with sand and coral rubble dredged from the adjacent lagoon. The Navy used the island from 1942 to 1946. In 1952, Coast Guard personnel moved to the island and established a LORAN station to aid area ship navigation. By 1979, the LORAN station was no longer needed, and the Coast Guard removed its personnel from the island. The Fish and Wildlife Service then began using the facilities as a full-time field station.

The field station and its runway are essential if the Service is to meet its responsibilities for protecting and enhancing wildlife resources in the Refuge. The facilities provide a basis for monitoring all islands in French Frigate Shoals, which presently provide habitat for more than half of the world's population of Hawaiian monk seals. Tern Island itself provides habitat for almost one-tenth of the world's population

of Hawaiian monk seals and is also habitat critical for endangered sea turtles and, at times, more than 100,000 seabirds. The Refuge staff on Tern Island works closely with the National Marine Fisheries Service to: locate and airlift emaciated pups to Honolulu for rehabilitation and subsequent release; airlift healthy pups to other locations where seal populations are more depleted; remove and destroy marine debris that could entangle and thereby injure or kill seals; conduct year-round censuses of seals on French Frigate Shoals; provide logistic support for monk seal research and management activities; and provide an enforcement presence to discourage unauthorized boat landings on French Frigate Shoals.

In the late 1980s, the Service considered abandoning the Tern Island Field Station because of the expense involved in operating and maintaining the facilities. As noted in previous Annual Reports, the Commission wrote to the Service on several occasions urging that the station be maintained and staffed year round. The Service was able to do so as a result of special Congressional appropriations for operation of the Hawaiian Islands Refuge from 1987 to 1989 and an increase in the budget for Refuge operations in Hawaii in 1990.

Unfortunately, the future existence of the field station is uncertain. The integrity of the island itself has become threatened by the severe deterioration of the island's seawall. Wave action, particularly that generated by winter storms, is the primary cause of the loss of the seawall and this, in turn, is causing serious erosion problems. As erosion takes place, additional threats are emerging. Long-buried cables, fuel tanks (some still containing fuel), and other debris, which were covered over when the island was built are becoming exposed. In November 1989, station personnel had to pump the contents of one fuel tank into 55 gallon drums because the tank had been so severely undercut by wave action that they feared it would roll over and spill. The debris, seawall openings, and gaps between the seawall and the coral sand backfill now pose a serious entrapment threat for monk seals and sea turtles. Hazardous materials left over from the LORAN station also pose a long-term environmental threat.

To help evaluate options for the future of the field station, the Fish and Wildlife Service undertook an assessment of the situation during the summer of 1989. Views of the Commission and other concerned agencies and groups were solicited during the assessment and in September 1989 the Service's report, "Evaluation of U.S. Fish and Wildlife Service Operations on Tern Island in the Hawaiian Islands National Wildlife Refuge: Recommendations for a Long-Term Course of Action," was completed.

Among other things, the report recommended that the Service enlist cooperative support from the Corps of Engineers and the

U.S. Navy to repair and replace portions of seawall and to continue occupation of the field station and runway over the next 10-20 years. In this regard, the study noted that the Defense Environmental Restoration Account, which provides funds for mitigating environmental damage and addressing hazards caused by Defense Department activities, could be a source of funding for at least some of the work and that restoration work also might be undertaken as a training exercise by Navy Seabees. The report also recommended removal of the hazardous debris buried or dumped when the runway was being built and in the intervening years.

At the Commission's 1990 annual meeting in Honolulu, Hawaii, on 8-10 March, representatives of the Fish and Wildlife Service advised the Commission that it had begun to develop a four-phase plan to completely restore and refurbish the island's facilities. The plan envisioned initial engineering and environmental studies, improving the island's access channel and ship basin to allow access by ships carrying building supplies and construction equipment, construction and restoration of the seawall and island infrastructure, and removal of all debris and hazardous material left by the former Navy and Coast Guard occupancy.

During 1990, the Service carried out bathymetric studies preparatory to undertaking restoration work. It also explored arrangements with the Navy and the Corps of Engineers to support and carry out the needed work. By the end of 1990, agreement had been reached with the Corps of Engineers for it to do the engineering evaluation of actions needed to restore the island itself. The formal agreement was to be signed in the early weeks of 1991. The Commission will continue to work closely with the State of Hawaii, the Fish and Wildlife Service, the Navy, the Corps of Engineers, and the Coast Guard to accelerate the process of restoration.

The Hawaiian Monk Seal Recovery Plan and Comprehensive Work Plan

As noted above, the Commission wrote to the Service on 11 December 1989 recommending among other things that the Hawaiian Monk Seal Recovery Plan adopted in March 1983 be updated and that a comprehensive work plan to implement its provisions be prepared. The National Marine Fisheries Service agreed and asked the Recovery Team to update the Recovery Plan by 1 March 1990. In submitting its recommendations on the Hawaiian monk seal recovery program in late February 1990, however, the Recovery Team stated its belief that the 1983 plan still provided a useful guide to overall recovery needs. Instead of updating the plan, the team recommended appending the results of its program review to the plan. Therefore, using the 1983 plan, the recommendations of the Recovery Team, and the recommendations of the Marine Mammal Commission, the National Marine Fisheries Service began developing the work plan recommended by the Commission.

On 17 May 1990, the Service transmitted a draft three-year Hawaiian Monk Seal Work Plan to the Commission for review and comment. The work plan identified funding needs for Fiscal Years 1991, 1992, and 1993 in the amounts of $450,000, $467,000, and $487,000, respectively. Identified tasks focused on: (1) recovery of monk seal populations in the western end of the species' range (i.e., Kure Atoll, the Midway Islands, and Pearl and Hermes Reef); (2) resolution of the mobbing problem at Laysan and Lisianski Islands; and (3) monitoring monk seal populations at the five major breeding locations (i.e., French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Reef, and Kure Atoll).

The three-year work plan provided funds to continue the Head Start Project at Kure Atoll in 1991 and 1992 and at either Midway Island or Kure Atoll in 1993. It also provided funds to continue rehabilitating emaciated female pups from French Frigate Shoals and releasing them at Kure Atoll in 1991 and Midway Island in 1992 and 1993 to help rebuild those populations.

Regarding work on the mobbing problem, the work plan identified funding to begin treating up to 50 percent of the adult male seals on Laysan Island with a testosterone-suppressing drug in 1991 and expanding the work to Lisianski Island in 1993. In the event that the experimental treatment is unsuccessful in reducing aggressive male behavior toward females, the plan included provisions for castrating selected captive adult males to evaluate the effects of surgery on breeding behavior. To better identify the breeding male seals and, as possible, the animals engaged in the mobbing behavior, the Work Plan included funds for tagging adult males at Laysan Island in 1991 and Lisianski Island in 1993. It also indicated work would be done to tag adult female seals although funds to do so were not described.

To meet population monitoring needs, the work plan listed funding needs for island-specific population assessment and tagging work at four islands in 1991 and six islands in 1992 and 1993. Time permitting, those doing the assessments also would perform other important work, such as removing hazardous debris, collecting data on seal mortality and injury, gathering scat and spew samples for prey analysis, and collecting tissue samples for DNA fingerprinting. It also noted that additional field visits to some islands may be undertaken to tag weaned pups and immature seals.

By letter of 4 December 1990, the Commission provided comments to the Service on the three-year work plan. In its letter, the Commission noted that it was apparent that its recommendations, as well as those of the Recovery Team, had been carefully considered. It also noted that the projected funding levels for the next three years appeared reasonable and asked to

be advised if the Service anticipated difficulties in ensuring that they would be available. The Commission also noted, however, that several parts of the work plan were neither as clear nor as detailed as they should be and that both the Recovery Team and the Commission should be provided additional information to help them review the proposed actions.

Regarding the mobbing problem at Laysan Island and the proposal to treat up to 50 percent of the island's adult male seals with a testosterone-suppressing drug, the Commission expressed reservations and asked the Service to clarify: whether preliminary field studies to identify individual breeding males had been completed; why the Service believes treating up to 50 percent of the adult males is appropriate as an initial effort; and if the Service envisions a different approach if surgical, rather than chemical, castration is pursued? The Commission also asked for additional information as to why no funds had been identified for tasks to assess the effects of tagging on adult females, to tag weaned pups not tagged as part of island-specific monitoring work, or to tag immature seals not tagged in 1988 or 1989. The Commission also noted that it was not clear whether all five major breeding sites would be monitored in 1991, asked if this were planned, and asked if funds for doing so would be available. As of the end of 1990, the Commission was awaiting an answer.

Conclusion

Although the Hawaiian monk seal recovery program has made significant progress recently, the program is not in as strong a position as it should be to build on that success to address key management needs. Two contributing factors have been insufficient funding and inadequate program oversight. Late in 1989, the Service began taking significant steps to address these deficiencies. At the end of 1990, the Commission looked forward to working with the program staff and the Recovery Team in 1991 on efforts to review and strengthen program plans.

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. As noted in the Commission's previous Annual Report, available information indicates that Steller sea lions have declined substantially throughout most of their range since the late 1970s. The declines have been greatest in the eastern Aleutian Islands and in the western Gulf of Alaska.

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, in consultation with its Committee of Scientific Advisors, recommended that the Service proceed immediately to designate the species as depleted and that a conservation plan, similar to a recovery plan for endangered and threatened species, be developed to guide recovery efforts. In November 1988, Congress amended the Marine Mammal Protection Act, directing, among other things, that the National Marine Fisheries Service prepare a conservation plan for Steller sea lions by 31 December 1990.

Much of the information and analyses needed to prepare this plan had been compiled and published in 1988 by the Commission in "Selected Marine Mammals of Alaska: Species Accounts with Research and Management Recommendations." The Commission advised the Service of this by letter of 6 December 1988 and noted that the Service therefore should be able to complete a Steller sea lion conservation plan well before the Congressionally mandated deadline of 31 December 1990.

By November 1989, the Service had not yet prepared a conservation plan or promulgated a final rule designating the Steller sea lion as depleted. In view of the continuing population decline, the Environmental Defense Fund petitioned the Service on 21 November 1989 for an emergency listing of Steller sea lions as endangered under the Endangered Species Act. By letter of 20 December 1989, the Commission recommended that the Service act immediately on that petition and that it complete and distribute a draft Steller sea lion conservation plan by March 1990 at the latest. In its letter, the Commission noted that, because designation as either endangered or threatened automatically confers depleted status upon the listed species or population, there was no reason to pursue a depleted designation under the Marine Mammal Protection Act.

On 31 January 1990, the Commission again wrote to the National Marine Fisheries Service stressing the need to act on the Environmental Defense Fund's petition and to develop and adopt a recovery plan or conservation plan for Steller sea lions. The Commission noted that available data indicated that Steller sea lions were in danger of extinction throughout a significant portion of their range, and it recommended that the Service publish an emergency listing of the species as endangered. The Commission also noted that an emergency listing would be effective for only 240 days and therefore recommended that the Service take immediate steps to prepare a proposed "permanent" listing which could be published shortly after publication of the emergency rule. To expedite preparation of a draft conservation or recovery plan, the Commission recommended that the Service

establish and convene a meeting of a Steller sea lion recovery team as soon as possible.

The Commission noted the key elements that should be included in the conservation and recovery plan and provided the Service with a list of knowledgeable persons for possible appointment to the recovery team. The Commission also recommended that the Service consider increasing observer coverage in all fisheries known to take Steller sea lions incidentally, and, in consultation with the Alaska Department of Fish and Game and the North Pacific Fishery Management Council, undertake an analysis of the possible socio-economic impacts of actions that might be required to reverse the Steller sea lion population decline.

Representatives of Alaska and U.S. west coast fisheries advised the National Marine Fisheries Service, by letter of 29 January 1990, that they were committed to identifying the causes and taking the steps necessary to reverse the Steller sea lion decline. They added, however, that they did not think that the Steller sea lion was in danger of extinction or required protection that would be afforded by such a designation under the Endangered Species Act. The letter indicated that an industry-sponsored workshop would be held in Anchorage, Alaska, on 21-22 February 1990 to help define research, management, and funding needs with respect to interactions between Steller sea lions and commercial fisheries.

On 16 February 1990, the Commission wrote to the Service noting that the industry-sponsored workshop provided an opportunity to solicit views from both industry and environmental groups on factors that should be considered in developing and implementing a Steller sea lion recovery plan. With regard to plan development, the Commission suggested that the optimal approach would be to: develop hypotheses concerning the cause or causes of the observed decline; determine how various fisheries, fishery regulations, and fishing gear and practices might be restructured or otherwise altered to test the hypotheses; and then design and carry out a series of experiments and parallel sea lion, fish population, and environmental studies to test the hypotheses. The Commission noted that the observed population decline may not be fisheries-related and that experimental conservation measures should be designed to minimize impacts on affected fisheries while, at the same time, permitting timely acquisition of needed data.

Ongoing and planned efforts to assess population status and to reverse the observed Steller sea lion population decline were reviewed during the 8-10 March 1990 meeting of the Marine Mammal Commission and its Committee of Scientific Advisors. During the meeting, the Director of the National Marine Fisheries Service advised the Commission that the Service had decided to: (1) list

Steller sea lions as threatened under the Endangered Species Act on an emergency basis; (2) establish a recovery team to help develop and implement a recovery plan; (3) repeal existing regulations that allow fishermen to shoot at or near sea lions to keep them away from their gear and catch; (4) reduce by half (from 1,350 to 675) the number of Steller sea lions allowed to be taken incidentally during commercial fishing operations in the region west of 141° west longitude; and (5) establish no-entry buffer zones around the principal Steller sea lion rookeries in Alaska. On 5 April 1990, the Service published a Federal Register notice giving effect to these decisions.

On 7-8 April 1990, the Service's National Marine Mammal Laboratory held a workshop on Steller sea lions. The workshop was convened under auspices of the U.S.-U.S.S.R. Environmental Protection Agreement and involved scientists from Canada as well as the Soviet Union and the United States. Table 3 summarizes sea lion count data compiled by the workshop.

The data clearly indicate that Steller sea lions have declined dramatically throughout most of their range. The data also indicate that the rate of decline has been greater in recent years and that, at the present rate of decline, the number of sea lions in the Aleutian Islands and the Gulf of Alaska will be reduced to about one percent of their 1960 level by the year 2000.

Section 3 of the Endangered Species Act defines an endangered species as one "which is in danger of extinction throughout all or a significant proportion of its range...." A threatened species is one "which is likely to become an endangered species within the foreseeable future throughout all or a significant proportion of its range." The Commission believes that the available data, as summarized in Table 3, supports listing the Steller sea lion as endangered rather than threatened. By letter of 18 May 1990, the Commission advised the National Marine Fisheries Service that it continued to believe that the Service should list the species as endangered. The Commission also pointed out that the emergency listing would expire on 1 December 1990 and that, to ensure that a permanent rule would be in place by then, the Service should not attempt to resolve all uncertainties concerning needed conservation measures before issuing the proposed permanent rule.

With respect to needed conservation measures, the Commission noted that the shooting prohibitions, three-mile buffer zones, and other measures contained in the emergency rule could be insufficient to reverse the observed population decline. In particular, the Commission noted that the observed decline could have been caused by fishery-related declines in food availability and that, if this is the case, larger buffer zones around

Table 3. Summary of Steller Sea Lion Counts in the United States, Canada, and the Soviet Union

Survey Area	Counts by Survey Period 1956-1978	1975-1979	1982-1986	1989	Percentage Change 1956-1978
Soviet Union					
Kurile Islands	14,076		8,000-12,000	6,000	-57
Kamchatka Peninsula	15,000	10,000-15,000	8,000-12,000	5,000	-67
Commander Islands	12,592	4,578	3,500	2,600	-79
Second count	12,000		2,000	1,100	-91
Okhotsk Sea	5,000	1,200	1,500	900	-82
Robben Island	200			200	0
Alaska					
West./Cent. Aleutians	46,005	65,675	39,475	12,602	-73
Eastern Aleutians	52,530	17,499	10,802	3,145	-94
Bering Sea	7,000	4,950	1,000	600	-91
Gulf of Alaska	38,037	33,451	30,056	14,049	-63
Southeast Alaska	7,000	7,772	7,962	9,000	+29
Seal Rocks	1,530	2,500	2,900	2,000	+31
Forrester Island		900		1,462	+62
British Columbia (three rookeries)	11,500 (pre-1965)	3,500	4,000	4,000	-65
Continental United States					
California, Oregon, & Washington	8,000	5,410	4,500	4,000	-50
Farallon Islands		110	75	49	-54
Año Nuevo	1,200	600		150	-88
Oregon				2,000-3,000	

principal Steller sea lion rookeries, protection of important feeding areas outside the buffer zones, and changes in fishing seasons or practices may be required to ensure availability of adequate food.

Except for the prohibition against shooting at or near Steller sea lions, which is applicable range-wide, the emergency rule promulgated by the National Marine Fisheries Service in April 1990 provided no protection for sea lions in areas outside of Alaska. As indicated in Table 3, sea lion counts in Washington and California, as well as in Alaska, have declined substantially. Several rookeries in southern and central California have disappeared completely, and remaining colonies in central and northern California have declined by more than 90 percent. The Commission therefore recommended that the Service consider adopting additional protective measures in its proposed permanent rule, including the designation of critical habitat for Steller sea lions in Washington, Oregon, and California, as well as Alaska.

Section 4(a) of the Endangered Species Act directs that critical habitat for an endangered or threatened species be designated concurrently with the listing except when such a designation would not be prudent or would unnecessarily delay the listing. In its 18 May 1990 letter, the Commission recommended that critical habitat designation for Steller sea lions include, at a minimum, all major rookery areas and sufficient forage habitat around those areas to allow successful breeding and pup rearing. The Commission also noted that all essential feeding areas may not be in the immediate vicinity of pupping colonies, that ongoing satellite tracking efforts involving tagged sea lions and other studies should seek to identify essential feeding areas, and that critical habitat designations should be refined accordingly.

On 20 July 1990, the National Marine Fisheries Service published an advance notice of proposed permanent rulemaking to designate the Steller sea lion as threatened under the Endangered Species Act, and to incorporate protective measures similar to those in the emergency rule. The final rule was published in the Federal Register on 26 November 1990. Among other things, the final rule prohibits persons subject to the jurisdiction of the United States from discharging firearms at or within 100 yards of a Steller sea lion. With certain exceptions, the rule also prohibits vessels from operating within three nautical miles, and persons on foot from approaching closer than one-half statutory mile, of 35 Steller sea lion rookeries in Alaska.

In its notice, the Service cited a number of reasons why the species was being listed as threatened, rather than endangered. In particular, the Service noted that: there is not sufficient information to consider animals in different geographic regions

as separate populations (therefore the status of the entire species must be considered); there are areas in the species' range where abundance is stable or not declining significantly; and preliminary results of 1990 counts are similar to the results of counts done in 1989, suggesting that the decline may have stopped or slowed. The Service acknowledged that more comprehensive protective measures may be required, but noted that it did not want to delay the listing while additional protective measures were developed and evaluated, and that more comprehensive protective regulations and critical habitat would be proposed in a separate rulemaking.

At the end of 1990, it was the Commission's understanding that critical habitat and additional protective measures would be proposed following completion and adoption of the Steller Sea Lion Recovery Plan. In this regard, the Commission understood that the Recovery Team had met four times in 1990 and that it expected to complete and provide a draft plan to the Service early in 1991. At that time, the draft plan would be made available to the Commission and the public for review and comment.

Harbor Seal (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 coast from San Ignacio Lagoon, Mexico, north through southeastern Alaska, west into the Bering Sea, Aleutian, Commander, and Kurile Islands, and south to Hokkaido, Japan.

In 1986, the Commission provided funds to compile and evaluate available information on the biology, ecology, and status of harbor seals and nine other marine mammal species that occur commonly in the coastal waters of Alaska. The results of this review -- published in the 1988 Commission report, "Selected Marine Mammals of Alaska: Species Accounts with Research and Management Recommendations" -- indicated that numbers of harbor seals, as well as Steller sea lions, had declined dramatically in recent years in parts of Alaska.

To better assess and monitor population status and trends, the Alaska Department of Fish and Game established a series of aerial survey routes in Prince William Sound and in southeastern Alaska near Ketchikan and Sitka to be surveyed biennially. Available funding was insufficient to continue the surveys as planned. Therefore, in 1987, the Commission provided funds to the Alaska Department of Fish and Game to continue harbor seal counts in certain key areas. The counts, made during the August-September 1988 molt period, indicated an approximate 40 percent decline since 1984 in the number of harbor seals at selected survey sites in Prince William Sound and an approximate 85

percent decline since 1976 in numbers on southwestern Tugidak Island, one of the largest harbor seal colonies in the North Pacific.

As noted in Chapter X, the Commission provided funds to the Alaska Department of Fish and Game in 1990 to repeat the Tugidak Island survey. The Commission, as discussed in Chapter VII, also organized and convened a workshop to identify and determine how to resolve critical uncertainties concerning the cause of the observed declines in harbor seal, Steller sea lion, North Pacific fur seal, and other marine populations in the Bering Sea and Gulf of Alaska.

It is not clear whether harbor seals require special protection in parts or all of their range in Alaska. To help make this determination, the Commission will contract early in 1991 for a review and update of the harbor seal species account published in 1988.

North Pacific Fur Seal (Callorhinus ursinus)

North Pacific or northern fur seals occur seasonally in waters throughout the rim of the North Pacific Ocean from southern California to Japan. The species was taken commercially for its pelt from the 1700s to 1984; it is presently taken by Native residents of the Pribilof Islands in Alaska for subsistence purposes. Most pupping and breeding occur on Robben Island, the Kurile Islands, and the Commander Islands in the Soviet Union and on the Pribilof Islands in the United States.

The Pribilof Islands' fur seal population, which historically has constituted about three-fourths of the total number of northern fur seals, is estimated to have numbered between 2 and 2.5 million animals when the Pribilof Islands were discovered in 1786. Although the number of fur seals on the islands has fluctuated widely since then as a result of changing sealing practices, the population size was estimated to have been at that level as recently as the 1950s. Over the past three decades, the number of seals on the Pribilof Islands has declined significantly for reasons that are not known. Recent estimates place the number of seals on the islands at about 800,000 animals. A similar decline appears to have occurred at Robben Island in the Soviet Union.

As noted in previous Annual Reports, the nations involved in commercial fur seal harvests have managed fur seal herds under a series of international agreements during most of the 20th century. Between 1957 and 1984, northern 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 the 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 herd to the level that would provide the greatest harvest year after year, 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 for an additional four years. As a result, management authority in the United States became subject to domestic laws, including the Marine Mammal Protection Act. Among other things, the Act precludes commercial harvesting, unless the Act's moratorium on taking is waived, and provides for subsistence harvests by Alaska Natives. Since 1985, directed taking of fur seals in the United States has been limited to Native subsistence harvesting on the Pribilof Islands.

The 1990 Subsistence Harvest

Until 1984, Alaska Natives on the Pribilof Islands relied on meat and other by-products from the commercial seal harvest to meet subsistence needs. Beginning in 1985, Native residents have conducted directed subsistence harvests governed by regulations issued by the National Marine Fisheries Service under authority of the Marine Mammal Protection Act and the Fur Seal Act. The number of fur seals taken on the Pribilof Islands for subsistence purposes since that time and other pertinent harvest data are presented in Table 4.

Under applicable regulations, annual subsistence harvests are limited to taking sub-adult male seals between the end of June and the second week of August. In mid-August, female seals begin arriving at the rookeries in larger numbers and young male and female seals, which are not easily distinguished, become intermixed. The regulations also require the National Marine Fisheries Service to estimate the minimum and maximum number of seals needed for subsistence purposes by Native residents on both St. George Island and St. Paul Island (the two principal islands of the Pribilofs) before the start of each year's harvest. If the minimum estimate is reached, the harvest must be suspended pending a determination by the Service that additional seals are required to meet subsistence needs.

In 1989, 1,340 seals were killed during the subsistence harvest on St. Paul Island and 181 seals were taken on St. George Island. On 25 May 1990, the National Marine Fisheries Service published its estimates of the 1990 subsistence needs of the Pribilof Islanders and proposed using the 1989 harvest levels as the projected levels for 1990. Noting that there was a substantial decrease in the proportion of each harvested seal utilized (from 43 percent in 1988 to 38 percent in 1989), the Commission, by letter of 2 July 1990, expressed its belief that the proposed

Table 4. Subsistence Harvest Levels for North Pacific Fur Seals for the Years 1985 to 1990

	1985	1986	1987	1988	1989	1990
Seals Taken:						
St. Paul Island	3,384	1,299	1,710	1,145	1,340	1,076
St. George Island	329	124	92	113	181	164
Total	3,713	1,423	1,802	1,258	1,521	1,240
Percent Utilization*	43.8	47.2	40.7	43.5	38.2	39.9
Pounds of Meat Taken**	93,400	31,700	38,800	26,500	26,600	21,800

* Percent utilization refers to the amount of meat and seal by-products, by weight, removed from the animal for subsistence use. Figures are based on data from the St. Paul Island harvest only.

** Data on pounds of meat taken are available only from St. Paul Island. In 1985, seals taken on St. Paul Island were shared with St. George Island; however, much of the meat spoiled and was later discarded because improper freezing methods were used.

harvest level of 1,340 seals for St. Paul Island had overestimated the true subsistence need of the island residents. The Commission therefore recommended that the 1988 harvest level of 1,145 seals be adopted as the estimated St. Paul Island harvest level for 1990. While no detailed harvest data are available for St. George Island, the Commission noted that the proposed 1990 harvest level of 181 represented a per capita consumption less than half that for St. Paul Island and did not appear to be excessive.

On 30 July 1990, the Service published a final notice of expected harvest levels, estimating a 1990 subsistence need of 1,145 to 1,800 seals for St. Paul Island and 181 to 500 seals for St. George Island. The actual subsistence takes in 1990 were 1,076 seals on St. Paul Island and 164 on St. George Island. No female seals were taken on either island.

Applicable regulations provide for extending the harvest to as late as 30 September if subsistence needs are not met by 8 August. In 1988, the Service noted that there was an increased risk of taking female seals during the extension period, and it announced its intent to eliminate this provision of the regula-

tions for 1989 and subsequent years. The Service again indicated its intent to eliminate the extension provision in its 1989 and 1990 harvest notices. As yet, however, no proposed amendment to the regulations has been published.

Preparation of a Conservation Plan for the North Pacific Fur Seal

As discussed in previous Annual Reports, the Pribilof Islands' population of North Pacific fur seals was designated as depleted under the Marine Mammal Protection Act by the National Marine Fisheries Service in 1988. In view of the population's continuing decline, 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. By letter of 6 December 1985, the Commission provided the Service with a preliminary plan outline.

When the Marine Mammal Protection Act was amended on 23 November 1988, a new section was added to the Act requiring the preparation of conservation plans for species listed as depleted. With respect to North Pacific fur seals, the new section explicitly directed the Service to prepare a conservation plan by 31 December 1989. A draft plan was prepared by the Service's National Marine Mammal Laboratory and transmitted to the Commission for comment on 27 March 1990.

On 23 April 1990, the Commission, provided extensive comments on the draft plan. It noted that the plan provided a useful overview of information on past exploitation, life history, population status and trends, and possible causes of the decline. The Commission also indicated that, although the plan raised a number of useful avenues for further research, the discussion was not sufficiently clear to determine what precisely is being recommended, how recommendations relate to one another, or how they would contribute to recovery and conservation of the population. Noting that important management needs receive insufficient attention in the draft plan, the Commission concluded that the plan appeared to be a population monitoring and assessment plan rather than a plan to conserve and restore the North Pacific fur seal to optimal sustainable population levels.

To rectify deficiencies in the draft plan, the Commission recommended that the Service: (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. In addition, the Commission recommended that the Service designate a fur seal recovery program coordinator to oversee recovery efforts and establish a fur seal conservation team to help guide the recovery program. The Commission also asked that the Service advise it of the steps that would be taken to develop, approve, and implement the plan.

Having received no reply to its 23 April 1990 letter, the Commission, on 4 December 1990, again wrote to the Service seeking a response to its questions and comments on the draft plan. At year's end, a revised fur seal conservation plan had not been provided to the Commission, and no other response to the Commission's letters on the plan had been received.

International Actions

As noted above, the Interim Convention on the Conservation of North Pacific Fur Seals expired in 1984. As discussed in previous Annual Reports, consideration was given to negotiating a new fur seal convention in 1987 and 1988. However, the Service, in consultation with the Commission, suspended efforts to pursue a new agreement in July 1988. In this regard, the Commission believes that when a conservation plan, as mandated by the 1988 amendments to the Marine Mammal Protection Act, has been developed and adopted, the Service should determine what international efforts are necessary to implement the plan and how such cooperation can best be achieved.

Under the Driftnet Impact Monitoring, Assessment, and Control Act of 1987, the United States concluded agreements in 1989 and 1990 with Japan, Taiwan, and Korea to monitor the take of marine resources, including North Pacific fur seals, in the high seas driftnet fisheries in the North Pacific Ocean. Those agreements are discussed in Chapter IV. Preliminary estimates based upon limited 1989 observer data from the Japanese fleet and 1988 fishing effort data suggest that more than 2,100 fur seals are killed annually due to entanglement in squid driftnets in the North Pacific Ocean.

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. This proposal was discussed in the Commission's Annual Report for 1989. By letter of 5 October 1989, the Commission recommended withdrawal of the listing proposal until questions regarding the status of the Pribilof Islands pupping colonies, the levels of incidental take in high seas driftnet fisheries, and the possibility that the high seas take would expand existing markets for fur seal products were

resolved. The Commission also suggested that the National Marine Fisheries Service consider seeking an Appendix III listing for the species pending reassessment of the Appendix II listing proposal.

The Commission again wrote to the Service concerning the listing of fur seals under the Convention on 4 December 1990. Noting that the Service had conducted another season of research on the Pribilof Islands and 1989 observer data on the take of fur seals incidental to the Japanese squid driftnet fishery had become available, the Commission requested that the Service advise it as to whether and to what extent the uncertainties noted above had been resolved. The Commission further requested the Service to identify any additional studies or analyses needed to address the identified concerns and to provide a schedule of its plans to undertake them. In addition, the Commission asked to be advised as to what steps the Service has taken or planned to take to consider an Appendix III listing. At the close of 1990, no response from the Service had been received.

Pacific Walrus (*Odobenus rosmarus divergens*)

Walruses occur in a series of separate population stocks around the arctic ice cap. They occur in the Bering and Chukchi Seas between the United States and the Soviet Union (*i.e.*, the Pacific walrus); the Laptev Sea off northern Siberia; the eastern Canadian arctic and western Greenland; eastern Greenland; and the Barents, Kara, and White Seas off Spitsbergen and the northwest Soviet Union. Within historic times, at least seven stocks existed. All were exploited heavily and the stock in the St. Lawrence River-Nova Scotia region of eastern Canada was hunted to extinction. Subsistence hunting by native groups still occurs on stocks in the Canadian Arctic, Greenland, and the Bering Sea-Chukchi Sea Region.

With the exception of the Pacific walrus in the Bering and Chukchi Seas, which account for perhaps 80 to 90 percent of the world's walruses, the present range and size of remaining walrus stocks appears to be much reduced from what formerly existed. The Pacific walrus appears to have returned to pre-exploitation levels a decade ago. Based on joint U.S.-U.S.S.R. walrus surveys conducted at five-year intervals since 1975, the population was estimated to have numbered 246,000 animals in 1980 and 232,500 animals in 1985. Data from the 1990 census were being analyzed as of the end of 1990. Although the results are expected to be available early in 1991, the data may not be sufficient for developing a population estimate because of problems encountered during the survey.

Subsistence Harvests

Walruses have traditionally been an important subsistence resource for Native peoples in Alaska and the Soviet Union. They provide food and raw materials essential for Native life in the far north and ivory for traditional Native handicrafts. The Marine Mammal Protection Act provides an exemption from its moratorium on the taking of marine mammals to allow Alaska Natives to continue harvesting walruses and other marine mammals for these purposes, provided that the take is carried out in a non-wasteful manner.

Table 5 on the following page shows the number of Pacific walruses harvested by Alaska and Soviet Natives since 1970 in the Bering and Chukchi Seas. The totals do not include animals that escaped with lethal wounds or sank before being retrieved. These animals may number perhaps 40 percent of the walruses killed during the harvest. Considering these additional animals, the total annual removal rate from the population by Soviet and Alaska hunters through most of the 1980s prior to 1989 likely has been between 10,000 and 15,000 animals annually.

The 1989 harvest by Alaska Natives was the smallest in the past 20 years. Ostensibly, this was due to a very short spring hunting season caused by a late, but rapid, break-up of ice in the Bering Sea. Unfortunately, the Fish and Wildlife Service chose not to support a harvest monitoring program in 1990 because of funding constraints. Although some data on catch will be available through the marking and tagging program, it is not clear that these data will be sufficient to develop harvest estimates comparable with those based on past harvest monitoring data. The marking and tagging records indicate a catch of 754 walruses in 1989 and a preliminary total of 1,447 walruses for 1990.

Interactions Between Whales and Commercial Fisheries

In 1960, the State of Alaska designated the Walrus Islands, including Round Island, in northeast Bristol Bay as a State Game Sanctuary to protect habitat important to walruses and other wildlife. By 1986, at least 12,400 walruses were using the islands as a haulout site. Recent information, however, suggests that the initiation of yellowfin sole trawl fishing near the islands has been affecting walruses. In 1987 and 1988, the number of walruses on Round Island declined by more than 50 percent -- a decline coincident with the onset of yellowfin trawl fishing near the islands. It has been suggested that the very loud noise and disturbance associated with the trawlers were the cause of the decline.

In 1989, the North Pacific Fishery Management Council considered amendments to the groundfish fishery management plan

Table 5. **Estimated Annual Harvest of Pacific Walruses by Native Peoples in Alaska and the Soviet Union, 1970 to 1989**

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

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.

under which yellowfin sole fishing is managed. Among other things, it considered options for closing certain waters around walrus haulouts in northern Bristol Bay to yellowfin sole fishing. The closures, intended to protect walrus haulouts, were proposed as experimental mitigation measures to be evaluated for effectiveness after two years. The proposed amendments noted that proposed acoustical studies at Round Island and Cape Pierce by the U.S. Fish and Wildlife Service, in cooperation with the Alaska Department of Fish and Game, would provide a basis for evaluating the utility of the adopted measures.

The proposed amendments were circulated by the National Marine Fisheries Service and, on 13 September 1989, the

Commission provided comments. Among other things, the Commission concurred with the determination that the cause of the walrus decline on Round Island may well be related to noise and disturbance by operating trawlers, and it agreed that developing experimental closed fishing areas was warranted. The Commission noted, however, that the proposal did not identify criteria for determining if, by the end of the experimental period, the closure was having its desired effect. Therefore, the Commission recommended that the Service identify the criteria and monitoring studies needed to assess the closures' effectiveness. It also noted that the Service's authority to establish closures extended only to waters outside the State of Alaska's three-mile jurisdiction and that the Service should ensure that complementary actions were taken by the State in its waters to avoid increased fishing activity close to walrus haulouts.

On 6 December 1989, the Service announced that it was adopting a rule to give force to the Council's recommendation. The rule established a two-year seasonal groundfish fishing closure in Federal waters between 3 and 12 miles from Round Island, certain other islands in the Walrus Islands, and Cape Pierce in the Togiak National Wildlife Refuge. The closure covered periods between 1 April and 30 September in 1990 and 1991. Also in 1989, the Alaska Board of Game adopted a measure authorizing the Alaska Department of Fish and Game to control all access to State waters within three miles of Round Island. The Department subsequently established regulations requiring State permits for entering State waters around Round Island.

On 20 February 1990, the Commission received a request from the Fish and Wildlife Service to review a draft Fishery Management Plan for the Togiak National Wildlife Refuge. The purpose of the Plan was to review management activities for conserving fishery resources and habitat in a manner consistent with the purposes for which the Refuge was established. It did not address the possible effects of noise and disturbance associated with yellowfin sole trawlers operating offshore of walrus haulouts at Cape Pierce in the Refuge.

Therefore, the Commission wrote to the Service on 2 April 1990 referencing the above mentioned actions to limit fishing in Federal waters 3 to 12 miles from Cape Pierce. In its letter, the Commission recommended that the Draft Plan be modified to include comparable measures inside three miles. Specifically, it recommended: that the Plan identify objectives for protecting walrus haulouts within the Refuge; that the Service consult with the National Marine Fisheries Service, the North Pacific Fishery Management Council, the Alaska Board of Game, and the Alaska Department of Fish and Game to establish management measures within three miles of shore to complement measures adopted beyond that limit; and that the Service collect data on the number of

walruses hauling out at Cape Pierce to assess the effectiveness of the fishery closures.

By letter of 27 July 1990, the Fish and Wildlife Service responded, noting that it did not believe that the Refuge's fishery management plan was the appropriate place to address the issue of the effect of yellowfin sole fishing on walruses and that it might best be addressed in the Refuge's public use plan. It therefore advised that the Commission's comments had been referred to the Service's public use planning group for the Refuge.

By letter of 22 August 1990, the Commission responded to the Service's letter. It noted that its comments on the draft plan were intended to ensure that fishery management regulations within the Refuge were consistent with those in Federal waters beyond three miles and that the matter appeared to be a clear fishery management issue. It therefore asked to be advised why the Service considered the matter inappropriate for the Refuge's fishery management plan. It also asked to be advised of what actions had been or would be taken by the public use planning group or other responsible parts of the Service to coordinate fishery management provisions for the Togiak Refuge with those adopted by the National Marine Fisheries Service, the North Pacific Fishery Management Council, and the State of Alaska to prevent fisheries from affecting walruses in the Refuge as well as in other areas.

By the end of 1990, the Service had not yet replied to the Commission's 22 August letter. Therefore, it was not clear what, if any, actions the Service had taken to ensure that regulations within the Refuge closer than three miles from walrus haulout sites at Cape Pierce were consistent with walrus protection regulations outside of three miles in Federal waters. It also was not clear what studies were being supported by the Fish and Wildlife Service to monitor walrus haulout patterns at Cape Pierce or whether the Service's proposed acoustical studies off Cape Pierce and Round Island to assess the effectiveness of fishing closures had been carried out as proposed.

International Walrus Workshop

On 26-30 March 1990, an international workshop was convened in Seattle, Washington, on the ecology and management of walrus populations worldwide. Its purpose was to improve communication and encourage cooperation among the researchers and managers responsible for conserving the various walrus stocks around the Arctic. Several of the stocks reside in waters governed by more than one country. The participants included the world's foremost experts on walrus biology, ecology, and conservation from all countries in which walrus occur, including Canada, Greenland, Norway, the Soviet Union, and the United States. Primary support

for the Workshop was provided by the Marine Mammal Commission with the assistance of the Fish and Wildlife Service.

The report of the Workshop, published in October 1990 (see Appendix B, Fay et al. 1990), reviews the history and status of each population stock. Among other things, the status review notes that walrus stocks in Canada and Greenland, which support small annual harvests, appear to be stable but much reduced in size and distribution from the time of first European contact. The Soviet western arctic stock, which has received full protection for over 30 years, appears to be severely depleted and is showing no noticeable signs of recovery. Although information on the Laptev Sea stock is insufficient to determine recent population trends, that stock also appears to be much reduced from former levels.

The report also includes a series of working group papers summarizing current knowledge of and needed actions on a number of key walrus research and management issues. Regarding research issues, the participants agreed, among other things, that the different walrus stocks should be defined for management purposes by strengthening and better coordinating ongoing studies of historical records, tagging (including radio-tagging), morphological differences, biochemical differentiation, and behavioral differences. It was noted that priority research objectives included the needs to better understand walrus habitat-use patterns, food requirements, stock size, and certain other vital stock parameters. Methods for collecting relevant data were assessed and recommended.

Regarding management needs, the participants noted that monitoring the status of stocks was the most difficult and costly of needed information-gathering activities and that it is not being done effectively for any stock at present. The most important measurement noted in this regard involves monitoring the size and age-sex composition of annual harvests (for those stocks sustaining harvests) in relation to location. Other important measurements identified are seasonal distribution, use of shore haulout sites, and standard animal fitness indices (e.g., fatness, age at first reproduction, and blood parameters). It was noted that alternative approaches for regulating harvests need to be evaluated and that this should include ways to reduce the number of animals killed but not retrieved. It was also noted that, in addition to establishing sanctuaries on and around major walrus haulouts, programs may be needed to safeguard important offshore feeding and breeding areas. Finally, it was noted that research and management efforts for those stocks inhabiting waters of two countries require cooperative efforts between nations and that these activities should be guided by a multi-national scientific and technical committee.

Preparation of a Walrus Conservation Plan

As noted in Chapter VII, the Commission supported efforts to prepare species accounts with research and management recommendations for several marine mammals in Alaska, including the Pacific walrus. The species accounts were completed late in 1988. Shortly after their completion, the Commission wrote to the Fish and Wildlife Service recommending that the accounts for species under the Service's jurisdiction (including the walrus) be used as the basis for developing conservation plans pursuant to new amendments to the Marine Mammal Protection Act.

In March 1989, the Fish and Wildlife Service responded to the recommendation, noting that it was developing a management plan for walruses that would address the new provisions for conservation plans in the Act. To start the planning process, the Service advised the Commission that it had formed a Walrus Management Plan Advisory Team composed of representatives from concerned Federal and State agencies and the Eskimo Walrus Commission.

An initial meeting of the team was held in November 1988 and a second meeting was held in March 1989. During the meetings, participants developed a preliminary plan outline. Further work on the plan was suspended in March 1989 due to the Exxon Valdez oil spill. Early in 1990, the matter again appeared to be receiving attention. In response to a December 1989 inquiry regarding the status of conservation plans for marine mammals in Alaska, the Fish and Wildlife Service wrote to the Commission on 9 January 1990 advising it that work on the walrus plan remained a high priority within its Alaska Region.

Despite the Service's commitment at that time, it appears that little progress was made during 1990 to pursue development of the walrus plan. There were no meetings of the Walrus Management Plan Advisory Team in 1990 and, instead of progress in planning walrus research and management, it appeared that the Service's walrus program was beset by problems. For example, as noted above, the 30-year harvest monitoring program was abruptly suspended in 1990; the Service appeared unable to address research and regulatory needs to protect walrus haulouts, including those within its National Wildlife Refuge system, from possible effects of commercial fishing; and the 1990 walrus survey appeared likely to produce results of little or no value for estimating population size and trends.

Therefore, at the end of 1990, the Commission began a review of walrus research and management needs. The review is expected to be completed early in 1991. At that time the Commission will provide the results to the Service and will make recommendations regarding priority needs for strengthening the walrus research and management program.

Northern Right Whale (Eubalaena glacialis)

The northern right whale is the most endangered marine mammal in coastal waters of the United States and is the most endangered large whale in world. It occurs only in the Northern Hemisphere where populations 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 large whale.

Historic catch records suggest that discrete stocks existed in the eastern and western North Atlantic. The eastern North Atlantic stock may be extinct. The western North Atlantic stock, which occurs seasonally in certain coastal waters off the eastern United States and Canada, numbers perhaps 300-350 animals and is the largest surviving stock of northern right whales. In the North Pacific, two or more separate stocks may exist or have existed. There is no known area in the North Pacific where right whales occur predictably, and, in the past 50 years, there have been few, if any, reports of cow-calf pairs. The number of right whales throughout the North Pacific may number no more than a few tens of animals.

Right whales were brought to their precarious status by commercial whaling. Indeed, the species' common name comes from the combination of factors that made it the "right" whale to kill. It was prized for the large quantity and quality of its oil and baleen; it occurred in nearshore coastal waters convenient to shore-based whaling stations; it swam slowly; and fat, well-nourished whales tended to float when killed. Northern right whales were taken by Basque whalers along the coast of southern Europe in the 11th century and were probably the first species to be hunted by a regular whaling industry. By the mid-19th century they were being taken throughout their range in both oceans, and by the late 19th century all known stocks were severely depleted and economically extinct. Nevertheless, commercial whalers continued to take right whales opportunistically throughout the first third of the 20th century.

Through the first International Convention for the Regulation of Whaling, which entered into force in 1935, a ban on taking right whales was accepted by most whaling nations. Right whales thereby became the first whale to receive international protection from commercial whalers. The ban was later carried forward by the International Whaling Commission under the International Convention for the Regulation of Whaling of 1946 and has been accepted by all whaling nations for several decades. The species also has received protection through its listing on Appendix I of the Convention on International Trade in Endangered Species of Flora and Fauna, its listing as endangered under the

U.S. Endangered Species Act, and its consideration as depleted under the U.S. Marine Mammal Protection Act.

Despite protection over the past 50 years, northern right whale stocks have increased little, if at all, in absolute size. This is undoubtedly due, at least in part, to the death or injury of individual right whales and the degradation of essential habitat due to human activities. Information indicates that, over the past 20 years, right whales have been killed and injured by collisions with commercial, military, and recreational vessels and by entanglements in commercial fishing gear. In addition, they may be affected by vessel traffic (including whale-watching activities) in ways other than direct physical harm (e.g., by vessel-related noise and disturbance), and by dredging and dredge spoil disposal, exploration and development of offshore petroleum and hard mineral resources, oil spills, whale research, and perhaps other human activities. Other factors precluding a rapid increase in right whale numbers also include the very low levels to which all stocks were reduced and the species' inherently low reproductive capacity. Mature females typically bear only a single calf every two to four years.

As noted in previous Annual Reports, the Commission has supported a number of studies and workshops to address right whale research and management needs (see, for example, Appendix B, Kraus 1985 and the Georgia Conservancy 1986, and Appendix C, Winn 1984, Winn et al. 1985, and Brownell et al. 1986). During 1990, as discussed below, the Commission continued to devote attention to right whale-related research and management needs.

Preparation of a Right Whale Recovery Plan

As noted in previous Annual Reports, the Commission has recommended several times that the National Marine Fisheries Service constitute recovery teams and prepare recovery plans for endangered whales, including northern right whales, occurring in waters of the United States. Regarding right whales, the Service responded in July 1987 by constituting a Northern Right Whale Recovery Team and initiating steps to prepare a recovery plan. Funding limitations delayed the team's first meeting until December 1988, at which time it discussed a preliminary draft plan developed by the Service. The team concluded that the draft plan would require substantial modifications and offered to develop a recommended plan for consideration by the Service.

The Service agreed and, early in 1990, the team completed its work and submitted a recommended draft plan. On 6 February 1990, the Service published a Federal Register notice requesting public and agency comments on the "Draft National Recovery Plan for the Northern Right Whale (Eubalaena glacialis)" prepared by the team. The draft plan provided a general summary of information on the biology, ecology, and status of right whales.

It also identified threats to the species, actions to protect and conserve right whales and their habitat in U.S. waters, and cost estimates for those actions over a five-year period.

The Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, reviewed the draft plan and, on 22 March 1990, wrote to the Service providing comments. In its letter, the Commission noted that some of the statements and conclusions in the draft plan appeared inappropriate or unjustified. For example, the draft plan concluded that there had been no change in the size of right whale populations over the past 50 years even though there is no reliable basis for estimating the size or trends in population growth between the early 1900s and about 1980. The Commission also noted that many of the recommended actions were not clearly described or justified, and that the goals and tasks in the draft plan were not structured in a way that would facilitate development of a comprehensive implementation plan. Therefore, the Commission recommended that the Service ask the Recovery Team or otherwise arrange to reformat and substantially revise the draft plan. To help in this regard, the Commission developed and attached to its comments a revised step-down outline for the plan.

In light of public and agency comments, including those by the Commission, the Service decided to consider further revisions to the draft plan. To help in this regard, the Commission offered to assist the Service in redrafting the plan in the fall of 1990. A revised working draft plan was completed by the Commission early in winter and, at the end of 1990, it was being reviewed by the Service. Among other things, it was the Commission's understanding that the Service was considering whether the plan should be circulated for review by the public, other agencies, and the Recovery Team in light of the changes. In view of the progress, it was the Commission's expectation at the end of 1990 that a final plan would be adopted by the Service in 1991.

Critical Habitat for Western North Atlantic Right Whales

As noted above, certain coastal waters off the eastern United States and Canada are used seasonally by a 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 (used as a calving ground and nursery area for most of the stock's newborn calves between January and March); (2) Cape Cod Bay and Massachusetts Bay (used as a feeding area by some juvenile and adult whales and a significant proportion of the stock's cow-calf pairs in March and April); and (3) the Great South Channel 40 to 60 miles east of Cape Cod, Massachusetts (used as a feeding area and migratory corridor by a substantial part of the right

whale population in May and June). The other two areas are in Canada in the lower Bay of Fundy near the U.S.-Canadian border (used by cow-calf pairs as well as juvenile and adult whales for nursing and feeding between July and November), and near Browns Bank about 25 miles southeast of southern Nova Scotia (used by adult and juvenile whales for feeding and mating between July and November).

On 5 February 1990, a letter was submitted by the Recovery Team leader on behalf of the Right Whale Recovery Team petitioning the National Marine Fisheries Service to designate areas within certain boundaries along the coast of southern Georgia and Florida, in Cape Cod Bay, and in the Great South Channel as critical habitat under section 4 of the Endangered Species Act. A copy of the letter was provided to the Commission and was reviewed in conjunction with the draft recovery plan. In its 22 March 1990 letter to the Service commenting on the draft Recovery Plan, the Commission noted that, while convincing arguments for designating the three areas as critical habitat probably could be made, the 5 February petition for the designation did not include a useful review of information justifying the action or the proposed boundaries. Therefore, the Commission recommended that the Service advise the petitioner that additional information would be required in order to adequately assess the merits of the petitioned action.

By letter of 18 May 1990, the Recovery Team submitted an amended petition for designating critical habitat and a brief review of literature on the occurrence of right whales in each of the three areas. On 12 July 1990, the National Marine Fisheries Service published a Federal Register notice announcing that the petition had been received and that, within 12 months, the Service would conduct a review to determine if the requested action were warranted. To help with its review, the Service requested information and comments on the petitioned action, including relevant reprints and publications, from the public and government agencies.

The Commission reviewed the Service's notice and the amended petition and found that analyses of information in support of the petition were still incomplete and that justification for the action was neither as clear nor as strong as it could and should be. For example, while the petition indicated that right whales occur in each of the three areas on a seasonal basis, it was not clear whether the proposed boundaries accurately prescribed the areas in which right whales occurred most often based on available sighting data, or what was known regarding the number of right whales likely to occur in each area on a seasonal basis. Therefore, as noted in Chapter X, the Commission contracted for a report to synthesize information on right whales and their habitats in and adjacent to each of the three proposed critical

habitat areas. The report is expected to be completed early in 1991.

By letter of 26 September 1990, the Commission wrote to the Service in response to its request for information and comments on the petitioned action. In its letter, the Commission noted that there appear to be sufficient grounds for designating critical habitat in each of the three areas. The Commission also noted, however, that a synthesis and analysis of available information was still needed to better evaluate and illustrate the basis for the proposal and any special management needs in each area relative to right whales. In this regard, the Commission advised the Service that it had contracted for a study to help assess these needs and that it would forward the results as soon as they were completed. The Commission also forwarded copies of all other Commission-sponsored studies on right whales completed over the past five years.

Humpback Whale (*Megaptera novaeangliae*)

Humpback whales occur in all the world's oceans; they range from the tropics to the polar ice zones. All populations were so severely reduced by commercial whaling that exploitation of the species was banned by the International Whaling Commission in 1966. In 1970, humpback whales were designated as endangered under the U.S. Endangered Species Preservation Act, a designation which was carried forward under the Endangered Species Act of 1973. As noted in Chapter IV, the International Whaling Commission has authorized the take of up to three humpback whales annually for traditional subsistence purposes by residents of St. Vincent and the Grenadines.

At least 3 of the 13 recognized humpback whale stocks (*i.e.*, the western North Atlantic, the eastern North Pacific, and the central North Pacific stocks) occur seasonally in U.S. waters. The primary threats to recovery of these stocks are commercial and recreational vessel traffic, offshore oil and gas development, commercial fisheries, and coastal development.

Draft Recovery Plan for Humpback Whales

As noted in previous Annual Reports, the Commission recommended in 1984 and again in 1986 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, in July 1987, constituted a Humpback Whale Recovery Team to assist in preparing a recovery plan. In 1989, the Service completed work on the draft plan and, on 16 October 1989, made it available for agency and public review.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed this draft plan and provided comments to the Service on 30 November 1989. The Commission noted that the draft plan did not identify needed research and management tasks in sufficient detail to effectively guide development of actual recovery programs and that problems were sufficiently different among the regions to merit independent recovery programs for each regional stock. It recommended that the recovery 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.

By letter of 18 May 1990 the National Marine Fisheries Service acknowledged receipt of the Commission's comments on the draft Recovery Plan. In its letter, the Service noted that a revised draft Recovery Plan, incorporating reviewers' comments, had been distributed to the Recovery Team in preparation for their 23-24 May 1990 meeting in Seattle, Washington. The Service further noted that, subsequent to the Recovery Team's meeting, an implementation schedule with cost estimates and task priorities would be circulated for public and agency review and comment.

On 20 July 1990 the National Marine Fisheries Service published a Federal Register Notice announcing the availability of the implementation schedule and requesting comments by 20 August 1990. At the end of the year, the Commission was advised that the revised Recovery Plan and implementation schedule were being reviewed within the National Marine Fisheries Service and that the plan was expected to be completed in early 1991.

Interactions Between Humpback Whales and Vessel Traffic

A matter of general concern regarding humpback whales and certain other endangered whales in U.S. waters (e.g., right and gray whales) is disturbance by whale-watching boats and other vessels. As noted in previous Annual Reports, the problem has been a matter of particular concern in coastal waters off Hawaii, southeast Alaska, New England, and California.

Hawaii -- The shallow, coastal waters of the main Hawaiian Islands, particularly Maui, Molokai, Lanai, and Kahoolawe, appear to be principal calving/breeding grounds for the eastern North Pacific stock of humpback whales. To minimize disturbance from whale-watching and other activities, the National Marine Fisheries Service, in consultation with the Marine Mammal Commission, published a "Notice of Interpretation of Harassment of Humpback Whales in Hawaiian Waters" in 1979. This notice provided guidelines for approaching whales and advised vessel and aircraft operators of steps that should be taken to avoid

harassing whales and, thus, avoid violating the Marine Mammal Protection Act and the Endangered Species Act.

As noted in previous Annual Reports, vessel and aircraft traffic in Hawaiian waters has increased in recent years. Accompanying this increase has been a corresponding increase in the level of whale harassment due to failure of aircraft and vessel operators to adhere to the whale-watching guidelines outlined in the Service's Notice of Interpretation. Because the guidelines do not have the legal force of regulations, the Service has had difficulty prosecuting violators. To overcome this problem, the Service, in 1986, proposed formal regulations to replace the 1979 Notice of Interpretation. The Commission commented on the proposed rules on 23 December 1986, noting that in some ways they would provide less stringent standards than the 1979 Notice of Interpretation. On 23 November 1987, the Service issued an interim rule prohibiting: aircraft from approaching closer than 1,000 feet; vessels or swimmers from approaching closer than 100 yards; and vessels or swimmers from approaching cow/calf pairs closer than 300 yards.

The Service decided not to adopt the regulations as final, pending consideration of the findings of a whale-watching workshop held in Monterey, California, on 14-16 November 1988. In their report, released in early 1989, the workshop participants concluded, among other things, that: (1) whale-watching provides useful opportunities for educating the public, for developing an ecologically sound conservation ethic, and for conducting basic research on the distribution, abundance, and behavior of whales; (2) whale-watching can disturb and alter the behavior of whales, which in turn may affect vital processes such as feeding and reproduction and cause decreases in the survival or productivity of whales; and (3) a licensing or permit system should be developed to help ensure that operators of whale-watching vessels are aware of applicable regulations and operate accordingly.

Following publication of the workshop findings in 1989, the Service requested that its Regional Offices develop proposals for regional whale-watching regulations, taking into account the species involved, the kinds and numbers of whale-watching activities prevalent in the region, and the seasonality of those activities. At the end of 1990, the Commission was aware of no further action that had been taken by the Service to address this matter. The interim regulations for Hawaiian waters, still in effect at the end of 1990, will remain in effect until changed.

Concerned that whale-watching and other activities may be having significant adverse effects on humpback whales in Hawaii, the Commission, in consultation with its Committee of Scientific Advisors, conducted a detailed review of relevant research, management, and enforcement programs during its annual meeting

held in Hawaii on 8, 9, and 10 March 1990. As noted in Chapter X, the Commission also contracted for a study to compile and evaluate information concerning population status and steps being taken to identify and avoid or mitigate threats to the whales and their habitats in Hawaii.

During the Commission's meeting, scientists conducting research on humpback whales in Hawaii reviewed their objectives, methods, and the results of their studies. Representatives of the Hawaii Department of Transportation -- the responsible State agency -- reviewed steps that had been and were being taken by the State to protect humpback whales and their habitats in State waters. Representatives of the National Marine Fisheries Service reviewed ongoing efforts to develop a Recovery Plan, coordinate research activities, and enforce compliance with the interim whale-watching regulations.

During these reviews it was noted that: the distribution of whales, particularly females with calves, appears to have shifted in some areas in recent years, from shallow nearshore waters to deeper offshore waters, possibly because of increased vessel traffic in the nearshore areas; and this shift in distribution could be having adverse effects if calving, calf rearing, and breeding are more successful in shallow nearshore areas than in deep water. It also was noted that humpback whale research in Hawaii is being funded primarily from private sources and that some researchers are financing their research by selling photographs taken in the course of their studies and having members of the public pay to participate in the research. These activities may warrant modification of the applicable permit conditions under which this research is being conducted.

At the end of 1990, the Commission, in consultation with its Committee of Scientific Advisors, was reviewing the results of the contract study and other information obtained since its March meeting to determine what more should be done to protect humpback whales and their habitats in Hawaii. The results of this review will be communicated to the National Marine Fisheries Service early in 1991.

Alaska -- During the summer, part of the central North Pacific stock of humpback whales inhabits waters in southeast Alaska, including Glacier Bay, a part of the Glacier Bay National Park and Preserve which is administered by the National Park Service. In the late 1970s, when the number of whales using Glacier Bay declined, it was believed that increased tour boat and other vessel traffic may have caused or contributed to the decline.

As discussed in previous Annual Reports, the Commission, in cooperation with the National Park Service and the National Marine Fisheries Service, convened meetings of scientists in

October 1979 and December 1981 to identify the possible causes of the decline and research needed to determine the actual cause or 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.

Based on results of those meetings and consultations, the National Park Service initiated a multi-year research program in 1980 to assess factors which might be affecting humpack whale distribution in Glacier Bay and surrounding waters. It also promulgated temporary regulations which, among other things, reduced to 1976 levels the number of large commercial tour ships and smaller recreational vessels that could enter the Bay. The temporary regulations also established a mechanism for designating "whale waters" in which certain vessel operating restrictions were to apply. These regulations were modified and reissued annually until 1985, when the National Park Service adopted permanent regulations. These 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."

Since the early 1980s, the National Park Service has allowed a gradual increase in the number of vessels entering the Bay during the summer. This has been in accordance with advice provided by the National Marine Fisheries Service in a Biological Opinion issued by the Service in 1983. In that Opinion, the National Marine Fisheries Service recommended limiting the number of cruise ships and other types of vessels that enter Glacier Bay each summer to no more than 20 percent above the 1976 levels (i.e., no more than 107 cruise ship entries). The National Marine Fisheries Service further recommended that increases in vessel traffic be allowed "only if the number of whales entering Glacier Bay remains equal to or is greater than the 1982 level and only following public notice and hearing...."

In 1988, the authorized cruise ship entry level was 107 (i.e., 20 percent above the 1976 level). In 1989, the Park Service considered authorizing more than 107 entries. To assess the possible consequences of doing so, it again consulted the National Marine Fisheries Service pursuant to section 7 of the Endangered Species Act. After reviewing the alternatives and the results of whale monitoring studies conducted by the Park Service in 1988 and 1989, the National Marine Fisheries Service advised the Park Service, on 5 October 1989, that an increase in vessel traffic could not be justified since the number of whales entering the Bay during the standard observation period in 1988 and 1989 were both below the 1982 level of 22 whales. The National Park Service subsequently decided to limit cruise ship access to the Bay in 1990 to the 1988 level of 107.

On 16 August 1990, Greenpeace wrote the National Park Service, alleging that the Park Service had violated the Endangered Species Act, the Marine Mammal Protection Act, and the Administrative Procedure Act by authorizing more than 107 cruise ship entries into Glacier Bay during the 1990 season. By letter of 23 August 1990 to the Park Service, the Marine Mammal Commission expressed its understanding that: the number of cruise ships and other types of vessels that may enter Glacier Bay during each summer is limited by regulation; any increase would require amendment to the Service's regulations and reinitiation of section 7 consultations with the National Marine Fisheries Service; the regulations allow increases in vessel entry levels "only if the number of whales entering Glacier Bay remains equal to or is greater than the 1982 level"; and information on the number of humpback whales in Glacier Bay in 1988 and 1989 indicated that fewer whales were present in those years than in 1982.

The Commission asked that, if the Park Service had authorized an increase in the number of entries, it advise the Commission of: (1) the basis for determining that the increase would not have an adverse effect on humpback whales using the Bay; (2) the steps that have been or will be taken to verify that the authorized increases do not affect the number or behavior of humpback whale that utilize the Bay; and (3) how applicable regulations were amended and whether consultation with the National Marine Fisheries Service, pursuant to section 7 of the Endangered Species Act, was undertaken.

On 8 November 1990, the Park Service replied, noting that pending litigation regarding many of the Commission's questions prevented it from responding to the issues. It did note that the National Marine Fisheries Service had been consulted prior to allowing the additional entries into the Bay during the 1990 season. At the end of 1990, the Commission was looking forward to receiving a complete answer to its 23 August letter to the Park Service.

Bowhead Whale (Balaena mysticetus)

Bowhead whales occur only in the Northern Hemisphere. They are circumpolar in distribution and are associated with ice-bound arctic and sub-arctic regions. Historically, there are believed to have been at least four or five separate populations. Over-exploitation by commercial whalers between 1600 and 1900 reduced all populations to extremely low levels, and one population, the Spitsbergen population north of Scandinavia, may be extinct. The species was listed as endangered under the Endangered Species Act in 1970 and depleted under the Marine Mammal Protection Act in 1977.

The largest surviving population is in the western Arctic, where animals migrate seasonally between the Bering Sea and the Chukchi and Beaufort Seas. A preliminary 1990 analysis of abundance indices derived from visual censuses done since 1978 suggests that, during the period 1978 to 1988, the population increased at an average annual rate of 3.1 percent (95 percent confidence interval, 0.1 to 6.2 percent). The most recent population estimate, accepted by the International Whaling Commission at its 1990 meeting, is 7,800 whales (95-percent confidence interval, 5,700 to 10,600).

The population is important to Alaska Natives who continue to hunt bowhead whales for subsistence and cultural purposes. Both the bowhead whale population and the availability of whales to Native subsistence hunters could be affected by offshore oil and gas exploration and development in the Beaufort, Chukchi, and Bering Seas.

Eskimo Whaling

The number of whales struck and landed or lost by Eskimo whalers increased throughout the early 1970s from approximately 50 to more than 100 whales per year (see Table 6 on the following page). Causes of the increase included: restrictions on the subsistence take of caribou; more cash to invest in whaling activities as the result of work on the Alaska pipeline and settlement of compensation claims relating to Native land rights; and the progressive change from use of the darting gun to the shoulder gun, which, unlike the former, does not attach a "fixing line" to the whale.

At its June 1977 meeting, the International Whaling Commission reviewed information on the status of the western Arctic bowhead whale population and the increasing take by Alaska Eskimos. The best available data at that time suggested that the population may have numbered as high as 2,000 animals and as low as 600, approximately 6 to 10 percent of its estimated pre-exploitation size. Concerned that this increasing subsistence take was jeopardizing the population, the Whaling Commission, acting on the advice of its Scientific Committee, eliminated the exemption that had allowed bowhead and other protected species of whales to be taken by Natives for subsistence purposes.

As described in previous Annual Reports, the United States sought to have the exemption reinstated. At a special meeting in December 1977, the Whaling Commission agreed to restore the exemption but limited the take to a total of 18 animals struck in 1978. This action was based in part on a pledge by the U.S. Commissioner that the United States would undertake a comprehensive research program to closely monitor the bowhead whale's population status and trends, a commitment which has been honored.

Table 6. Quotas and Number of Bowhead Whales Taken, 1973-1991

	IWC Quotas[1]		Takes by Alaska Eskimos			
Year	Landings	Strikes	Landed	Struck But Lost	Total Struck	Percent Struck Landed
1973	[No quota]		37	10	47	79
1974	"	"	20	31	51	39
1975	"	"	15	28	43	35
1976	"	"	48	43	91	53
1977	"	"	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	11	28	61
1982 [2]	45	65	8	11	19	42
1983			9	9	18	50
1984		43	12	13	25	48
1985 [3]		26	11	6	17	65
1986 [4]		26	19	9	28	68
1987		32[5]	22	9	31	71
1988		35	23	6	29	79
1989	41	44	18	8	26	69
1990 [6]	41	47[7]	30	14	44	68
1991	41	44	--	--	--	--

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

2 In 1980, a block quota was set for the years 1981 to 1983. In any one year, the number landed was not to exceed 17 and the number struck was not to exceed 27.

3 In 1983, a block quota was set on strikes alone for 1984 and 1985 with a one year strike limit of 27.

4 In 1985, a quota of 26 strikes per year was set for the years 1985-1987. Strikes not used in any one year could be used the following year provided that no more than 32 strikes were made in any single year.

5 In 1987, the IWC modified its 1987 quota to 32 strikes.

6 In 1988, a quota of 44 strikes or 41 landings was adopted for the years 1989 to 1991. Up to three strikes not used in 1988, 1989, or 1990 may be used the following year.

7 Three unused strikes were transferred from the 1989 to the 1990 hunt.

In its continuing review of the status of whale populations from which animals are taken for subsistence purposes, the International Whaling Commission's Scientific Committee will once again examine the western Arctic bowhead population at its May 1991 meeting. This assessment, part of the Committee's comprehensive assessment of whale stocks, will include consideration of quotas on the number of bowhead whales that can be taken by Native subsistence hunters in 1992, 1993, and 1994.

Quotas established by the International Whaling Commission are to be implemented by the member nations. In the United States, the Secretary of Commerce and the Alaska Eskimo Whaling Commission share responsibility for regulating, monitoring, and enforcing the Alaska Eskimo bowhead whale hunt pursuant to a memorandum of understanding signed in 1981 and renewed annually. To date, the quotas set under this agreement have been consistent with those established by the International Whaling Commission. Although this memorandum was not renewed in 1990, the subsistence take did not exceed the quota established by the Whaling Commission (see Table 6).

Industry-Native Agreement on Bowhead Whales

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, and thereby affect the Alaska Eskimo spring and fall bowhead hunts. Among other things, hunters may have to travel greater distances to find whales and thereby increase the risk that they may be injured or killed or be unable to bring dead whales back to their villages. Therefore, in 1986, the Alaska Eskimo Whaling Commission and certain companies engaged in oil and gas activities on Alaska's North Slope entered into a cooperative agreement calling upon the industry, among other things, to: attempt to tow whales killed by Native hunters to suitable butchering sites to prevent meat from spoiling; cache emergency supplies (e.g., gasoline, food, etc.) 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 will take to avoid interfering with ongoing whaling activity. The agreement was approved by the National Oceanic and Atmospheric Administration in 1986; it has been modified, as necessary, and renewed annually.

Bowhead Whale Research Planning and Coordination

The Marine Mammal Commission has played a major role in planning and coordinating bowhead whale research. As noted above, the International Whaling Commission lifted its ban on subsistence taking of bowhead whales in December 1977, The action was based, in part, on a pledge by the U.S. Commissioner that the United States would undertake a comprehensive research

program on the species. Anticipating this, the National Marine Fisheries Service, acting on a Marine Mammal Commission recommendation, prepared a bowhead whale research plan in August 1977. The plan was inadequate and the Commission convened a group of experts in September 1977 to review it. Subsequently, the Commission developed and provided a strengthened research program plan to the Service. This plan was modified and adopted by the Service before the December 1977 meeting of the International Whaling Commission.

In 1978, the Bureau of Land Management (whose offshore functions were later consolidated into the Minerals Management Servive) initiated research on bowhead whales in response to consultations pursuant to section 7 of the Endangered Species Act, with the National Marine Fisheries Service. At issue were the possible effects of offshore oil and gas exploration and development on bowhead whales and how best to assess these. To avoid duplication and coordinate research being planned or supported by Federal agencies (particularly the Bureau of Land Management and the National Marine Fisheries Service) and other groups, the Commission, as noted in previous Annual Reports, recommended that a series of research review and coordination meetings be held. The Commission also helped to organize these meetings, which were held between 1978 and 1981. In 1982, at the recommendation of the Marine Mammal Commission, the National Marine Fisheries Service assumed responsibility for organizing and convening these research coordination meetings.

In recent years, formal coordination meetings have not been held and it is not clear that everything necessary is being done to ensure that bowhead whale studies continue to be well-designed, properly coordinated, and not duplicative of each other. In this regard, questions were raised during the Commission's Annual Meeting in Monterey, California, on 23-25 February 1989, as to whether the objectives of a study being supported by the Minerals Management Service were realistic, given the described study design. Also, concerns were raised that this study could interfere with other ongoing studies and adversely affect both the whales and the annual subsistence hunt by Alaska Eskimos.

In its 20 March 1989 comments on the permit application regarding the 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. The Commission also recommended that the Service's Alaska Regional Director convene a meeting of all researchers, before the start of the spring bowhead whale research season, to ensure that the various research activities were properly coordinated.

The Minerals Management Service subsequently constituted a Scientific Review Board (i.e., quality review board) as recom-

mended by the Commission. The Board, which includes a member of the Commission's staff, met before and after the 1989 and 1990 research seasons to review the program's experimental design and results to date. The Board recommended follow-up studies and changes in the study design. In a similar vein, the National Marine Fisheries Service held a program coordination meeting before the 1989 summer field season, but not before the 1990 season. However, representatives of the Minerals Management Service's contractor and the National Marine Fisheries Service did meet with representatives of the Native community to organize and coordinate the 1990 program with the Native hunt and other planned research.

Small-Take Exemption

In April 1988, the National Marine Fisheries Service published a Federal Register notice requesting comments on a proposal from six oil and gas exploration companies to allow the incidental take of bowhead and gray whales during oil and gas exploration activities along the coast of Alaska. The Commission's comments on this proposal and subsequent actions by the National Marine Fisheries Service are described in Chapter IX.

Other Activities Related to Bowhead Whales

The Fifth Conference on the Biology of the Bowhead Whale sponsored by the North Slope Borough was held 1-3 April 1990 in Anchorage, Alaska. Among the objectives of this Conference were to review and evaluate: recent census and other population data; the results of basic research on the behavior and biology of bowhead whales; and the findings of research being done to determine the possible effects on bowhead whales of various industrial activities in the Arctic. Commission representatives participated in the conference. Papers and other relevant information from the conference will be given to the International Whaling Commission's Scientific Committee for use in its forthcoming assessment of the status of bowhead whale stocks.

In 1990, the Minerals Management Service underwrote and coordinated production of a book on the biology and natural history of the bowhead whale. Not only will it be published by the Society for Marine Mammalogy in 1991, but, prior to publication, relevant chapters will be given to the International Whaling Commission's Scientific Committee for its bowhead whale assessment.

In 1991, the Commission will continue to monitor matters related to bowhead whales and advise the National Marine Fisheries Service on further actions that may be necessary to protect and encourage the recovery of the western Arctic bowhead population.

Gulf of California Harbor Porpoise (Phocoena sinus)

The Gulf of California harbor porpoise, or vaquita, is one of the smallest, and perhaps rarest, of all cetaceans. Its range is limited to the northern Gulf of California or Sea of Cortez in northwest Mexico. Major threats to its survival include incidental take in various gillnet fisheries and degradation of habitat as a result of agricultural run-off and reduction in the flow of the Colorado River.

Very little is known of the life history or ecology of the species. Indeed, the species was not described until 1958 and, prior to 1984, it was known from only 20 confirmed records. Between 1986 and 1989, however, aerial and boat surveys by researchers from the University of California, Santa Cruz, produced sightings of 110 animals, some of which may have been resightings. In addition, more than 85 deaths in fishing nets have been reported since 1985. No reliable population abundance estimate is available.

As noted in previous Annual Reports, the Commission has played an important role in encouraging and assisting work on the vaquita. In 1976 and again in 1979, the Commission provided funds for some of the first surveys to determine the distribution of the population. In 1984 and 1985, it provided support to locate bones and carcasses of dead animals washed ashore and to train students to identify, collect, and prepare museum specimens of the species. In 1987, it provided support to determine the types and levels of environmental contaminants present in blubber samples taken from animals caught incidentally in fishing nets. Results of the latter study found low levels of pesticides and other chlorinated hydrocarbon contaminants, suggesting that these pollutant were not a significant threat at that time.

In 1978, the Government of Mexico added the vaquita to its list of wildlife species that are rare or in danger of extinction. That same year, the International Union for the Conservation of Nature and Natural Resources (now known as the World Conservation Union) listed the species as vulnerable in its Red Data Book. In 1979, it was included on Appendix I of the Convention on International Trade in Endangered Species of Flora and Fauna. In the early 1980s, the species was proposed for listing as threatened under the U.S. Endangered Species Act. Following a recommendation by the Marine Mammal Commission, the species was listed in 1985 as endangered rather than threatened.

Vaquitas are killed incidentally in gillnets, especially large mesh nets (5-6 inch mesh), used in fisheries for totoaba (a species of sea bass), other finfish, and sharks. The totoaba gillnet fishery began on a small scale in the mid-1920s and reached a peak early in the 1940s. Between the 1940s and early 1970s, the catch declined dramatically and in 1975 the fishery was closed by the Mexican Government to allow recovery of the stock. Despite the closure, illegal fishing continued.

To assess the status of the totoaba stock, the Mexican Government began authorizing experimental gillnet fishing in 1985. From 1985 through the first several months of 1990, at least 52 vaquita were recorded killed in gillnets set for totoaba. Also during that period, 24 vaquita were recorded killed in shark gillnets and at least five animals died in shrimp trawls.

In 1988, researchers from the Center for the Study of Deserts and Oceans and the Universidad Nacional Autonoma de Mexico began a cooperative program, funded by the Center for Marine Conservation, to interview fishermen in the northern Gulf of California about their knowledge of and interactions with vaquitas. The study concluded, among other things, that all reported takes occurred in waters less than 50 meters deep and that the vaquita population was being depleted at a rate of about 32 animals per year. The report recommended closing certain areas to gillnet fishing, prohibiting the sale of totoaba, developing economic alternatives for gillnet fishermen, developing a public education program on over-exploiting marine resources in the Gulf of California, and developing a management plan for the vaquita.

Similar conclusions and recommendations were developed by the Scientific Committee of the International Whaling Commission at its 42nd meeting in Noordwijk, the Netherlands, in June 1990. The Committee concluded that the vaquita's limited range and very low abundance made it the rarest marine cetacean and that threats from incidental catches in gillnets and other human activities also made it the most endangered. Because of its precarious status, the Scientific Committee of the International Whaling Commission recommended: (1) completely closing the totoaba fishery; (2) reconsidering the issuance of permits for experimental totoaba fishing; (3) immediately stopping the illegal shipment of totoaba across the U.S.-Mexican border; and (4) developing and implementing a management plan for the long-term protection of the species and its habitat. The Committee also recommended that World Conservation Union change its classification of the species from vulnerable to endangered.

Acting on the Scientific Committee's advice on the vaquita and other small cetaceans, the International Whaling Commission adopted a resolution asking the Committee to collect information on the present status of the stocks of small cetaceans, including the vaquita, that are subject to significant direct or incidental takes and on the impact of those takes on the stocks (see also Chapter IV). The Whaling Commission intends to forward a report on this work to the 1992 United Nations Conference on Environment and Development.

In October 1990, a Workshop on the Mortality of Cetaceans in Passive Fishing Nets and Traps was convened at the request of the International Whaling Commission with partial support from the Marine Mammal Commission (see Chapter IV). Its purpose was to

review the incidental take of cetaceans worldwide in static fishing gear. Workshop participants noted that the continued existence of the vaquita is being placed in serious doubt by illegal totoaba fishing and other gillnet fishing and that the problems are being exacerbated by inadequate enforcement and a lack of economic alternatives for gillnet fishermen. They recommended that high priority be placed on reducing or eliminating the incidental mortality of the vaquita in totoaba gillnets in Mexico.

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 dolphins, porpoises, and whales throughout the world. The plan lists more than 40 projects in urgent need of support. Among those listed is a proposal for a three-year project to: (1) organize a workshop to design a monitoring program for the vaquita; (2) conduct vessel censuses to estimate population size and monitor population trends; (3) monitor incidental catches in Gulf of California fisheries; (4) retrieve and examine vaquita carcasses that wash ashore on beaches; (5) develop and implement a public awareness program, largely directed at fishermen; and (6) formulate a recovery plan for the species. To help organize and secure funding for this and other projects, the Specialist Group, with partial support from the Marine Mammal Commission (see Chapter X), has established a headquarters at the Southwest Fisheries Center of the National Marine Fisheries Service. As a related action, late in 1990, scientists with the Southwest Fisheries Center were planning a cooperative program with the Secretaria de Pesca of Mexico to conduct aerial surveys of the known range of the vaquita beginning in 1991.

At the end of 1990, the Commission was reviewing recommendations for conservation and management of the vaquita to determine actions that the United States might take to assist Mexico's efforts to protect and encourage recovery of the species.

Harbor Porpoise (Phocoena phocoena)

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

Substantial numbers of harbor porpoise are caught and killed incidentally in U.S. fisheries, including salmon gillnet fisheries off Alaska and Washington; groundfish fisheries in the Bering Sea and the 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. They are also taken incidentally in Canadian fisheries operating in waters between Alaska and Washington State. The animals caught in Canada may be from populations that are being affected by fisheries in U.S. waters. On the U.S. east coast, harbor porpoise are taken in the groundfish gillnet fishery in the Gulf of Maine; in purse seine and weir fisheries for Atlantic herring and mackerel; in shad and sturgeon gillnet fisheries; and in fixed gear such as traps and pots.

Elsewhere, the impact of fishing on harbor porpoise is also thought to be severe. A report of the International Whaling Commission's subcommittee on small cetaceans presented at the Whaling Commission's 1990 annual meeting suggests that incidental take may be a problem throughout the world wherever gillnet fisheries occur in areas inhabited by harbor porpoise. Although information is sparse, the report noted that the incidental take of harbor porpoise may be quite large in fisheries in the North and Baltic Seas. While the impacts of this take are poorly understood, available evidence suggests that harbor porpoises are less common in many areas of the northeast Atlantic than they were previously.

Until very recently, harbor porpoise also have been a target of Turkish fishermen and have been taken in very large numbers in the Black Sea. There is a temporary moratorium on the taking of harbor porpoise, pending assessment of the stock. As a related issue, Turkish fishermen have called for a cull of harbor porpoise and other small cetaceans in response to a decline in the Black Sea anchovy fishery, perceived to be the result of competition with cetaceans (see discussion in Chapter IV under International Whaling Commission and also Chapter X).

In North America, the impact of fisheries on harbor porpoise stocks appears to be particularly severe in waters off the central coast of California and off the northeastern United States, specifically in the Gulf of Maine and the Bay of Fundy. As noted, off north-central California, harbor porpoise and other marine mammals are killed incidentally in the set net fisheries for halibut and other finfish. For example, in 1983-1984, 1984-1985, and 1985-1986, the estimated incidental takes of harbor porpoise in the halibut gillnet fishery were 303, 226, and 226, respectively.

In the northwest Atlantic, an estimated 300 to 1,500 harbor porpoise are killed each year in the groundfish gillnet fishery. It is speculated that these animals may be part of a single population that migrates north along the New England and eastern Canadian coast in spring and summer, and offshore and south, perhaps as far as North Carolina, or even Florida, in autumn and winter. Abundance was estimated at a minimum of 3,056 porpoise in the Bay of Fundy in July-August 1981, and 7,956 in the nearshore waters of the Gulf of Maine in July 1982.

Little is known about the number, size, and discreteness of harbor porpoise populations in U.S. waters. Therefore, it is difficult to judge whether the level of take has caused or is causing one or more populations to be reduced below their maximum net productivity level. As has been noted in past Annual Reports, in 1986 and again in 1987, the Marine Mammal Commission provided funds to the University of California at Santa Cruz for a pilot project to radio-tag and track a representative number of harbor porpoise. The purpose of the study was to obtain information on distribution and movement patterns to help assess the relative discreteness of harbor porpoise populations in different geographic areas (see Appendix B, Silber, Wells, and Norris 1990).

On 8 August 1990, a group of scientists and conservationists in the New England area wrote to the Marine Mammal Commission to express their concern about the status of harbor porpoise in the Gulf of Maine. In the letter, the group noted that a 1981 survey carried out by the New England Aquarium with funding from the National Marine Fisheries Service indicated that between 8,000 and 15,300 harbor porpoise were present in U.S. coastal waters in the Gulf of Maine. Based on mortality estimates gleaned from various sources, the group estimated an annual mortality of harbor porpoise approaching 1,000 animals in Gulf of Maine fisheries. The group also noted that studies comparing animals caught in the late 1970s with those taken in the 1987 and 1988 gillnet fisheries indicate characteristics of a population that is declining in size.

Based on this information, the group concluded that the harbor porpoise population in the Gulf of Maine is in trouble, and 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 U.S. Endangered Species Act; (2) replicating the 1982 harbor porpoise survey in the Gulf of Maine to determine present abundance; (3) analyzing harbor porpoise sighting data collected over the past decade to detect possible trends in relative abundance; (4) analyzing the seasonal distribution of harbor porpoise and gillnet fisheries and, if results indicate, closing certain areas to fishing on a seasonal basis; (5) conducting studies of ways that fishing gear or fishing methods might be modified to eliminate or reduce the incidental take of harbor porpoise; (6) analyzing stranding data to detect changes in the age structure of harbor porpoise; and (7) undertaking a modeling exercise to estimate effects of varying levels of take on different population sizes.

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, including, but not necessarily limited to the

Gulf of Maine. The Commission further noted that incidental take in commercial fisheries also may be having a significant adverse effect on harbor porpoise off central California and that problems may also exist off Washington and Alaska.

In its letter, the Commission also noted that data from fishery observer programs and related population assessment programs being conducted or planned by the Service's Northeast and Southwest Fisheries Centers could possibly resolve many if not most of the uncertainties concerning the nature, level, and biological significance of the incidental take and the status of affected populations. The Commission therefore requested that the National Marine Fisheries Service advise it of the results to date of the observer program and related fisheries reporting programs as they pertain to harbor porpoise, and of 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 requested that the Service advise it of work underway or planned to differentiate possible stocks along both the east and west coasts.

It its 10 October letter, the Commission pointed out that, because harbor porpoise migrate between U.S. and Canadian waters, effective conservation may require cooperative research and management programs with Canada. In this regard, the Commission recommended that, if the Service had not already done so, it consult with responsible Canadian authorities to develop a coordinated research and management program for harbor porpoise.

At the end of 1990, the Commission had not received a response to its 10 October letter.

Bottlenose Dolphin (Tursiops truncatus)

The bottlenose dolphin is the most common cetacean in the coastal waters of the southeastern United States. It is also the cetacean species most frequently taken and maintained in captivity for public display and scientific purposes. Capture of bottlenose dolphins for these purposes began early in the 1900s and considerable, but unknown, numbers of animals were taken prior to enactment of the Marine Mammal Protection Act in 1972. Since then, more than 500 bottlenose dolphins have been collected under permits issued by the National Marine Fisheries Service.

It is unlikely that live captures and removals alone have caused significant declines in the affected populations. However, in 1987-1988 and in 1990, unusually high numbers of bottlenose dolphins died and washed up on beaches along the middle and south Atlantic states and the northern Gulf of Mexico, respectively (see Chapter V for a discussion of these mortalities). In addition, unknown but perhaps significant numbers of bottlenose dolphins are caught and killed in menhaden,

shrimp, and other fisheries in 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 unusual mortalities, incidental take in fisheries, etc., 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 may cause one or more local populations to be reduced or maintained below its maximum net productivity level.

Because of these uncertainties, the Commission, by letter of 12 April 1989, advised the National Marine Fisheries Service that it was suspending consideration of all applications to take bottlenose dolphins from the Gulf of Mexico until the Service had: (1) convened a public hearing on a pending permit application from the Ouwehands Zoo; (2) evaluated the information that was obtained; and (3) provided the Commission with the Service's assessments of the status of the affected population stocks and the effectiveness of its special management and research programs to ensure that those stocks are not disadvantaged by such taking.

Subsequently, additional information on the Service's research and management programs was made available to the Commission and others. This material included proposed revisions of quotas for Atlantic bottlenose dolphins in southeastern regional waters and background material distributed during a review of the Southeast Fisheries Center's marine mammal program.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the additional information and, by letter of 23 May 1989, provided comments to the Service. In its letter, the Commission noted that the assessment and related quota recommendations generally appeared to be well founded but that a number of issues required further consideration. In particular, the Commission suggested that the Service: (1) arrange for an independent review of available survey data and the analyses done to date to ensure that uncertainties have been clearly identified and considered; (2) review available incidental take data and generate a first-order approximation of the numbers of bottlenose dolphins being taken incidentally by commercial fisheries in each of the geographic management areas; and (3) review available chase-and-capture data to determine if particular age/sex classes of dolphins, or dolphins in general, are becoming more difficult to find or capture. It also recommended that the Service identify the 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 this regard, the Commission noted that monitoring programs should be able to detect 10- to 20-percent changes in the size and productivity of dolphin stocks that are subject to live capture and removal or incidental take.

On 26 June 1989, the Service replied to the Commission's 23 May letter noting, that it agreed it was desirable to conduct an independent review of survey data. On 24 November 1989, the Commission received a letter addressing the remaining issues raised in the Commission's letters of 12 April and 23 May 1989. In its response, the Service noted that it would develop quota recommendations for taking of bottlenose dolphins from management units based on the resolution of the available data by January 1990. The Service also noted that it was unable to comment on the Commission's question concerning the possible effects of chase and capture on bottlenose dolphin survival and reproduction. It added that it was currently collecting available data on numbers of animals chased, encircled, and released and that, once collected, the data would have to be analyzed.

The Commission responded to the Service by letter of 28 December 1989. With respect to population monitoring, the Commission noted that planned efforts seemed inadequate to verify that authorized removals, by themselves and in conjunction with other removals such as incidental take in commercial fisheries, would not cause any of the affected dolphin populations to be reduced below their maximum net productivity levels. The Commission therefore suggested that the Service provide an assessment of the type of program (including cost estimates) that would be required to monitor the affected populations with sufficient precision to detect population declines before the populations could be reduced below their maximum net productivity levels.

In its letter, the Commission also noted that uncertainties concerning the numbers, sex, and ages of bottlenose dolphins being taken incidentally in commercial fisheries in the Gulf of Mexico raised serious questions about the validity of the assumptions upon which live capture quotas presently are based. Further, it noted that, if the uncertainties cannot be resolved, the Service will not be able to justify authorizing any live captures and removals in or near management units where incidental take may occur. In this regard, the Commission suggested that the Service provide: (1) an assessment of the types and levels of commercial fishing in and near each of the bottlenose dolphin management units; (2) an assessment of the best available information concerning the levels of incidental take in each area; (3) descriptions of steps being taken or planned to obtain more reliable information on the incidental take; and (4) the estimated costs of the assessments described above.

According to surveys carried out 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 nearshore population by as much as 50 or 60 percent. As noted in the previous Annual Report, on 11 November 1988 the Center for Marine Conservation petitioned the Service to initiate action to list the mid-Atlantic coastal migratory stock of bottlenose dolphins as depleted under the Marine Mammal Protection Act. On

11 October 1989, the Service published an advance notice of proposed rulemaking and a request for comments on the proposal.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the notice and, by letter of 21 December 1989, provided comments to the Service. In its letter, the Commission noted that, in its opinion, it would be ill-advised to list the nearshore mid-Atlantic bottlenose dolphin stock 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. At the end of 1990, the Commission was not aware of any further action taken by the Service.

As discussed in Chapter V, an unusually high number of bottlenose dolphins died and washed ashore along the northern Gulf of Mexico in January, February, and March 1990. This phenomenon caused particular concern in light of the 1987-1988 bottlenose dolphin die-off along the mid-Atlantic coast, as well as other more recent marine mammal die-offs elsewhere in the world. At the annual meeting of the Commission and its Committee of Scientific Advisors on 8-10 March 1990 in Honolulu, Hawaii, the Service reviewed available information on the apparent increased mortality and discussed its plans to revise quotas for removing bottlenose dolphins from the waters of the Gulf of Mexico and the east coast of Florida. The Service indicated that it intended to adopt a number of recommendations forwarded by the Commission in its letter of 28 December 1989.

On 16 March 1990, the Commission wrote to the Service regarding the die-off. In its letter, the Commission noted that the cause or causes of the mass mortality had not yet been determined. It further noted that, if the die-off were the result of a contagious disease, the disease could be transmitted to captive dolphins by animals removed from the wild for purposes of public display or scientific research. Therefore, the Commission recommended that live captures and removals of bottlenose dolphins from Gulf waters be suspended. As noted in Chapter V of this Report, the Commission also recommended that the Service convene a group of experts to determine the adequacy of the research protocols under which the investigation was being conducted.

In response to the recommendation that live captures be suspended, the Service advised the Commission by letter of 2 April 1990 that all permit holders had voluntarily agreed to suspend capture of bottlenose dolphins for 90 days to allow time to evaluate the die-off. The Service added that it intended to obtain agreement from permit holders to extend the suspension period or take any other actions that appear to be necessary to protect bottlenose dolphins.

By Federal Register notice of 31 May 1990, the Service sought comments on an advance notice of proposed rulemaking to

establish regulations and revise quotas for removal of bottlenose dolphins for purposes of public display and scientific research. In its notice, the Service noted that it was preparing an environmental impact statement on the proposed regulations that would provide a comprehensive review of the status of stocks of bottlenose dolphins in the southeastern region and the validity of the two-percent rule for determining the allowable take.

In the same issue of the Federal Register, the Service announced that an interim policy, including interim quotas for removal of bottlenose dolphins, had been in effect since February 1990. The Service stated that, on the basis of population surveys and estimates of the level of human-induced mortality, its January 1990 recommended quotas for removal of animals were set at a total of 56 animals, compared to the previous quota of 91 animals. However, because of uncertainties raised by the die-off of bottlenose dolphins, the Service announced that it had adopted more conservative interim quotas totaling 35 animals, of which no more than 50 percent could be female.

Because of the previously noted voluntary suspension of live capture and removal of bottlenose dolphins for scientific research or public display purposes, no animals were taken under the interim quotas. On 20 August 1990, the Service wrote to permit holders authorized to take bottlenose dolphins, noting that, although the die-off of bottlenose dolphins appeared to have ended, the Service did not yet have adequate information to make definitive conclusions about the status of affected populations. Therefore, the Service asked that permit holders defer collection of bottlenose dolphins until 1991 or 1992 except in situations where collection is absolutely necessary to maintain a public display.

At the end of 1990, the Service had not completed or released the environmental impact statement concerning the capture and removal of bottlenose dolphins from U.S. waters for purposes of public display and scientific research.

River Dolphins (Superfamily Platanistoidea)

The five species of river dolphins are among the most endangered cetaceans in the world, primarily because their riverine habitat is extremely fragile and accessible to humans. The baiji or Yangtze river dolphin (*Lipotes vexillifer*) in China has been reduced to only a few hundred animals, and the population is still declining. A similar situation faces the Indus river dolphin or Indus susu (*Platanista minor*) in Pakistan. The status of the Ganges river dolphin or Ganges susu (*P. gangetica*) is uncertain, but its numbers are thought to be declining due to rapid degradation of riverine habitat throughout its range in India, Bangladesh, and Nepal. The habitat of the boto or Amazon river dolphin (*Inia geoffrensis*) is under heavy pressure from commercial fishing, hydroelectric development, and

deforestation, especially in Brazil. The population size and status of the franciscana (Pontoporia blainvillei) are unknown, but incidental take in gillnet fisheries continues throughout its range in coastal waters of Argentina, Uruguay, and Brazil. The baiji, Ganges river dolphin, and Indus river dolphin are listed in Appendix I of the Convention on International Trade in Endangered Species of Fauna and Flora, and the boto and franciscana in Appendix II.

In recent years, the Marine Mammal Commission has taken part in several efforts aimed at protecting and conserving these species. The Commission participated in the process that resulted in designation of the baiji and the Indus river dolphin as endangered under the U.S. Endangered Species Act in 1989 and 1990, respectively. It continues to support such designation for the other three river dolphin species. As discussed in previous Annual Reports, the Commission also contributed funds to help convene and publish proceedings of an international workshop on the biology and conservation of river dolphins, held in Wuhan, China, in 1986.

In 1990, the Commission provided funds to the Center for Marine Conservation to help establish an office for the Cetacean Specialist Group of the International Union for the Conservation of Nature and Natural Resources, now the World Conservation Union (see Chapter X). The purpose of the office, which is located at the National Marine Fisheries Service's Southwest Fisheries Center, is to help implement studies identified in the Group's worldwide action plan on dolphins, porpoises, and whales. Progress has been made in developing proposals and securing support for a number of the projects involving river dolphins, several of which already have been launched. For instance:

- The National Geographic Society and the Center for Marine Conservation have partially funded a study of the level and effect of incidental takes of dolphins, including the franciscana, in coastal fisheries of Argentina.

- Earthwatch has agreed to support research on Amazon river dolphins and other dolphins in Brazil.

- The Government of India has provided start-up funding for surveys of Ganges river dolphins and their habitat in the Ganges and Brahmaputra River systems.

- Conservation International has provided partial funding to investigate alternatives to the use of oil from the Ganges river dolphin as an attractant in subsistence fisheries in India.

- A Regional River Dolphin Committee has been formed to facilitate exchange of information and ideas on research and conservation of Ganges river dolphins among specialists at 13 universities in India, Bangladesh, and Nepal.

- Proposals for surveys of Ganges river dolphins and Indus river dolphins in Pakistan, Bangladesh, and Nepal are under review.

- China has established a 135-km-long reserve for the baiji in the Yangtze River and it is providing funds for a patrol vessel to enforce protective regulations.

- A proposal for constructing and operating a semi-natural reserve for the baiji in the Yangtze River is under review, and baseline studies for the reserve were completed in 1988.

- Population surveys and photo-identification studies of the baiji continued in 1990 under sponsorship of Nanjing Normal University, World Wildlife Fund, and Texas A&M University. (The Marine Mammal Commission provided partial support for this in 1987.)

- Dialog has been initiated with the World Bank and various non-governmental organizations to promote increased consideration of river faunas in internationally funded development.

- Proposals to census Amazon river dolphins and assess fishery impacts in Colombia, Venezuela, and Peru are under review or have been submitted to funding organizations.

During 1991, the Commission will continue to review progress and, as possible, assist in international efforts to conserve river dolphins. In addition, the Commission, in consultation with its Committee of Scientific Advisors, will continue to take part in the review of river dolphin species for listing under the U.S. Endangered Species Act.

Polar Bear (*Ursus maritimus*)

Polar bears are circumpolar in distribution and inhabit most ice-covered seas of the Northern Hemisphere as far south as the Pribilof Islands in the eastern Bering Sea. The species is commonly found within 300 km of the Alaskan coast of the Chukchi and Beaufort Seas from the Bering Strait to the U.S.-Canadian border. There are no reliable estimates of the total number of polar bears or whether the species is increasing or declining in abundance. This is due partly to difficulty in detecting individual animals against the typical background of snow and ice. In addition, because of the low density of polar bears distributed over large, uninhabited areas, it has been too costly to carry out aerial surveys to the extent that would be needed to provide meaningful population estimates.

Commercial whalers and subsistence hunters may have extirpated local populations of polar bears in Alaska. The species historically was found on St. Matthew Island but was eliminated

there by commercial hunters by the early 1900s. Elsewhere in Alaska polar bears were taken primarily for subsistence purposes by Native Alaskans. One exception was guided sports hunting of bears during the 1950s and 1960s. From 1961 until enactment of the Marine Mammal Protection Act in 1972, Alaska State regulations provided a preference for subsistence hunters and restricted the taking of cubs and females with cubs. The average annual take in Alaska between 1960 and 1972 was 260 animals.

International concern about the vulnerability of polar bear populations to human activities led to the International Agreement on the Conservation of Polar Bears. The agreement was concluded in 1973 by Canada, Denmark (for Greenland), Norway, the Union of Soviet Socialist Republics, and the United States, and entered into force in 1976. The agreement prohibits the taking of polar bears from aircraft or large motor vessels or in areas where they were not taken by traditional means in the past. Under the pact, signatory nations are required to conduct a polar bear research program and to coordinate research and management for populations that overlap national boundaries. Under resolutions appended to the agreement, signatory nations are requested to afford special protection to cubs and females with cubs and to establish an international system of identifying polar bear hides to control trafficking in illegal hides.

In the United States, enactment of the Marine Mammal Protection Act in 1972 transferred management responsibility for polar bears from the State of Alaska to the Federal Government. This authority has been delegated to the Fish and Wildlife Service in the Department of the Interior. The Act provides that Alaska Natives may hunt polar bears and other marine mammals for subsistence purposes and to create and sell traditional articles of handicraft. The Act does not provide for restricting Native harvest unless the polar bear population is declared depleted or the take is determined to be wasteful.

Hunting, if not regulated effectively, could have significant adverse effects on the southern Beaufort Sea polar bear population, which is hunted by Natives from western Canada as well as Alaska. 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. Success of the Agreement will depend on voluntary compliance as the Agreement has no legal

status in Alaska or Canada and does not provide for enforcement and penalties in Alaska.

If implemented effectively, the Agreement will ensure that Native hunting does not adversely affect the southern Beaufort Sea polar bear population. However, other activities in areas under U.S. jurisdiction may be affecting both this population (shared with Canada) and the population to the west in the Chukchi Sea (shared with the U.S.S.R.). Oil and gas exploration and development, in particular, may have adverse effects on polar bears and their habitat. Also, expanding human presence in the Arctic is increasing the potential for bear-human interactions which, in turn, may result in the injury and death of both polar bears and people.

Recognizing the potential threats to polar bears, the Marine Mammal Commission on 11 January 1989 wrote to the Fish and Wildlife Service. In its letter, the Commission noted that 1988 amendments to the Marine Mammal Protection Act directs that the Fish and Wildlife Service and the National Marine Fisheries Service prepare conservation plans for depleted species and populations of marine mammals. Although not specifically required, conservation plans may also benefit non-depleted species. The Commission suggested that the Fish and Wildlife Service prepare conservation plans for the polar bear and other marine mammal species under its jurisdiction, and pointed out that most of the necessary work had already been published in the Commission-sponsored report, "Selected Marine Mammals of Alaska: Species Accounts with Research and Management Recommendations."

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 response to growing concern, the Marine Mammal Commission, in January 1989, sponsored a workshop to determine ways to assess and minimize the possible effects of oil and gas exploration and development on polar bears. Participants included representatives of the Alaska Department of Fish and Game, the Canadian Wildlife Service, the Department of Renewable Resources of the Government of the Northwest Territories, the Department of Wildlife Management of the North Slope Borough, the Inuvialuit Game Council of the Northwest Territories, the Marine Mammal Commission, the Minerals Management Service, and the Fish and Wildlife Service. The results of the workshop are described below.

On 3 March 1989, the Fish and Wildlife Service responded to the Commission's 11 January letter. It indicated that the Service planned to prepare conservation plans for polar bears, Alaska sea otters, and walruses. It also indicated that the planning process would be public and that it was expected to take about one to one and one half years to complete the plans.

The Exxon Valdez oil spill, which occurred on 24 March 1989, delayed preparation of the conservation plans as well as the report from the Commission-sponsored workshop (see Chapter VIII for more information on the Exxon Valdez oil spill). On 13 December 1989, the Commission wrote to the Service asking for a status report on efforts to develop conservation plans for polar bears, walruses, and Alaska sea otters.

The Service responded to the Commission's letter on 9 January 1990. Among other things, the response indicated that the polar planning group had met on 30 March and 19 October 1989, and planned to meet again in late February 1990. It requested information from the workshop held by the Commission in January 1989 and from a follow-up meeting hosted by a member of the Commission's Committee of Scientific Advisors in October 1989.

On 27 June 1990, the Commission provided the Service a discussion paper on polar bear-human interactions related to Alaska oil and gas exploration and development. The paper was prepared cooperatively by representatives of the Commission, the Service, and the State of Alaska based upon discussions at the October 1989 follow-up meeting noted earlier.

Among other things, the discussion paper recommended that: lessees of Federal and State offshore lands be required to site, design, and operate facilities to minimize the possibility of interactions with polar bear; training programs be developed and used to ensure that all persons working in areas where polar bears may occur are well versed in what to do to avoid encounters with bears and how to respond if bears are encountered; regulations be promulgated pursuant to section 101(a)(5) of the Marine Mammal Protection Act to authorize incidental taking of small numbers of polar bears in the course of implementing approved polar bear interaction plans; further research be undertaken to evaluate the safety and effectiveness of possible alternative means for detecting and deterring polar bears. The Commission noted that implementing these recommendations would require cooperative efforts by the Fish and Wildlife Service, the Minerals Management Service, the State of Alaska, and the Alaska oil and gas industry. It recommended that the Fish and Wildlife Service take such steps as necessary to implement them immediately.

The report from the Commission-sponsored workshop was completed and provided to the Service and others on 28 December 1990 (see Appendix B, Lentfer 1990). The 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) death, injury, or harassment resulting from interactions with humans; (2) damage or destruction of essential habitat; (3) contact with and ingestion of oil from acute and chronic oil spills; (4) contact with and ingestion of other contaminants; (5) attraction or repulsion by industrial noise; (6) harassment by aircraft, ships,

or other vehicles; (7) increased hunting pressures; (8) indirect food chain effects due to the impacts of oil- and gas-related activities on the food web upon which polar bears depend and on which they are a part; and (9) mortality, injury, and stress resulting from scientific research to determine the possible effects of oil, gas, and other activities on polar bears and other species. The report also 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 increase in the Arctic.

The report concludes that the likelihood of harmful interactions between bears and people could be reduced by requiring the development, adoption, implementation, and enforcement of site-specific polar bear interaction plans. It recommends that the Fish and Wildlife Service, in cooperation with the Alaska Department of Fish and Game, the Minerals Management Service, industry, and Native groups develop guidelines and procedures for preparation, review, and approval of interaction plans, and that an industry group, such as the Alaska Oil and Gas Association, seek an incidental small take exemption as provided for by section 101(a)(5) of the Marine Mammal Protection Act to allow taking that may be required to effectively implement approved plans.

The report identifies key data gaps and research that would be required to fill the gaps. It recommends that additional studies be done to evaluate the relative merits of possible polar bear detection and deterrent systems and to locate important polar bear denning areas and determine how den sites and denning bears may be affected by construction and other activities nearby. It also recommends that oil spill contingency plans include specific measures for assessing and minimizing the impacts of oil spills on polar bears and that a program be established to assess and monitor the levels of anthropogenic hydrocarbons and other possible contaminants present in polar bears and other components of the food web of which they are a part, particularly ringed seals.

In its 28 December 1990 letter forwarding the 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 are necessary to evaluate the relative merits of possible

detection and deterrent systems, and to better determine important polar bear denning areas and how denning areas and denning bears 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 specific measures in oil spill contingency and response team plans 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 Service take such steps as necessary, including promulgation of regulations or seeking domestic implementing legislation, to give full effect to the provisions of the 1976 Agreement on the Conservation of Polar Bears. 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 that Agreement which specifies that "[e]ach Contracting Party 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 and migration patterns, and shall manage polar bear populations in accordance with sound conservation practices based upon the best available scientific data."

In 1991, the Commission, in consultation with its Committee of Scientific Advisors, will continue to seek completion, adoption, and effective implementation of an Alaska polar bear conservation plan.

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. Efforts in this regard have recently focused on implementing new provisions set forth in amendments to the Act enacted in 1988. Among other things, the amendments establish an interim five-year exemption authorizing incidental takes of marine mammals in commercial fisheries and establish reporting and observer requirements. The amendments also direct the Commission to develop and transmit to the Secretary of Commerce recommended guidelines 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 Commission efforts to develop a system to govern incidental taking in fisheries after October 1993 are discussed below. Also discussed below are recent actions regarding the incidental take of porpoise in purse seine nets used by commercial yellowfin tuna fishermen in the eastern tropical Pacific Ocean. As noted in previous Annual Reports, the "tuna-porpoise" issue has been the subject of intense concern and controversy over the past several decades. Also discussed below is recent legislation enacted by the State of California to reduce or eliminate the incidental take of marine mammals in certain fisheries. 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 porpoise, *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*, 839 F.2d 795 (D.C. Cir. 1988), 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, 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.

The 1988 Marine Mammal Protection Act Amendments

In response to uncertainties raised by the Kokechik decision, the Marine Mammal Protection Act was amended in 1988 to provide a limited five-year exemption from the incidental-take prohibition for most 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 fishing to continue 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 have registered with the Service and have obtained an exemption certificate by 21 July 1989 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 would continue 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 Fisheries 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 exemption revocation.

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 with respect to marine mammal species under the 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. After that, Congress will re-examine the issue in light of the information gathered under the interim exemption and enact a permanent system for regulating incidental taking. As a first step in developing the long-term regulatory regime, the Marine Mammal Commission was statutorily directed to provide to the Secretary of Commerce, by 1 February 1990, recommended guidelines to govern the incidental taking of marine mammals in the course of commercial fishing operations after 1 October 1993.

Implementation of the 1988 Amendments

The National Marine Fisheries Service, after consultation with the Commission, published an advance notice of proposed rulemaking on 27 January 1989, providing a general description of the new statutory provisions and a proposed categorization of each U.S. fishery, based upon the frequency with which marine mammals were estimated to be taken incidentally. A final list of fisheries, with minor revisions and the addition of some fisheries, was published by the Service on 20 April 1989.

Following discussions with the Commission, the Service issued interim regulations on 19 May 1989 to implement most other provisions of the interim exemption. Among other things, those

regulations codified the criteria used to categorize fisheries (i.e., for determining if takings are frequent, occasional, or of remote likelihood); set forth procedures for owners of vessels in Category I and II fisheries to register for and be issued exemption certificates; specified the terms and conditions of exemption certificates; required that Category I vessels accept observers when requested to do so; established procedures for issuing emergency and special regulations; and explained that reporting requirements would be addressed in a separate rulemaking.

Final reporting regulations were issued by the Service on 15 December 1989. Under the regulations, fishermen 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. Included with the regulations were an approved log form and instructions for filling it out. In addition to maintaining a log, exemption certificate holders must display an exemption decal on the vessel and must submit to the Service, by the end of each year, an annual report, including a copy of the required logs. 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.

At the beginning of 1990, approximately 10,400 vessel owners had registered for and had been issued exemption certificates. By year's end, nearly 16,000 vessels participating in Category I or Category II fisheries had registered and had obtained exemption certificates. Renewal of exemption certificates, issued automatically in 1990, will be issued in 1991 only if the required reports have been received by the National Marine Fisheries Service. It is unknown how many unregistered vessels are illegally operating in Category I and II fisheries without exemption certificates. During 1990, 61 violations of the registration requirements were detected by the Service.

As noted above, regulations setting forth the reporting requirements under the interim exemption were published on 15 December 1989. Those regulations did not become effective until 16 January 1990 and reports for 1989 were submitted on a voluntary basis. Even though the reporting regulations had yet to enter into force, some 3,500 annual reports for 1989 were submitted, based upon the requirements set out in the proposed rule. Figures on the number of reports filed by Category I and Category II fishermen for 1990 and on the reported level of incidental take are not yet available.

Based on 1989 reports and other available information, including observer data, the Service, on 17 July 1990, proposed certain revisions to its 20 April list of fisheries. 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. Also proposed was the addition of 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. The Service also published revised estimates of the number of vessels operating in various fisheries for public comment.

By letter of 17 August 1990, the Commission commented on the proposed revisions to the list of fisheries. 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.

Under applicable regulations, the Service established 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.

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 FY 1990, $7.5 million was authorized for the interim exemption observer program. 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 a representative sample of vessels in each of these fisheries during 1990. Under Magnuson Act requirements, 100 percent observer coverage was provided for the Atlantic Ocean foreign mackerel trawl fishery. Substantial coverage was also provided for the joint-venture Alaska groundfish fishery with approximately 95-percent observation of the operations by vessel day. Projected and actual observer coverage for these and the other Category I fisheries are shown on Table 7.

Recommended Guidelines for the Incidental Take of Marine Mammals After October 1993

The Marine Mammal Commission was directed by the 1988 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:

Table 7. Interim Exemption Observer Program: Percent Coverage

Fishery	FY 1989[1] target	CY 1989[2] estimate	FY 1990 target	CY 1990 estimate	FY1991 target
Atlantic Mackerel Foreign Trawl	100	100	100	100	100
Gulf of Maine Groundfish/Mackerel	10	1.6	10	1.1	10
Prince William Sound Drift Gillnet	20	0	5	5	5
Prince William Sound Set Gillnet	0[3]	0	5	5	5
Alaska Peninsula Drift Gillnet[4]	20	0	5	5	5
Washington Marine Set Gillnet	20	39.6	35	39.1	35
California Drift Gillnet (Thresher Shark/Swordfish)	10	0	20	5[5]	20
California Set Gillnet (Halibut/ Angel Shark)	15	0	20	5[5]	0
Alaska Groundfish (Joint Venture)	100	14	100	>90	100
Alaska Groundfish (Domestic)	20	0	20	80[5]	20

1 Observer coverage is funded on a fiscal year basis and targeted coverage is for the period 1 October through 30 September.

2 Estimated observer coverage is recorded on a calendar year basis.

3 No observer coverage was planned for this fishery between 21 July and 1 October 1989 because no fishing was expected after the Exxon Valdez oil spill.

4 The National Marine Fisheries Service has proposed to revise its listing of this fishery. All but the South Unimak portion would be moved to Category II and would no longer be included in the observer program.

5 Preliminary estimate.

(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, publication 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 originally asked for by 23 February, but, at the request of several fisheries groups, the public comment period was extended until 30 March 1990.

Numerous comments on the draft guidelines were received. The Commission, in consultation with its Committee of Scientific Advisors, took those comments into consideration when preparing its recommended guidelines which were provided to the National Marine Fisheries Service on 12 July 1990. In addition to the recommended guidelines, the Commission prepared and provided to the Service a document summarizing all substantive comments on the draft guidelines and explaining how they were addressed.

The Commission, in its guidelines, recommended that the legislation to govern the taking of marine 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: (a) a recovery plan or conservation plan, including an implementation plan, has been developed, adopted, and put in place; (b) 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; (c) 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 (d) 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: (a) the authorized level of incidental take clearly would have a negligible effect on population size and productivity; and (b) 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.

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 believes it unlikely that, unless additional population assessments are undertaken by the National Marine Fisheries Service, information needed to make required status determinations for many marine mammal stocks will 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 note 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 populations. 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 Tuna-Porpoise Issue

For reasons not yet fully understood, schools of large yellowfin tuna 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. Beginning 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 mesh of 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.

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, more than 150 vessels made up the U.S. tuna fleet in the eastern tropical Pacific, accounting for nearly 70 percent of the fishery capacity. In the late 1970s and 1980s significant shifts in the fishery to overseas operations occurred. By 1984, the U.S. fleet operating in the eastern tropical Pacific had declined to 73 vessels and the U.S. share of the fishery capacity had fallen to 41 percent. 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.

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. At one point during the 1990 fishing season only seven U.S. vessels were participating in the fishery. Some U.S. tuna seiners returned to the eastern tropical Pacific late in 1990 and, by the end of the year, 14 U.S. vessels were operating in the area. Of these, however, only two vessels were fishing for tuna by setting on porpoise.

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, preliminary data indicate that shipments to markets outside the United States have increased since April 1990.

The decline of the U.S. fleet in the eastern tropical Pacific has been offset in large part by a growth of foreign fleets in the area. Most of the growth in the international fleet during the 1980s came from two nations, Mexico and Venezuela. The Mexican fleet, now with 49 vessels, increased by nearly 50 percent during the decade 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 18 vessels participating in the fishery.

Following the El Niño event of 1983-1984 and the economic decline of the eastern tropical Pacific tuna fishery associated with that event, there was a significant shift in U.S. operations to the recently established western Pacific fishery. At that time, approximately one-third of the 90-vessel U.S. fleet remained in the eastern tropical Pacific, one third relocated to the western Pacific, and one third was sold or retired from the fleet. United States participation in the western Pacific remained fairly stable until the "dolphin safe" policy was announced by U.S. canners in April 1990. Following that announcement, about half of the U.S. vessels remaining in the eastern tropical Pacific applied for and obtained licenses to enter the western Pacific fishery.

A significant fraction of the reductions in the number of vessels in the U.S. eastern tropical Pacific tuna fleet since the 1970s can be traced to the reflagging of vessels. Since 1979, 58 U.S. purse seiners have been transferred to foreign flags, with 17 going to Venezuela, 10 to Vanuatu, 10 to the Republic of Korea, 4 to Mexico, and 17 to eight other countries.

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 also 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.

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, and others continued to devote substantial attention to the tuna-porpoise issue in 1990. Much of this effort was directed towards (1) implementation of amendments to the Marine Mammal Protection Act's tuna-porpoise provisions enacted in November 1988; (2) a further reduction in the incidental mortality of porpoise in both the domestic and foreign

fishing fleets; and (3) enactment of tuna labeling legislation. Discussions of the Commission's past activities and a historical summary of the efforts to resolve the tuna-porpoise problem are presented in previous Annual Reports.

The 1990 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 porpoise for the years 1981-1985. A general permit to take porpoise 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 porpoise by the U.S. and foreign tuna purse seine fleets since passage of the Marine Mammal Protection Act are listed in Table 8. Although these are the best available mortality estimates, it should be noted that many of the estimates may have wide confidence intervals. 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.

As discussed above, there has been a substantial and fairly steady decrease in the number of U.S. vessels participating in the eastern tropical Pacific tuna fishery since the mid-1970s. However, there has not been a corresponding reduction in the incidental mortality of marine mammals resulting from U.S. fleet operations. Rather, mortality figures have, at least in part, fluctuated based on factors independent of the number of vessels operating in the fishery. For example, the low mortality experienced in 1983 was related to a reduction in fishing effort during the 1982-1983 El Niño event. Much of the reduction in mortality experienced in 1989 has been attributed to a prohibition on sundown sets imposed by the 1988 amendments to the Act. Other factors which vary from year to year (i.e., the percentage of sets made on porpoise, the average size of tuna schools caught, or the locations within the eastern tropical Pacific where fishing effort is concentrated) may also cause fluctuations in marine mammal mortality rates.

Dolphin mortality resulting from U.S. tuna fishing operations in 1990 was the lowest since the purse seine fishery began. The single most important factor contributing to the reduced mortality was the announcement on 12 April 1990 by the major U.S. tuna canners that they would no longer trade in tuna

Table 8. Estimated Incidental Kill of Porpoise in the Tuna Purse Seine Fishery in the Eastern Tropical Pacific Ocean*

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	--

* Estimates are based on kill per set and fishing effort data. They do not include possible deaths of seriously injured porpoise released alive.

caught by setting on porpoise. Until the new policy was announced (i.e., for the period 1 January to 20 April 1990), the reported incidental take was only slightly less than that for the comparable period in 1989. As outstanding contracts with the canners were satisfied, the number of sets on porpoise by U.S. vessels, and the associated incidental catch of marine mammals, began to drop. Overall, for 1990, there was a 27-percent decline in the number of sets made on porpoise as compared to 1989. By mid-July, the full effect of the canners' new policy was evident. With the closure of a significant portion of the market to dolphin-caught tuna, most U.S. fishermen either left the eastern tropical Pacific or switched to alternative fishing methods. Between 23 July 1990 and the end of the year, only 260 dolphins were killed incidental to U.S. tuna fishing operations. At the end of 1990, 14 U.S. purse seine vessels were fishing in the eastern tropical Pacific. As noted earlier, only two of those continued to fish by setting on dolphin.

The low mortality figure for 1990 was not solely attributable to abandonment of setting on porpoise, however. Preliminary reports indicate that the average dolphin kill for the U.S. fleet was about 2.8 dolphins per set, about the lowest mortality rate ever recorded in the fishery. Also, the frequency of problem sets (those in which more than 15 dolphins are killed) declined from about six percent in 1988 and 1989 to less than four percent in 1990.

Final incidental-take data for 1990 for the foreign fleets are not yet available. Based on preliminary data, the foreign kill rate is expected to decline by more than 40 percent from the 1989 rate. Despite this substantial improvement, it appears that the foreign kill rate for 1990 will be more than twice that for the U.S. fleet.

While the "dolphin safe" policy of U.S. canners appears to have had a significant influence on U.S. fishing practices in the eastern tropical Pacific, the overall patterns in the fishery as a whole do not appear to have changed much as a result. The Inter-American Tropical Tuna Commission reports that foreign fleets made only three percent fewer purse seine sets on porpoise during 1990 than they did in 1989.

Implementation of the 1988 Amendments

As discussed in previous Annual Reports, changes to 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 were enacted in 1988. Implementation of these requirements during 1990 is reviewed below.

Observers -- The 1988 amendments to the Marine Mammal Protection Act addressed the issue of observer coverage in the U.S. tuna fleet by requiring that the Service place an observer aboard each vessel on all trips during 1989 and subsequent years unless, for reasons beyond the Service's control, an observer is not available. The 100-percent observer requirement may be waived after the 1991 fishing season if the Service determines, after notice and opportunity for public comment, that lesser coverage will provide sufficiently reliable information.

In compliance with a 17 January 1989 court order, full observer coverage of the U.S. fleet was achieved in 1989, despite a projected funding shortfall. Full observer coverage was maintained during 1990. Although the majority of U.S. vessels fishing in the eastern tropical Pacific no longer are setting on porpoise, they continue to carry observers to verify that dolphin sets were not made and to certify that tuna landed are "dolphin safe."

Issues with respect to observer coverage of foreign vessels are addressed below in the discussion of the comparability of foreign programs.

Sundown Set Restrictions -- Available data indicate that incidental mortality rates are much higher during sundown sets, when it is more difficult to see and release porpoise encircled in purse seine nets, than during daylight sets. The 1988 amendments directed the Secretary of Commerce to publish regulations by 1 January 1989 requiring U.S. tuna fishermen to complete the process of backdown to remove porpoise from the net no later than 30 minutes after sundown. The restrictions on sundown sets may be waived for individual certificate holders 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.

An interim final rule to implement this and other provisions of the amendments was published by the National Marine Fisheries Service in the Federal Register on 6 January 1989. Although the Commission and others had recommended that the Service establish a time before sunset beyond which a set could not be initiated, the Service did not adopt this approach. Instead, its rule merely required that backdown of the net be complete and rolling of the purse seine to "sack up" be begun before one-half hour after sundown. Thus, it remains up to the vessel operator to determine whether a set should be started. The Service did, however, adopt an enforcement policy to address the Commission's concern. Under that policy, fines of $5,000 to $10,000 are assessed for violations of the sundown set prohibition. Penalties will be substantially reduced in those cases where the set was started 90 or more minutes before sunset and the operator made an earnest effort to rescue porpoise.

The interim rule also set forth the procedures and standards for issuing waivers of the sundown set prohibition. To qualify, an operator must have had a minimum of five observed sundown sets since 1 July 1986 and must have had an average kill rate in those sets that was 0.154 porpoise per ton of tuna caught or less. In 1989, nine operators applied for waivers and two were issued. While no new waivers were issued in 1990, both waiver holders qualified for renewal in 1990. Only two sundown sets were conducted in 1990 pursuant to the waivers.

The Service has drafted and plans to publish in early 1991 a final rule to replace the interim rule now in effect. One change expected in the final rule is the replacement of kill per ton with kill per set as the standard for issuing waivers. Preliminary analyses indicate that two additional vessel operators will qualify for a waiver of the sundown set prohibition under a kill per set standard. By the end of 1990, none of the operators granted a waiver was fishing on tuna associated with dolphins.

Performance Standards -- Late in 1986, the Service began developing regulations to establish performance standards for individual vessels and captains in the U.S. tuna purse seine fleet. The performance standards were intended to address the matter of problem sets that arose in 1986 when certain vessels

and captains experienced exceptionally high kill rates. Performance standards had not yet been implemented when the Marine Mammal Protection Act was amended in 1988. The amendments directed the National Marine Fisheries Service to develop and implement a system of performance standards for U.S. tuna fishermen by the beginning of the 1990 fishing season. The system had to include a mechanism for identifying and providing supplemental training to certificate holders whose incidental marine mammal mortality was consistently and substantially higher than the fleet average. It also had to provide for suspending or revoking the certificates of those fishermen whose high rates of incidental take reflected a lack of diligence or proficiency in the use of required fishing techniques and gear.

A draft proposed rule to implement the operator performance requirements was provided to the Commission for review in mid-1989. The draft rule proposed two separate standards for judging the performance of U.S. tuna vessel operators. Any skipper who exceeds the five-year fleet-wide average porpoise mortality rate by a factor of five on any fishing trip, or who exceeds the mortality standard by 1.5 times on three consecutive trips, would be subject to certificate suspension.

In a 4 August 1989 comment letter, the Commission recommended that a performance standard assessing long-term operator performance be added. The Commission also noted that the proposed standards should be, but apparently were not, based on a statistical analysis of mortality rate performance observed within the fleet. In addition, the Commission noted that, prior to 1989, U.S. tuna fishermen were allowed to conduct sundown sets, which have a higher mortality than daylight sets. It therefore recommended that the Service exclude such sets from the data used to calculate the five-year average against which performance is judged.

Due to scheduling considerations, the Service could not incorporate the suggested revisions before publication of the proposed rule on 1 November 1989. The Service informed the Commission, however, that the 4 August letter would be included as part of the record on the rulemaking.

The Service published an interim final rule on 17 May 1990 establishing operator performance standards. Consistent with the Commission's recommendation, the standards are statistically based and exclude sundown sets. Under the interim rule, an operator's certificate will be suspended if (1) the average kill rate for any trip exceeds 26.30 dolphins per set; (2) the kill per set on three consecutive trips exceeds 3.89 dolphins; or (3) the mortality rate on any four trips out of eight consecutive trips or within a 24-month period exceeds 3.89 dolphins per set. The Service may require any operator who exceeds the 3.89 dolphin per set kill rate for a trip to receive supplemental training in the use of gear and fishing techniques designed to reduce the

incidental take of marine mammals. Repeated suspensions will result in certificate revocation.

The interim rule also mandates that certificate holders authorize the release to the National Marine Fisheries Service of vessel-specific data collected by Inter-American Tropical Tuna Commission observers. This provision is expected to eliminate any differences in the information available to the Service irrespective of whether it was collected by a Service or a Tuna Commission observer.

The Service indicated in the preamble to the interim rule that it would, during the first quarter of 1991, report on implementation of the performance system. Based on that report, the Service may propose revised standards or may replace the interim rule with a final rule.

Use of Explosives -- As directed by the 1988 amendments, the interim rule published by the Service on 6 January 1989 prohibited the use of explosives other than Class C pest control devices (seal bombs) in the U.S. tuna fishery. The amendments further required the Service to undertake a study to determine whether the use of Class C explosives results in physical impairment or increased mortality of marine mammals and, based on the results, regulate their use by 1 April 1990.

Observer data from 1989 indicate that explosive devices were used in more than one-third of all marine mammal sets to control and herd dolphins while the purse seines were deployed and maneuvered. While the number of explosives used was not recorded, observers estimated that, when used, an average of 200 seal bombs were used per set. The greatest use was in the backdown phase of the purse seining operation.

The statutorily mandated study of Class C explosives was conducted by the Service's Southwest Fisheries Center. The results were reviewed at a 27-29 November 1989 workshop at which participants concluded that: (1) detonation of these devices within 0.5 meter of a dolphin can cause physical injury; (2) data are insufficient to determine the sound level at which damage to dolphin hearing may occur; (3) long-term or chronic effects on dolphins may occur from explosives; and (4) available data are inadequate to test whether the use of explosives causes an increase or a decrease in dolphin mortality. 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, as required by the 1988 amendments, issued an interim final rule to prohibit the use of all explosives during sets on marine mammals. The rule was published in the Federal Register on 29 March 1990 and became effective 1 April 1990. The Service expects to publish a final rule to replace the interim rule early in 1991.

National Academy of Sciences Study -- The 1988 amendments required the National Marine Fisheries Service to contract with the National Academy of Sciences for an assessment, to have been completed by 8 September 1989, of alternative tuna fishing methods that do not involve the incidental take of marine mammals. In anticipation of enactment of this amendment, the Service held a workshop on 11-12 October 1988 to assist in developing terms of reference for the National Academy of Sciences study. The Commission participated in that workshop and subsequently provided members of the Academy's panel with substantial background documentation.

Although the study was to have been completed by 8 September 1989, a contract for the study was not concluded by the Service and the Academy until September 1989. Under the terms of the contract, the study was to have been completed by 10 September 1990. However, because of unexpected delays, the schedule could not be met. While the contract was amended to set 31 January 1991 as the new completion date for the Academy's report, release of the report is not expected before April 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 that is 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.

As discussed in previous Annual Reports, 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 comparable to that of the United States and to force timely implementation. Under the amendments, a foreign program, to be found comparable to that of the United States, 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 must be no more than twice that of the U.S. fleet by the end of the 1989 season and must be 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.

To implement the 1988 amendments, the Service, on 7 March 1989, published revised interim final regulations governing the importation of tuna taken in association with marine mammals. The regulations incorporated the statutorily imposed kill rate standards of two times the U.S. rate for 1989 and 1.25 times the U.S. rate for 1990 and subsequent years. The regulations also described what would constitute a comparable observer program; changes that would have to be made to foreign programs by the beginning of 1990; and limitations on the allowable mortality of eastern spinner and coastal spotted dolphins. The interim rule was replaced by a final rule published on 30 March 1990. Under the final rule, mortality rate comparisons are to be made based on the marine mammal kill per set rather than kill per ton of tuna caught, as was the case under the interim rule. The only other significant change instituted by the final rule was the addition of a provision allowing an embargoed nation to seek reconsideration of a negative comparability finding if its mortality rate meets the applicable standard for at least the first six months of the following year.

As discussed below, the comparability provisions and findings made thereunder were the subject of litigation during much of 1990. The reviewing Court in that matter ruled that the National Marine Fisheries Service was required to embargo yellowfin tuna harvested by foreign fleets in the eastern tropical Pacific unless, by the end of 1989, it had determined that the fishing nation had achieved a marine mammal mortality rate no more than twice that for the U.S. fleet. Inasmuch as these findings had not been made by August 1990 when the Court considered the matter, the Service was ordered to ban imports of all foreign-caught tuna from the eastern tropical Pacific until the required comparability findings had been made. Subsequently, affirmative findings were made for Venezuela, Vanuatu, Ecuador, and Mexico. The finding for Mexico was issued under the reconsideration provision of the new regulations based on data

from the first eight months of 1990. As noted below, the embargo of Mexican tuna was later reimposed because the quota for eastern spinner dolphins had been exceeded and then lifted pending appeal of the lower court ruling.

In response to the announcement by several canners that they would no longer purchase tuna caught in association with dolphin, 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, on 18 December, advised Ecuador of the opportunity to obtain a similar affirmative finding.

The Service issued another interim rule on 27 December 1990 to institute changes in the schedule for the submission of mortality data and other information upon which comparability findings are based. The rule changes from 31 July to 15 March the date by which the required information for the preceding fishing season must be provided to the Service. The Service is required by the rule to complete its review of the data and publish a proposed determination by 15 April. After a 30-day public comment period, a final finding for each nation will be made by 31 May. An affirmative finding from the previous year would remain in effect until then. Under this regulation, the Service has chosen to continue to base mortality rate comparisons, except for those made under the reconsideration provision, on data from an entire fishing year. Extending a previous year's finding until 31 May, when a new finding of comparability is to be made, however, is inconsistent with the District Court ruling discussed below. While technically applicable only to the 1989 fishing season, the Court ruled that the Service must embargo tuna from each nation fishing in the eastern tropical Pacific unless it has determined, by the end of the fishing season (i.e., by 1 January), that the nation's fleet has met the applicable mortality standard. The Commission expects to provide comments on the interim rule in February 1991.

As noted above, the 1988 amendments require that, before a foreign program may be found comparable to that of the United States, the Secretary must determine that:

> the rate of incidental taking of marine mammals of the harvesting nation during the 1989 and subsequent fishing seasons is monitored by the porpoise mortality

> observer program of the Inter-American Tropical Tuna Commission or an equivalent international program in which the United States participates and is based upon observer coverage that is equal to that achieved for United States vessels during the same period, except that the Secretary may approve an alternative observer program if the Secretary determines... that such a...program will provide sufficiently reliable documentary evidence of the average rate of incidental taking by a harvesting nation....

Other amendments required the United States to implement 100-percent observer coverage beginning in 1989.

On 10 May 1989, the National Marine Fisheries Service published a notice proposing to find that 33-percent observer coverage for all nations fishing for tuna in the eastern tropical Pacific Ocean and participating in the Inter-American Tropical Tuna Commission observer program would provide sufficiently reliable documentary evidence of the average rate of incidental taking and was acceptable. Absent such a determination, no foreign program could be found comparable to that of the United States without substantially increasing its observer coverage.

The Commission commented on the proposed finding on 12 July 1989. The Commission noted that 33-percent observer coverage might be acceptable for large fleets, but seriously questioned whether this level of coverage would provide an acceptable coefficient of variation in the estimated mortality for fleets with fewer than 10 vessels. The Commission also noted that, because the mortality rate on unobserved trips is almost certainly higher than on observed trips, 33-percent observer coverage, even for large fleets, may not be sufficient.

Therefore, the Commission recommended in its letter that, before a final determination on observer coverage was made, the Service should examine its rationale for assuming that the kill rate on observed trips would be representative of the performance of the fleet as a whole. The Commission also noted that observers serve an enforcement function and questioned whether reduced observer coverage for foreign fleets could provide an enforcement program comparable to that of the United States. In light of these difficulties, the Commission recommended that the Departments of Commerce and State take steps to expand the Inter-American Tropical Tuna Commission's observer program to provide as close to 100-percent coverage as possible.

As discussed in the litigation section below, Earth Island Institute challenged the legality of the Service's acceptance of lesser observer coverage for foreign fleets. While ruling that the statute permitted the Service to find programs with observer coverage less than that for the U.S. fleet comparable, the Court was not faced with the factual question of whether 33-percent

coverage met the statutory standard by providing a reliable estimate of incidental mortality for each fleet.

On 19 December 1989, the Service proposed to accept 33-percent observer coverage for large fleets (those with ten or more vessels) and 50-percent coverage for small fleets (those with five to nine vessels) during the 1990 fishing season. The Service also discussed and requested comments on the methods under consideration for determining whether the estimated mortality for a foreign nation is comparable to that of the United States.

The Commission provided comments on the proposed observer levels by letter of 12 March 1990. The Commission reiterated its concern that mortality data for observed trips is probably not representative of the mortality for unobserved trips and again asked the Service to examine the basis for its assumption that any "observer effect" which may exist can be discounted. The Commission also noted that the prohibition on sundown sets that went into effect on 1 January 1990 for comparable foreign programs casts further doubt on the reliability of mortality estimates based on the proposed observer levels. In addition, the Commission recommended that the Service use a direct, rather than a statistical, method to compare foreign and domestic mortality rates.

The Service issued its final determination of acceptable observer coverage for 1990 on 2 August 1990. It found that 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 between five and 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. As to the method by which mortality rates will be compared, the Service, consistent with the Commission's recommendation, chose the direct method, whereby point estimates of foreign and domestic kill per set rates will be compared.

The Service sought and obtained agreement at the 17-20 September meeting of the Inter-American Tropical Tuna Commission that observer coverage should be increased to levels approaching 100 percent. Meeting this goal, however, will require funding that is not currently available and will take time while observers are recruited and trained. 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.

Intermediary Nations -- The 1988 amendments also restrict 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 nation. Failure by the intermediary nation to adopt a parallel import ban within six months of U.S. action will prompt certification under the Pelly Amendment to the Fishermen's Protective Act and may result in restrictions on imports of all or some fish products from the intermediary nation.

These requirements were implemented through new provisions added in the Service's 7 March 1989 interim rule. 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. Final regulations implementing the intermediary nation provision were published on 30 March 1990. The only substantive change from the interim rule was clarification that transshipment of tuna through an intermediary nation would not constitute a prohibited import.

To date, no embargoes of intermediary nations have been imposed.

Tuna-Porpoise Program Review

Representatives of the Commission met with the staff of the National Marine Fisheries Service's Southwest Region and Southwest Fisheries Center on 20 February 1990 to review the Service's programs for assessing and minimizing the effects of tuna purse seine fishing on affected porpoise stocks in the eastern tropical Pacific. The Commission, by letter of 2 April 1990, found most aspects of the Service's programs to be well structured and effectively administered. The Commission, however, identified a number of things that could be done to strengthen the program. In particular, the Commission noted that the programs, as constituted, were unlikely to provide unambiguous indications that the affected porpoise stocks are not decreasing and that nothing more can be done to reduce marine mammal mortality and injury in time for Congressional oversight hearings in 1992.

To address the perceived shortcomings, the Commission recommended, among other things, that the Service (1) undertake a more thorough analysis of the possible sources of variance in the indices of abundance derived from research vessel data; (2) consider whether research vessel data and tuna vessel observer data can be combined to estimate porpoise stock trends more precisely; (3) expedite analyses of environmental data to determine whether such data can be used to improve the collection, analysis, and interpretation of porpoise distribution

and abundance data; (4) estimate the precision of back-calculation methods for assessing the absolute abundance of eastern spinner and other porpoise stocks; (5) explore ways to increase funding to the Inter-American Tropical Tuna Commission to enhance observer coverage of foreign fleets; (6) resolve uncertainties as to whether the Inter-American Tropical Tuna Commission is providing set-by-set observer data; (7) develop a discussion paper describing how an international quota system might contribute to lowering dolphin mortality, estimating appropriate quotas for each porpoise stock, and proposing a method for allocating those quotas among fishing nations; and (8) provide supplemental funding to enable the Southwest Fisheries Center to conduct the necessary analyses.

The Service responded to the Commission's recommendations by letter of 1 August 1990. The Service noted that the results of the five-year dolphin monitoring program had not been entirely satisfactory. While it originally believed that a 40-percent change in eastern spinner and northern offshore spotted dolphin stocks could be detected over the five-year period, more recent analyses indicate that the change would have to be 60 percent or greater to be detected at a statistically significant level by the research cruises being conducted. Nevertheless, preliminary results of the research vessel surveys suggest that the three stocks seem to be increasing. Data gathered to this point also suggest that the other stocks taken incidental to the purse seine fishery are stable, with the possible exception of the central stock of common dolphins, which recently may have begun declining.

While the Service agreed that observer data, as well as research vessel data, should be used to determine population trends, it did not believe that the two data sets could be combined to form a single index of abundance. Rather, it concluded that data from research vessels provide the best basis for minimum abundance estimates. However, a time series of ten or more years will be necessary before population changes on the order of five percent per year can be detected with reasonable certainty. As to the other points raised by the Commission, the Service agreed to incorporate environmental data into the trend analyses by 1992; indicated that a determination of absolute abundance through back-calculation is not warranted for any stock other than the eastern spinner dolphin; indicated that it was pursuing increased observer coverage for foreign fleets; explained that foreign nations were provided with observer data on a trip-by-trip basis; and expressed its willingness to prepare the recommended discussion paper. The recommendation with respect to supplemental funding was not addressed.

It is expected that the Commission will pursue some of these points at the Service's annual tuna-porpoise review meeting to be held in La Jolla, California, on 21-22 January 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 porpoise 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 porpoise 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 held 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 will have 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 would not be paramount, but would be pursued in concert with the goal of maintaining optimal utilization and conservation of the tuna resource. Among other things, the international program will include (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 another meeting by February 1991 to elaborate on the technical and economic aspects of the international program.

A technical workshop to discuss possible mechanisms for establishing international limits on dolphin mortality was convened by the Inter-American Tropical Tuna Commission in La Jolla, California, on 6-9 November 1990. Participants at that

workshop considered a variety of quota systems, including individual vessel quotas, national quotas, and quotas based on limiting mortality rates and numbers of sets. Further discussion of possible quota systems and implementation of other aspects of the international program agreed to at the Costa Rica meeting is scheduled for the Inter-American Tropical Tuna Commission meeting and a separate intergovernmental meeting to be held on 14-18 January 1991.

Tuna Labeling Legislation

On 19 July 1989, H.R. 2926, the Dolphin Protection Consumer Information Act of 1989, was introduced in the House of Representatives. Based on the premise that consumers would not buy tuna if they knew it was caught in ways that killed dolphins and that market pressures would force fishermen to use alternative fishing methods, the bill would have required all tuna caught in purse seine sets on dolphins or other marine mammals or caught in drift gillnets longer than one mile to be labeled as having been caught in ways known to kill dolphins. Other tuna would have been marked as being "dolphin safe."

The Commission, along with the National Marine Fisheries Service and others, presented testimony on the proposed legislation before the House Subcommittee on Commerce, Consumer Protection, and Competitiveness on 25 July 1990. The Commission advised against passage of the bill as drafted, noting that the proposed legislation could result in an increase in porpoise mortality if tuna fishermen chose to seek alternative markets for dolphin-caught tuna rather than switching to dolphin safe fishing practices. The Commission also noted that tuna stocks might be adversely affected if the smaller species and size classes of fish that do not associate with porpoise were preferentially targeted.

The Dolphin Protection Consumer Information Act was ultimately enacted as section 901 of the Fishery Conservation Amendments of 1990. The legislation establishes criteria for when tuna and tuna products may be labeled "dolphin safe," but 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 certification from a qualified observer that no dolphin sets were made for the entire trip on which the tuna was caught. A knowing violation of the labeling requirements is punishable by a fine of up to $100,000.

Litigation Related to the Tuna-Porpoise Issue

A lawsuit originally filed by Earth Island Institute on 12 April 1988 continued to be an important factor in the evolution of the United States tuna-porpoise program during 1990. The initial complaint in this matter, which pre-dated the 1988

amendments to the Marine Mammal Protection Act, alleged several violations of the Act. Among other things, plaintiffs alleged that the National Marine Fisheries Service had failed to: (1) implement the requirement that foreign nations exporting yellowfin tuna to the United States adopt dolphin protection programs and achieve incidental take rates comparable to those of the United States; (2) actively pursue and implement the requirement that marine mammal mortality incidental to tuna fishing be reduced to insignificant levels approaching zero mortality; and (3) establish a system for accurately determining the number of dolphins killed and otherwise taken incidental to U.S. tuna fishing operations.

Amendments to the Marine Mammal Protection Act addressing some of these issues were enacted on 23 November 1988. New requirements as to when foreign tuna-porpoise programs would be considered comparable to that of the United States were added, numerical standards for comparing U.S. and foreign kill rates were established, a National Academy of Sciences study of possible ways to catch tuna without taking marine mammals was mandated, and 100-percent observer coverage for the U.S. tuna fleet was required.

On 19 December 1988, the National Marine Fisheries Service issued a statement that, despite the recent amendments to the Act, it lacked sufficient funding to implement 100-percent observer coverage in 1989. Subsequently, the Service indicated that it would place observers on all trips beginning on or after 1 January 1989, although, if additional funding were not made available, reduced coverage might be required later in the year. On 5 January 1989, Earth Island Institute applied for a temporary restraining order to prevent two U.S. tuna vessels that had left port before the first of the year without observers from engaging in fishing operations on porpoise. A preliminary injunction was issued by the District Court for the Northern District of California on 17 January 1989 ordering that no certificated U.S. tuna vessel could depart on a fishing trip to the eastern tropical Pacific or could set on porpoise without an observer on board, unless the Court had determined that, for reasons beyond the control of the Secretary of Commerce, an observer was not available.

As discussed above, the National Marine Fisheries Service, in May 1989, published a notice proposing to find that observer coverage significantly less than that for the U.S. fleet was acceptable for comparable foreign programs. Earth Island Institute challenged this proposal in its pending lawsuit, seeking partial summary judgment on this issue. Earth Island Institute argued that the foreign observer provision of the 1988 amendments was intended to allow a nation to establish an observer program in which the United States does not participate but did not authorize the Service to accept a program that provides lesser coverage than the U.S. program. The Court ruled on 24 August 1989 that the Marine Mammal Protection Act did not

unambiguously require foreign observer programs to provide observer coverage equal to that of the United States and that the Service's interpretation was reasonable. While ruling on the legal construction of the statute, the Court did not address the factual question of whether 33-percent coverage met the Act's standard by providing a reliable estimate of incidental mortality for each fleet.

The plaintiffs filed a motion for preliminary injunction on 22 June 1990, asking the District Court to ban tuna imports from foreign nations until the National Marine Fisheries Service had made the required findings under the 1988 amendments to the Marine Mammal Protection Act. Specifically, the 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 these 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 injunction ordered the Secretary of Commerce to refrain from making a positive finding with respect to the tuna-porpoise program of any foreign nation and to revoke any such finding then in effect until a finding had been made that the marine mammal mortality of the foreign nation's fleet is no more than 2.0 times that of the U.S. fleet for the same period. The Court further 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 found that the 1988 amendments to the Marine Mammal Protection Act clearly prohibited, as of the end of 1989, a positive comparability finding, and 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 further determined that, "as of the end of 1990, the Secretary of Commerce may not make a finding of comparability unless the average taking rate of the foreign nation does not exceed 1.25 that of United States vessels." In so ruling, the Court 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 1989.

In contrast, the Court ruled that findings for the percentage take of eastern spinner and coastal spotted dolphins by foreign fleets are to be based upon data from an entire fishing year and need not be made by the end of the 1989 (or any subsequent) fishing season. As such, the Court left intact the Service's regulations which give foreign nations until 31 July to provide data for the preceding fishing year. The Court cautioned, however, that once the necessary reports are filed, the Service should make a prompt decision as to whether the quotas have been met.

In compliance with the Court order, the Customs Service issued a directive on 6 September 1990 prohibiting imports of yellowfin tuna and yellowfin tuna products unless accompanied by a declaration that the fish were not caught using purse seine nets in the eastern tropical Pacific.

On 7 September 1990, the National Marine Fisheries Service completed its review of marine mammal data submitted by Venezuela, Vanuatu, and Mexico. Based upon data for the 1986 through 1989 fishing seasons, positive findings were made for Venezuela and Vanuatu and the embargo was lifted for tuna from these two countries. The 1988-1989 marine mammal mortality rate for Mexico was 2.39 times that of the U.S. fleet. In addition, eastern spinner dolphins accounted for approximately 24 percent of the marine mammal mortality occurring incidental to Mexican tuna fishing operations during 1989. Thus, Mexico failed to meet the mortality rate comparability test and exceeded the 15 percent quota for eastern spinner dolphins.

Anticipating that its mortality rate would not be found comparable based on 1989 data, Mexico submitted data for the first eight months of 1990 seeking reconsideration from the National Marine Fisheries Service based on the more recent performance of its fleet. For the period 1 January-6 September 1990, the Mexican mortality rate was 1.58 times the U.S. rate. Eastern spinner mortality accounted for 10.3 percent of the total dolphin mortality for the period 1 January to 30 June 1990. Based upon the incidental take rates for the first part of 1990, the National Marine Fisheries Service issued a positive finding of comparability for Mexico on 7 September 1990. A positive finding was made for Ecuador on 11 September, leaving Panama as the only nation affected by the tuna import prohibition.

In response to issuance of the finding of comparability for Mexico, Earth Island Institute, on 17 September 1990, sought a temporary restraining order to reimpose the import ban against tuna from Mexico. Plaintiffs argued that under the 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 the failure by Mexico to meet the eastern spinner quota for 1989 could only be corrected by meeting the standard for the entirety of 1990.

A hearing on the matter was held on 24 September 1990 and the Court issued an opinion on October 4. The Court stated that, consistent with its earlier ruling, the requirement that foreign fleets not exceed 1.25 times the U.S. mortality rate does not become effective until the end of 1990. Thus, 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 was sufficient to overcome the statutory import ban. The Court ruled, however, 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. On this basis, a temporary restraining order prohibiting importation of Mexican tuna was issued. 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's ruling to the U.S. Court of Appeals for the Ninth Circuit on 22 October 1990, seeking expedited review. After defendants' motion to stay the ban on tuna imports from Mexico pending appeal was denied by the lower court, a similar motion was granted by the Court of Appeals on 14 November 1990. Pursuant to that stay, the National Marine Fisheries Service lifted the import prohibition on Mexican tuna on 16 November 1990. Oral argument on the U.S. Government's appeal is scheduled for the week of 11 February 1991.

Actions in the State of California

As discussed in Chapter II of this report, the take of California sea otters incidental to commercial fishing operations has been substantial in past years. In response, California imposed a series of fishery closures within the sea otter range. In some areas, the use of gillnets in waters shallower than 15 fathoms (90 feet) was banned. In other areas, the gillnet ban extended out to 20 fathoms (120 feet). While these gillnet bans resulted in an apparent decrease in incidental sea otter mortality, some sea otter deaths attributable to entanglement in gillnets continued to occur.

To address the problem, California, in 1990, enacted Senate Bill 2563. The new legislation bans the use of gillnets and trammel nets in waters shallower than 30 fathoms (180 feet) along most of the California coast between Waddell Creek (near Santa Cruz) and Point Sal (south of San Luis Obispo). The ban may be lifted for waters south of Point San Luis if the Director of Fish and Game determines that use of the prohibited gear will not result in any accidental take of sea otters. To facilitate enforcement of the ban, fishermen using gillnets or trammel nets in waters between 30 and 40 fathoms in depth within the area from Waddell Creek to Point Sal must notify the Department of Fish and Game at least 24 hours prior to using such gear; carry an observer if requested; and limit fishing to daylight hours. While aimed primarily at eliminating sea otter mortality, the

bill also requires additional gillnet and trammel net bans to be imposed if use of this gear is having an adverse impact on any species of seabird, marine mammal, or fish.

To address problems associated with the use of gillnets and trammel nets in Southern California waters, voters, in November 1990, approved Proposition 132, the Marine Resources Protection Act of 1990. The Act prohibits, beginning in 1994, fishing with gillnets and trammel nets within three nautical miles of the California coast south of Point Arguello. The ban also extends to waters within one mile around the Channel Islands. As of 1 January 1991, such gear may be used in these areas only if authorized pursuant to a permit issued by the Department of Fish and Game. The Act also establishes a fund to compensate fishermen for lost revenues and to assist them in switching to alternative fishing methods. It is expected that the gillnet ban will reduce or eliminate fishery-related take of several species of marine mammals, including gray whales, California sea lions, harbor seals, and harbor porpoise.

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 1990 with respect to the International Whaling Commission, alleviating the widespread impacts of high seas drift gillnet 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 (IWC)

During 1990, representatives of the Marine Mammal Commission and its Committee of Scientific Advisors consulted with the U.S. Commissioner to the IWC and others in preparation for the 42nd annual meeting of the IWC. Representatives of the Marine Mammal Commission also participated in meetings of the IWC and its Scientific Committee and in related post-meeting actions.

Pre-Meeting Activities

Review of U.S. Whaling Policy -- As discussed in previous Annual Reports, the IWC decided to undertake a comprehensive assessment of whale stocks by 1990 to determine whether catch limits other than zero for certain whale stocks would be appropriate. To determine the most appropriate U.S. position on this matter, on 29 September 1989, the U.S. IWC Commissioner recommended to the Secretary of State and the Secretary of Commerce that an interagency group be established to review and provide advice on U.S. whaling policy. The Secretaries agreed and a representative of the National Oceanic and Atmospheric Administration was asked to organize and chair a Whale Policy Review Task Force. In addition to the Marine Mammal Commission, agencies invited to participate on the Task Force included the

Department of State, the Department of the Interior, the Department of Justice, the Council on Environmental Quality, the U.S. Trade Representative, and the International Trade Administration in the Department of Commerce. The objectives of the Task Force were to review U.S. policy and legal obligations regarding whaling and the IWC and to develop policy recommendations which the Department of Commerce could provide to the President in the spring of 1990.

In February 1990, the Task Force reviewed a draft paper prepared for it by the National Oceanic and Atmospheric Administration. The draft paper presented possible policy options addressing three outstanding IWC issues: (1) continuing the current moratorium on commercial whaling; (2) establishing a new "small-type coastal whaling" category as had been raised by Japan with the IWC; and (3) adopting revised management procedures for calculating catch limits for whale stocks. On 12 March 1990, the Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, wrote to the Chairman of the Task Force, recommending that the desired policy objectives first be set forth so that the various options could be evaluated against those objectives.

On 22 March 1990, the National Oceanic and Atmospheric Administration circulated a draft Federal Register notice of Task Force findings. On 30 March 1990, the Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, returned comments. In its letter, the Commission recommended that the draft notice state an intent to recommend continued U.S. support for the current indefinite IWC moratorium on commercial whaling. It also recommended that any reconsideration of the moratorium provision by the United States be predicated upon: (1) the development of acceptable management procedures; (2) the availability of sufficient information to accurately assess the status of the affected whale stocks; (3) the presence of monitoring programs capable of verifying the predicted effects and detecting possible unforeseen effects of any resumption of commercial whaling that might be authorized by the IWC; and (4) assurances of member country participation in data reporting, monitoring, and enforcement regimes. The Commission further recommended that the United States not support any new management procedure unless it includes built-in safety factors that fully account for the maximum level of inherent uncertainty in estimating the status of whale stocks.

On 27 April 1990, the National Oceanic and Atmospheric Administration published the findings of the Task Force in the Federal Register. It noted that the Task Force had recommended that the United States continue its support for the current moratorium, that the United States oppose establishing a new category of "small type coastal whaling," and that the United

States participate in IWC meetings on critical issues including the development of new management procedures.

Comprehensive Assessment of Gray Whales -- In order to initiate the comprehensive assessment of whale stocks, the IWC recommended at its 1989 meeting that priority attention be devoted to three whale stocks: the eastern North Pacific gray whale, the Southern Hemisphere minke whale, and the North Atlantic minke whale. To undertake a comprehensive assessment of the status of the eastern North Pacific gray whale stock, the IWC Scientific Committee held a special meeting in Seattle, Washington, on 23-27 April 1990. The assessment conducted during this meeting was the first done for any whale stock under the IWC provision requiring a comprehensive assessment. Representatives of the Marine Mammal Commission participated in the meeting. Assessments of the two minke whale stocks were considered during the IWC annual meeting and are discussed below.

With respect to gray whales, the Committee agreed that the best estimate of the size of the eastern North Pacific gray whale stock was 21,113 animals (standard error 688) and that, between 1968 and 1988, the population had increased at an average annual rate of 3.2 percent (standard error 0.5 percent) although subsistence catches over that period had averaged 174 whales per year.

Based on population models considered at the meeting, the Committee questioned whether the maximum sustainable yield or the maximum net productivity level could be estimated for the stock. Although the Committee was unable to determine the minimum level below which catches of gray whales should not be taken, it agreed that the gray whale stock was well above that level and that the current annual catch of 179 was below the stock's sustainable yield. Because it could not determine the stock's maximum net productivity level, the Committee was unable to conclude whether its current classification as a sustained management stock in the IWC's Schedule of regulations was appropriate. After reviewing the data on gray whales, the Committee concluded that it would not be appropriate to apply the values of biological parameters from one species to another and that inter-species comparisons should be treated with caution.

Because the eastern North Pacific stock of gray whales was the first whale stock to be considered during the comprehensive assessment process, the Committee noted that its work had been greatly facilitated by having a steering group assign tasks to individuals in advance of the special meeting and circulate the background papers in advance of the meeting. The Committee recommended that this procedure be followed in all future assessments. Finally, the Committee noted that the difficulties found in attempts to classify this stock underscored the need for revising the IWC's current management procedure.

The 1990 Meeting of the IWC and its Scientific Committee

Membership and Participation -- The 42nd meeting of the Scientific Committee of the IWC was held 10-25 June 1990 in Noordwijkerhout, Netherlands. Following the Scientific Committee meeting, representatives of 30 of the IWC's 41 member nations participated in the 42nd annual meeting of the IWC in Noordwijk, Netherlands, on 2-6 July 1990.

Moratorium on Commercial Whaling -- In 1982, the IWC added a new provision to its Schedule of regulations (paragraph 10(e)) that established all catch limits for commercial whaling at zero beginning with the 1985-1986 pelagic and 1986 coastal whaling seasons. The provision also provided that, by 1990 at the latest, the IWC would undertake a comprehensive assessment of the effect of the zero catch quota on whale stocks and consider modifying the provision and establishing catch limits other than zero.

Despite a proposal to establish commercial catch limits for the central Atlantic minke whale stock, the IWC did not take action to change the moratorium provision. Therefore, catch limits for commercial whaling continued to be set at zero and will remain at zero unless and until a three-quarters majority of IWC members vote to modify the moratorium established under Schedule paragraph 10(e).

Comprehensive Assessment -- To meet the provisions of paragraph 10(e) for undertaking a comprehensive assessment, the IWC Scientific Committee developed a work plan and timetable for conducting a comprehensive assessment of whale stocks. This was approved by the IWC in 1986. Recognizing that assessment for all whale stocks could not be undertaken in 1990, the IWC agreed that priority attention should be directed first towards three stocks of whales -- eastern North Pacific gray whales, Southern Hemisphere minke whales, and North Atlantic minke whales. As noted above, the gray whale stock was considered at a special meeting of the Scientific Committee in April 1990. Assessments of the two minke whale stocks were undertaken at the Scientific Committee's annual meeting.

Regarding Southern Hemisphere minke whales, the Scientific Committee concluded that, based on available information, there were no clear stock divisions among minke whales in the Southern Ocean. It recommended, however, that additional research on stock identity be undertaken. Based on data collected from the six management areas established by the IWC for the Southern Ocean, the Committee calculated the following best estimates of Southern Hemisphere minke whale abundance: Area I, 73,302 whales; Area II, 122,156 whales; Area III, 88,735 whales; Area IV, 74,692 whales; Area V, 294,610 whales; and Area VI, 106,901 whales. The Committee was unable to reach agreement on whether

available population models could be used to calculate useful values of maximum sustainable yield rates for the various management areas or to determine the classification of the Southern Hemisphere minke whale stock.

Regarding North Atlantic minke whales, the Scientific Committee agreed for management purposes to recognize three stocks: the west Greenland, central, and northeastern stocks. It also agreed on population size point estimates of 28,000 and 3,266 whales for the central and west Greenland stocks, respectively. The Committee could not agree on a point estimate for the size of the northeastern stock, but it did agree on a combined 95 percent confidence interval of 43,500 to 114,000 whales. The Committee agreed that, if the results of the considered model are used as the basis for assessment and if the existing management procedure is applied, the central stock of minke whales in the North Atlantic should be classified as an initial management stock. However, because the management procedure is known to be flawed and the appropriateness of using the assessment model was disputed, the IWC did not agree to reclassify this stock. The IWC also was unable to agree on a classification of either the northeastern or west Greenland stocks, which are not now classified in the Schedule.

During the comprehensive assessments for both the North Atlantic and Southern Hemisphere minke whale stocks, there was discussion regarding possible catch limits that might be justified. However, pending completion of work to develop revised management procedures for calculating catch limits, some Committee members considered it inappropriate to suggest catch limits at this time and no recommendations on this matter were put forward.

Regarding future work on the comprehensive assessment, the Scientific Committee recommended, and the IWC agreed, that highest priority during the coming year should be assigned to work on developing revised management procedures and conducting assessments of North Atlantic fin whale, North Pacific minke whale, and bowhead whale stocks. In addition, the IWC agreed that a special meeting on the comprehensive assessment of North Atlantic fin whales should be held in February 1991.

Revised Management Procedure -- In order to consider catch limits other than zero under Schedule paragraph 10(e), the IWC has recognized the need to develop and agree on a revised management procedure. At its 1988 meeting, the IWC established three broad objectives to guide efforts to revise its management procedures: (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 Scientific Committee continued to develop a revised management procedure according to the timetable adopted at its 1989 meeting. Five alternative procedures are under review. The Scientific Committee reported that all five procedures continue to show promise. The Scientific Committee reaffirmed its intention to recommend a "best" management procedure at the 1991 IWC meeting.

Aboriginal/Subsistence Whaling -- During its 1990 meeting, the IWC adopted an aboriginal subsistence catch limit of three North Atlantic humpback whales for each of the years 1990-1991 and 1992-1993. These may be taken by Bequians of St. Vincent and the Grenadines.

No changes were made in catch limits for other aboriginal subsistence whaling that had been adopted at previous meetings. For the Bering-Chukchi-Beaufort Seas stock of bowhead whales taken by Alaskan Eskimos, no more than 47 bowhead whales may be struck or 41 whales landed in 1991. Previously adopted catch limits, left unchanged for other stocks subject to subsistence whaling, were as follows:

- eastern North Pacific gray whales taken on behalf of Soviet aboriginal natives and by Alaskan Eskimos: up to 179 whales may be taken in 1991;

- central North Atlantic minke whales taken by east Greenlanders: up to 12 whales per year may be taken in 1991 and 1992.

- west Greenland minke whales taken by west Greenlanders: up to 190 whales may be taken in 1990 and 1991 combined, with no more than 100 whales taken in either year; and

- west Greenland fin whales taken by west Greenlanders: up to 42 whales may be taken in 1990 and 1991 combined, with no more than 23 whales taken in either year.

Special Permits for Scientific Research -- The IWC's whale conservation program provides that member nations may issue special permits to their citizens to kill whales for purposes of scientific research, provided that the IWC has an opportunity to review and comment on the proposed permits. Since 1985 the IWC has adopted resolutions setting forth criteria and guidelines governing its review of proposals for special permits involving the lethal take of whales for research purposes. Considering advice from its Scientific Committee, the IWC also has adopted resolutions calling upon members to refrain from issuing or to reconsider proposed special permits that do not fully satisfy IWC

whale research criteria and guidelines. Although advice adopted by the IWC in the form of a resolution reflects a majority view of voting IWC members, such advice is not binding upon contracting governments.

At the 1990 annual meeting, Norway, Japan, and the Soviet Union submitted research proposals that included killing whales in 1990/1991. Norway's proposal called for killing five minke whales from the northeast Atlantic stock to complete studies on digestion and energy expenditure of free-swimming whales. The proposal was an extension of research conducted during the previous year and the Scientific Committee was unable to reach a consensus as to whether Norway's proposal fully satisfied all the IWC's criteria. The IWC subsequently adopted a resolution expressing the view that the proposal did not meet all established criteria and inviting the Government of Norway to reconsider the proposed take in 1990 under the special permit.

Japan's research whaling proposal called for killing 330 minke whales from Area V of the Southern Ocean. The purpose of the proposed research was, in part, to estimate age-specific and average mortality rates of Southern Hemisphere minke whales and to better understand the role of minke whales in the Antarctic ecosystem. The proposal was identical to the previous year's program and, as in 1989, the Committee was unable to reach a consensus as to whether the proposal fully satisfied all IWC criteria. The IWC subsequently adopted a resolution by consensus expressing the view that Japan's research proposal did not fully satisfy the IWC's criteria and inviting the Government of Japan to reconsider the IWC program.

The Soviet Union's scientific research proposal involved killing 50 to 70 minke whales and 25 to 30 fin whales in the Okhotsk Sea in 1990, 1991, and 1992. The research involved examining reproductive organs, collecting tissue samples, and investigating pollutant levels in the whales. The Scientific Committee was uncertain as to whether the research had already begun and, because no Soviet scientists attended the 1990 Scientific Committee meeting, the Committee was unable to resolve questions arising from its review of the proposal. Based on the proposal alone, the Committee concluded that the research did not meet all established criteria for research involving the killing of whales. During the IWC meeting, the Commissioner representing the Soviet Union stated that the research would not be undertaken in 1990 and the IWC therefore took no action with respect to this proposal.

Finance and Administration -- In the past several years, the IWC has faced critical financial problems because some members have either not paid or only partially paid required dues. During 1990, suspension of voting rights due to non-payment of member contributions was in effect with respect to Antigua and

Barbuda, Costa Rica, Kenya, Peru, Senegal, and Uruguay. Despite a somewhat improved financial situation, the IWC's funding support remained precarious as eight contracting governments failed to pay their dues in 1990.

Small Cetaceans -- Although the International Convention for the Regulation of Whaling of 1946 does not explicitly mention small cetaceans, and some members believe that the IWC has no authority to make recommendations regarding their management, the IWC Scientific Committee has established a small cetacean subcommittee to gather and review information concerning the conservation of these species. At the 1990 meeting, the subcommittee reviewed information on the biology and exploitation of: harbor porpoise stocks in the eastern and western North Atlantic and the eastern North Pacific Ocean; Dall's porpoise in the North Pacific Ocean; dolphin and porpoise stocks in the Black Sea; Burmeister's porpoise in coastal waters of South America; and the Gulf of California harbor porpoise or vaquita in the northern Gulf of California. Review results indicated that many populations badly need protection from either direct takes or incidental takes in fisheries. The subcommittee concluded that for many stocks, annual kill rates exceeded half of the estimated maximum recruitment rate.

In view of the subcommittee's conclusions, the Scientific Committee believed that the following recommendations (identified in order of priority) were critically important:

- Vaquita (see also Chapter II): Immediate action should be taken to halt illegal totoaba fishing in which vaquita are taken incidentally; issuance of permits for experimental totoaba fishing should be reconsidered; illegal importing of totoaba from Mexico into the United States should be halted; and a long-term management plan for conserving vaquita should be developed and implemented.

- Dall's porpoise: Because the Japanese hand-harpoon fishery for Dall's porpoise clearly far exceeds levels that could be sustained by the stock, catch levels should be reduced immediately to at least pre-1986 levels (which themselves may have been too high); further reductions should be made in subsequent years based on new stock assessments; and sighting surveys should be carried out to develop new population estimates.

- Black Sea dolphins and porpoise: In view of a proposed cull of dolphins and porpoise by the Turkish Government to reduce perceived competition for fish resources and also because of the uncertain reliability of dolphin and porpoise abundance estimates, current dolphin and porpoise stock estimates should not be used as a basis for management decisions and should receive a rigorous independent review.

- Harbor porpoise: Steps should be taken to reduce incidental take of harbor porpoise in gillnets throughout the species' range, especially in the southern North Sea and Danish waters, the Bay of Fundy and Gulf of Maine, and the central coast of California.

The IWC took note of the Scientific Committee's views and recommendations. Recognizing the plight of certain small cetacean stocks and the urgent need for international cooperation to ensure their conservation, the IWC adopted a resolution asking its Scientific Committee to compile information on the status of small cetacean stocks subject to significant direct and incidental take. The resolution asked its Committee to develop a report on the matter with scientific advice as seems warranted for the next IWC meeting. In addition, the IWC adopted a resolution asking the Government of Japan to consider the Scientific Committee's advice regarding Dall's porpoise and to reduce the allowable take to pre-1986 levels as soon as possible.

Small-Type Coastal Whaling -- In view of economic hardships imposed on certain coastal residents by the IWC's moratorium provision, some members have asked the IWC to review the socio-economic implications of the moratorium decision and to consider establishing a new category of whaling under the IWC's management program which would combine some characteristics of both commercial whaling and aboriginal subsistence whaling. An IWC working group has been established to review information and make recommendations on this matter. The working group met in advance of the 1990 IWC meeting to review information on small-type whaling and it developed a report that was subsequently considered by the IWC. Several reports were submitted by member nations and the IWC agreed that the working group should be continued, the submitted information should be reviewed, and a decision should be made on whether to reconvene the working group before next year's annual meeting.

Pending further review of the question of small-type coastal whaling, Japan requested that its coastal whalers be allowed an interim quota of 50 minke whales from the Okhotsk Sea-west Pacific stock in 1991. The action was opposed by several nations, including the United States, on the grounds that such a quota would violate the moratorium on commercial whaling. The IWC denied the requested quota by a vote of 5 in favor, 18 opposed, and 8 abstaining.

IWC Resolutions on Driftnets and Non-Lethal Research -- At the 1990 IWC meeting, the U.S. delegation introduced a resolution cosponsored by 20 other delegations and adopted by consensus. It endorsed actions called for in United Nations General Assembly resolution 44/225 (see section on high seas driftnets in this Chapter). The IWC resolution also requested the IWC Secretariat to forward relevant Scientific Committee reports containing

information on incidental take of cetaceans in gillnet fisheries to the United Nations General Assembly. It also asked that the final report of its conference on mortality of cetaceans in passive fishing nets be forwarded to the United Nations as soon as it was completed.

During the 1990 meeting, the French delegation introduced a resolution cosponsored by the delegations of the United States and 12 other nations encouraging contracting governments to base their research programs, to the maximum extent possible, on non-lethal research methods and to note the special measures taken in this regard in their reports on research.

Post-Meeting Activities

Scientific Research Permits -- As indicated above, the IWC has adopted a series of resolutions since 1987 expressing the view of the majority of its members on whether certain scientific research proposals fully satisfy the IWC's criteria for research involving the killing of whales. The United States considers failure to follow resolutions pertaining to scientific research programs adopted by the IWC to be grounds for certification under two provisions of domestic U.S. law -- the Packwood-Magnuson Amendment to the Magnuson Fishery Conservation and Management Act and the Pelly Amendment to the Fishermen's Protective Act.

Pursuant to the two provisions, the Secretary of Commerce is required to notify the President if he determines that foreign nationals are conducting fishing operations, including whaling, in a manner that diminishes the effectiveness of an international fishery conservation program. 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 fishery products into the United States from the certified nation. In 1990, actions pursuant to these laws were taken with respect to research whaling permitted by the Governments of Norway and Japan.

In 1986, the Secretary of Commerce certified the Government of Norway 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's conservation program.

At the 1988 IWC meeting, Norway submitted a scientific research proposal involving the killing of 35 minke whales in the North Atlantic. The IWC adopted a resolution calling upon Norway

to refrain from issuing a special permit for the research. After the 1988 IWC meeting, the Secretary of Commerce notified Norwegian officials that he would be faced with considering a new certification finding if Norway proceeded with its whale research program. That summer, Norway took 29 minke whales as part of its research program. The Secretary, however, withheld certifying Norway in view of a subsequent Norwegian communication of its intent to improve the research program into line with the IWC's conservation program.

At the 1989 IWC meeting, however, Norway's presentation of its revised research program was unconvincing. The IWC again adopted a resolution expressing the view that its criteria for research involving the killing of whales had not been fully satisfied and calling upon Norway to reconsider its research program. Subsequently, Norway issued a special permit for the research and 17 whales were killed. Norwegian officials were advised that a certification finding against Norway was being processed in light of Norway's action. In response, Norwegian officials requested a meeting and met with U.S. officials in November 1989 to present new information on the Norway's research program.

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 a certification was justified. On 23 January 1990, the Ministry of Foreign Affairs for Norway advised the Secretary of Commerce that Norway's plans regarding the need to kill whales in 1990 were not set and that Norwegian scientists looked forward to continuing to work with U.S. scientists to bring its research program into line with IWC requirements. 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 the IWC found that its research proposal failed to satisfy all applicable IWC criteria, he would certify Norway if whales were in fact killed.

As noted above, Norway subsequently submitted a research proposal involving the killing of five minke whales to the IWC at its 1990 meeting. The IWC adopted a resolution expressing a majority view that the proposed take did not fulfill all of its scientific research criteria and asking Norway to reconsider its decision to issue the special permit. On 10 August 1990 Norway advised the Secretariat of the IWC that, after carefully considering comments of the IWC's Scientific Committee, it planned to issue the special permit.

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 IWC's conservation

program. Because Norway receives no allocation of fish from U.S. waters, no action was taken to certify it under the Packwood-Magnuson Amendment. 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.

As noted in the previous Annual Report, the Secretary of Commerce certified Japan under the Packwood-Magnuson and Pelly Amendments on 9 February 1988 for authorizing a research program to take up to 300 Southern Hemisphere minke whales. The action was taken after Japanese scientists took 272 whales and while a resolution was pending before the IWC that called upon Japan to refrain from issuing a special permit for the proposed research. Japan's small allocation of fish from U.S. waters was immediately reduced by 50 percent under the Packwood-Magnuson Amendment. 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.

Before considering further sanctions, the President asked the Secretaries of Commerce and State to monitor Japanese whaling practices and to report back to him by 1 December 1988 on Japanese research activities. On 1 December 1988, the Secretary of Commerce advised the President that there had been no significant change in the circumstances that had led to the certification and that he was preparing recommendations for further actions. In the winter of 1988-1989, Japan took 241 minke whales in the Antarctic. In consideration of the death of the Japanese Emperor Hirohito and subsequent reorganization within the Japanese Government, the United States did not pursue sanctions early in 1989.

At the 1989 meeting of the IWC, Japan presented a revised research proposal involving the killing of 400 minke whales in the Southern Hemisphere during the 1989/1990 season. The IWC reviewed the proposal and adopted a resolution inviting the Government of Japan to reconsider its research program. Japan subsequently submitted a revised proposal involving the killing of up to 330 whales. The National Oceanic and Atmospheric Administration, in consultation with the Marine Mammal Commission, reviewed the revised proposal and concluded that it failed to reflect progress towards addressing concerns expressed by the IWC Scientific Committee. By letter of 14 December 1989, the Department of Commerce advised the Japan Fisheries Agency of the results of its review and noted that commencement of the Japanese research would initiate consideration of sanctions under the Pelly Amendment. That winter, Japan took 330 minke whales in Area IV of the Southern Ocean.

On 11 January 1990, the Director of the Japan Fisheries Agency wrote to the Director of the National Oceanic and

Atmospheric Administration, stating that he did not understand why and how U.S. scientists concluded that the revised program did not adequately address the concerns of the IWC Scientific Committee. In the letter, he offered to have Japanese scientists meet with U.S. scientists to explain the program. Subsequently, U.S. and Japanese scientists met on 13-14 February 1990 in Washington, D.C., and a subsequent meeting between U.S. and Japanese delegations was held on 6-7 April 1990 in Tokyo.

As noted above, Japan submitted a research proposal involving the killing of up to 330 antarctic minke whales to the IWC at its 1990 meeting. The IWC reviewed the proposal and adopted a resolution by consensus expressing the view that the program did not satisfy its research criteria and inviting Japan to reconsider its decision to issue the permit. Japanese and U.S. scientists met again on 11-12 October 1990 in Washington, D.C., to discuss technical aspects of the Japanese research program and, on 15 November 1990, the IWC Secretariat circulated a Japanese paper to IWC members describing Japan's response to the IWC Scientific Committee's comments. By letter of 4 December 1990, the National Oceanic and Atmospheric Administration asked for comments from the Marine Mammal Commission and other U.S. scientists on Japan's paper. At the end of 1990, the Commission had completed its review which indicated that the Japanese paper did not fully address the IWC's criteria for scientific research and it provided these results to the National Oceanic and Atmospheric Administration.

Black Sea Cetaceans - As noted above, the IWC's Scientific Committee reviewed information on a proposal by Turkish fishermen to cull Black Sea dolphins and porpoise so as to reduce perceived competition between small cetaceans and fishermen for anchovies. Based on its review, the Committee expressed concern that cetacean population estimates were not accurate and recommended that management action not be undertaken until those estimates had received a rigorous independent review.

In view of the recommendation, the Marine Mammal Commission contracted for such a review (see also Chapter X). The resulting report was completed in November 1990 (see Appendix B, Buckland 1990). The report concluded that the population estimates and conclusions upon which the proposed Turkish cull was based were biased and of questionable accuracy. By letter of 19 November 1990 to the Department of State, the Commission recommended that its contract report be forwarded to the Government of Turkey and that the Department urge the Turkish Government to undertake further assessments of Black Sea cetacean populations before making any management decisions. By the end of 1990, the Department of State had met with Turkish officials to discuss the status of Black Sea cetacean populations and had transmitted the Commission's report.

International Whaling Commission Conference on Mortality of Cetaceans in Passive Fishing Nets and Traps

Since the mid-1980s, the Scientific Committee of the International Whaling Commission has been concerned that several species of large cetaceans (e.g., gray, humpback, and right whales) and numerous species of small cetaceans were being affected adversely by incidental take in fisheries, particularly coastal and high seas gillnet fisheries. At its 1988 Annual Meeting, the Scientific Committee adopted terms of reference for a workshop on the mortality of cetaceans in passive fishing nets and traps. The terms of reference were accepted by the International Whaling Commission and, at its 1990 meeting, it was agreed that the workshop report should be forwarded to the Secretary General of the United Nations as soon as available.

The workshop and a related symposium were held at the National Marine Fisheries Service's Southwest Fisheries Science Center in La Jolla, California, on 20-25 October 1990. Participants included members of the Marine Mammal Commission's Committee of Scientific Advisors and scientists from 29 countries. The workshop was co-sponsored by the International Whaling Commission, the National Marine Fisheries Service, the Marine Mammal Commission, the United Nations Environment Program, the Australian National Parks and Wildlife Service, the New Zealand Department of Conservation, the World Wildlife Fund-U.S., the World Wildlife Fund-Sweden, and the World Conservation Union. Its principal objectives were to (1) identify and describe new and expanding net and trap fisheries that take cetaceans; (2) assess how and why entanglement occurs; (3) to the extent possible, estimate mortality and its impacts on affected cetacean populations; and (4) identify possible ways of reducing net-caused cetacean mortality.

Workshop participants compiled and evaluated the best available data concerning the incidental take of cetaceans in gillnet and trap fisheries worldwide. They concluded that several cetacean stocks are unable to sustain current levels of incidental take. These include the vaquita or Gulf of California harbor porpoise; the baiji in the Yangtze River; hump-backed and bottlenose dolphins along the eastern coast of South Africa; striped dolphins in the Mediterranean Sea; and harbor porpoises in central California and in the eastern and western North Atlantic. They also identified other stocks for which available information is insufficient to accurately evaluate impacts but where current incidental take levels are known to be large and probably are not sustainable. These include dusky dolphins in the eastern South Pacific, northern right whale dolphins in the central North Pacific, and sperm whales in the Mediterranean Sea.

Workshop participants concluded that cetacean populations, in general, seem unable to sustain annual kill rates greater than

a small percentage of the population. Kill rates as low as two percent per year may not be sustainable if the species is long-lived and has a low reproductive capacity or if the take is not random or uniform with respect to age and sex (e.g., if the fishery takes more females than males or more animals at their prime reproductive ages than at pre- or post-reproductive ages). They also concluded that: at least some cetaceans are likely to be caught wherever cetaceans and gillnets occur in the same area; there is no apparent universal cause or solution to the incidental take of cetaceans in fishing gear; and the precise nature of the interactions, and how they might be reduced, varies by area, type of fishing gear, species, culture, and various combinations of these. For example, some species may be caught because they cannot or do not detect the presence of nets before they become entangled in them, whereas others may be caught as they attempt to take fish out of nets or traps.

Workshop participants recommended that the responsible management authorities take immediate steps to reduce the incidental take of those species identified above whose populations are not large enough to sustain the incidental take. In cases where incidental take, combined with other types of take, is thought to exceed a small percentage of the population, participants recommended that the by-catch be limited, pending collection of reliable information on the size and discreteness of the affected population and on kill rates, age and sex composition of the kill, and total fishing effort.

Participants noted that, in most areas, fishermen are unaware of the extent and impact of cetacean entanglement. They recommended that fishermen be made aware of the problems and become involved in the process of finding solutions. They also noted a number of promising research areas that could lead to reducing the incidental take of cetaceans and that should be explored further. These include time and area restrictions on fisheries and changes in fishing gear and strategies.

The workshop report is expected to be provided to the Secretary General of the United Nations and members of the International Whaling Commission and its Scientific Committee by April 1991. The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, will review the report to determine what more the United States can do to ensure that incidental take in fisheries, by itself and in combination with other factors, is not causing marine mammal populations to be reduced, or to be maintained, below their optimum sustainable population levels.

Additional information concerning marine mammal-fisheries interactions and steps being taken by the Commission to identify and facilitate needed conservation measures are described in the next section of this Chapter and in Chapter V.

High Seas Driftnet Fisheries

High seas (or pelagic) driftnet fisheries began in the mid-1970s. Their rapid growth and widespread impacts have been and remain of great concern to the United States and other countries for many reasons. Among them are: (1) pelagic driftnets are indiscriminate; in addition to the target species, they catch and kill large numbers of marine mammals, seabirds, sea turtles, and fish; (2) nets and net fragments lost or discarded by driftnet fishermen are not biodegradable; they can continue to fish indefinitely, killing an unknown, but probably significant, number of marine organisms; (3) the use of driftnets, originally limited to the North Pacific and Mediterranean, is now common in many of the world's oceans and seas; and (4) the size of driftnets (a net can be more than 35 kilometers long and 10 meters in depth) and their great numbers mean that the total amounts of actively fishing gear are staggering (in the North Pacific squid driftnet fishery alone, well over 40,000 kilometers of net may be fishing in the North Pacific on a given night).

In fact, it is in the North Pacific that the world's largest driftnet fisheries occur. Here, neon flying squid are taken from June to December by fishermen from Japan, Korea, and Taiwan; salmon are taken primarily in June and July by fishermen from Japan; and albacore and billfish are taken principally between January and May by Japanese fishermen and between April and December by fishermen from Taiwan.

It has always been difficult to evaluate the impact of driftnet fisheries on marine mammals and other non-target species. Efforts to do so have been hindered by a lack of reliable information on fishing effort; the species, numbers, ages, and sexes of animals being caught; and the geographic and seasonal distribution of species taken. This matter, as it relates to North Pacific fisheries, is discussed at length in earlier Commission reports.

Among the many species taken has been the Dall's porpoise. In fact, between 1981 and 1986, the estimated average annual mortality in Japan's salmon driftnet fishery in U.S. waters was 2,600 porpoise. While estimates of total Dall's porpoise mortality outside of U.S. waters are not available, data from the high seas squid driftnet fishery suggest an average annual take in that fishery alone of nearly 2,500 porpoise between 1982 and 1986.

Besides Dall's porpoise, northern right whale dolphins, Pacific white-sided dolphins, common dolphins, striped dolphins, killer whales, harbor porpoise, pilot whales, Cuvier's beaked whales, North Pacific fur seals, Steller sea lions, and some large whales have also been taken in driftnet fishing operations in the North Pacific. Historical records and more recent

information justify a high level of concern for the effects of these fisheries.

International Actions in 1989 Related to Driftnet Fisheries

A number of important actions were taken in 1989. In July, the South Pacific Forum, an organization of nations throughout the South Pacific region, agreed upon the Tarawa Declaration, which formally called upon driftnet fishing nations around the world to recognize the South Pacific Ocean as a driftnet-free zone. In November, a number of South Pacific nations, led by New Zealand, signed the Convention for the Prevention of Fishing with Long Driftnets in the South Pacific to ban driftnets from their 200-mile Exclusive Economic Zones. Also late in the year, the Prime Minister of New Zealand put the issue squarely before the United Nations General Assembly. Shortly thereafter, the United States and ten other nations co-sponsored a resolution (Resolution 44/225), which was subsequently modified and unanimously adopted on 22 December 1989. The resolution calls upon the international community, to (1) review, through international organizations, data on pelagic driftnets and agree on further regulation and monitoring measures needed to protect living marine resources by 30 June 1991; (2) suspend pelagic driftnet fishing by 30 June 1992 unless effective conservation and management measures, jointly agreed to 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 pelagic driftnet fishing in the South Pacific Ocean as an interim measure pending the development of appropriate conservation and management arrangements agreed to by the concerned parties; and (4) immediately cease any further expansion of large-scale pelagic driftnet fisheries pending the results of the regional reviews.

The Driftnet Impact Monitoring, Assessment, and Control Act

To address concerns over the impact of driftnet fisheries on U.S. salmon stocks and other marine life, Congress passed the Driftnet Impact Monitoring, Assessment, and Control Act of 1987. Among other things, the Driftnet 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 life.

The monitoring agreements are required to provide for "statistically reliable cooperative monitoring and assessment of the numbers of marine resources of the United States killed and retrieved, discarded, or lost by the foreign government's driftnet fishing vessels." The enforcement agreements must include effective means of monitoring and detecting violations of laws, regulations, and agreements governing the location, season,

and other aspects of driftnet fishing operations. If foreign nations fail to enter into and implement "adequate" monitoring or enforcement agreements, the Act directs the Secretary of Commerce to certify that nation for possible imposition of sanctions under the Pelly Amendment to the Fishermen's Protection Act. Sanctions may include embargoes upon some or all fishery products imported into the United States by the offending nation.

The National Marine Fisheries Service, through the State Department, began negotiating the required agreements with Japan, Taiwan, and the Republic of Korea in 1988, and final agreements were signed in June, August, and September 1989, respectively. Although the agreements provided for a two-year phase-in of monitoring programs, they left program details to be negotiated at a later date.

Under the agreement with Japan, two programs were undertaken to monitor Japanese squid fishing operations between June and December of 1989, and for the months of July and August along the northern boundaries of the squid fishing zone. The June-December pilot program, which involved observers from Canada, Japan, and the United States, stipulated that the results be released in summary form only by 30 June 1990. There was no monitoring effort in 1989 with respect to Korean and Taiwanese squid driftnet fishing.

On 1 November 1989, the Commission, in consultation with its Committee of Scientific Advisors, wrote to the State Department. It noted that details of the 1990 programs to monitor Japanese, Korean, and Taiwanese fishing activities had yet to be agreed upon. The Commission therefore suggested that a group of quantitative scientists and biologists be convened to describe the monitoring and assessment programs that would be needed to ensure "statistically reliable" results. The State Department, in its 7 November 1989 reply, said that it would work closely with the National Marine Fisheries Service to determine the types of data to be collected and the necessary levels of observer coverage. On 20 November 1989, the National Marine Fisheries Service advised the Commission that it shared the Commission's views and that it attached high priority to securing statistically reliable data from the 1990 monitoring program. On 29 December 1989, the National Marine Fisheries Service also invited a Commission representative to meet with its technical experts involved in developing the U.S. positions for negotiating program details with Japan and Taiwan.

Results of 1989 Monitoring Efforts -- On 6 July 1990, Canada, Japan, and the United States jointly released the findings of the June-December 1989 pilot observer program on the Japanese high seas squid driftnet fishery. The observers, aboard about only four percent the ships, recorded the taking of more than 3.1 million flying squid by that small segment of the fleet.

The observed take of non-target species included: 208 northern fur seals, 141 Dall's porpoise, 455 northern right whale dolphins, 254 Pacific white-sided dolphins, 12 common dolphins, 52 unidentified dolphins, 59,060 albacore tuna, 10,495 yellowtail (not tuna), 7,155 skipjack tuna, 1,433,466 pomfret, 58,100 blue sharks, 9,173 seabirds, and 22 sea turtles. The report clearly documented a squid driftnet fishery by-catch of great magnitude.

The 1990 Driftnet Monitoring and Enforcement Agreement with Japan -- By letter of 11 January 1990, the National Marine Fisheries Service advised the Commission of the status of efforts to negotiate arrangements with Japan for the 1990 driftnet monitoring program. The letter and accompanying material indicated that the level of observer coverage in 1990 was based on data from the 1989 pilot program, that the number of observers would be greater than that in 1989, and that the objective was a monitoring program that would provide by-catch estimates for key species with 10 percent or less error.

In its 9 February 1990 reply to the National Marine Fisheries Service, the Commission noted that the level of precision sought should satisfy requirements for statistical reliability. It further noted that since the results of the 1989 squid driftnet monitoring program were not provided, it was not clear how one could conclude that the proposed program would achieve the desired level of statistical reliability. The Commission therefore asked that the data and analyses being used to determine the needed level of observer coverage be provided for it to review. Subsequently, a Commission representative was invited to participate in the negotiations with Japan.

On 31 March 1990, a monitoring and enforcement agreement between Canada, Japan, and the United States was concluded for the 1990 fishing season. Among other things, the agreement provided for (1) placing 10 Canadian, 35 United States, and 29 Japanese observers aboard pelagic squid driftnet fishing vessels; (2) placing 12 North American and 12 Japanese observers aboard the large-mesh driftnet vessels fishing for billfish and tuna; (3) placing satellite transmitters on all Japanese squid and large-mesh driftnet vessels so that fishing vessels could be located on a real-time basis; (4) continuing temporal and areal restrictions on squid fishing vessels to avoid the incidental catch of United States salmon; and (5) monitoring, including for enforcement purposes, Japanese salmon driftnet vessels that were being converted from a high seas mothership operation to a land-based operation.

The 1990 Driftnet Monitoring and Enforcement Agreement with Taiwan -- On 2 February 1990, the National Marine Fisheries Service advised the Commission of ongoing efforts which eventually led, on 23 February 1990, to reaching agreement with Taiwan on placing 14 U.S. observers and 10 Taiwanese observers

aboard Taiwanese driftnet vessels between May and October 1990. The agreement also provided for four additional observers, two from each side, to be moved from ship to ship among the driftnet fishing fleet. Under the 1990 program, all pelagic driftnet fishing vessels were to carry satellite transmitters to verify their location on a real-time basis.

The 1990 Driftnet Monitoring and Enforcement Agreement with the Republic of Korea -- The agreement concluded with the Republic of Korea in October 1989 provided for 13 Korean and 13 U.S. scientific observers to be placed aboard Korean squid driftnet fishing vessels during the 1990 fishing season. It also stated that all driftnet vessels would carry satellite transmitters to verify their location on a real-time basis.

Planning for 1991 and Beyond

As noted above, the United Nations General Assembly Resolution 44/225 calls for a moratorium on driftnet fishing beginning 30 June 1992 unless jointly agreed conservation and management measures based on statistically reliable data can be developed to ensure that unacceptable impacts on marine resources are avoided. The resolution also calls on regional organizations to review available scientific information and agree on further cooperative regulatory and monitoring programs by 30 June 1991. In response to the resolution, a number of nations, including Japan, submitted views to the United Nations. The Japanese submission expressed strong support for continuing driftnet fishing after June 1992.

In view of concerns expressed by the Marine Mammal Commission and other Federal agencies about the impacts of driftnet fishing and in light of the international efforts called for in the U.N. resolution, the State Department convened an interagency group on 5 September 1990 to develop an agreed approach to the review called for in the resolution.

On 26 October 1990, the Commission, in consultation with its Committee of Scientific Advisors, wrote to the State Department referencing the Japanese report to the United Nations. In its letter, the Commission expressed concern about the adequacy of U.S. efforts to prepare for international debate on high seas driftnet fishing beyond June 1992. Noting the United Nations' call for regional reviews by June 1991, the Commission recommended that the Department of State and the National Marine Fisheries Service jointly plan and convene two meetings.

In the first instance, the Commission recommended the immediate convening of a group of U.S. experts on North Pacific driftnet fishing to identify and assess the adequacy of available data on driftnet fisheries, to evaluate the fisheries' effects in the North Pacific Ocean, and to recommend statistical analyses

and other needed actions to decide under what conditions, if any, driftnet fishing might continue. The Commission also recommended that a second of the meetings, a regional review by international experts, be convened in the spring of 1991 to examine (1) available at-sea sighting data; (2) the extent of the ranges 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.

On 13 November 1990, the National Marine Fisheries Service requested Commission comments on proposed negotiating positions for the 1991 agreements on driftnet monitoring and enforcement programs with Japan, the Republic of Korea, and Taiwan. Since results of the 1990 program were not provided, it was not clear how they had been considered in developing the positions and thus the basis was lacking for independently determining if the programs would yield statistically reliable results.

The Commission, in consultation with its Committee of Scientific Advisors, wrote the National Marine Fisheries Service and the Department of State on 7 December 1990. In its letter, the Commission noted that the concerns expressed in its 9 February 1990 letter on the 1990 monitoring program with Japan remained. It recommended that the National Marine Fisheries Service and the State Department convene a group of U.S. experts to review and make recommendations on the proposed 1991 driftnet monitoring programs in light of results from the 1989 and 1990 programs.

During the October-November 1990 meeting of the International North Pacific Fisheries Commission, the Government of Canada offered to host a regional review of driftnet fisheries in the North Pacific in June 1991. The offer, intended to respond to the call for such meetings in Resolution 44/225, obviated the need for the second meeting recommended by the Commission. However, as of early December 1990, the Commission was not aware of any actions having been taken to convene a group of U.S. experts to review available data as recommended in its letters of 26 October and 7 December. Therefore, the Commission again wrote to the State Department on 14 December, recommending that an interagency working group, similar to the one convened by the Department in September, be formally constituted to work on the issue. The Commission provided a suggested list of agency members and working group objectives.

On 13 December 1990, the National Marine Fisheries Service, in providing the Commission with data summaries for the July-August 1989 monitoring program conducted by Japan, Canada, and the United States, noted that these and the June-December 1989 data summary already provided, were all that were available on the 1989 and 1990 programs. On 21 December, the Commission wrote

to the National Marine Fisheries Service, noting that since the summaries did not provide effort data for the total fisheries, one could neither estimate total catch and by-catch nor determine whether the proposed monitoring program included a representative sampling of the fishing effort. The Commission again recommended convening a group of experts to consider the matter.

On 21 December 1990, the National Marine Fisheries Service, in further reply to the Commission's 7 December letter, said that it would provide a detailed response to the Commission's comments within two weeks and invited a Commission representative to consult with its staff to review the technical details of the proposed negotiating position. At the end of 1990, the Commission was expecting the detailed response to its letter early in January.

Driftnet Act Amendments of 1990 and Related Legislation

On 28 November 1990, the President signed into law amendments to the Magnuson Fishery Conservation and Management Act. Among other things, the amendments: prohibit the use of driftnets more than 1.5 miles in length in U.S. waters and their use by any U.S. vessel fishing beyond the U.S. Exclusive Economic Zone; expand upon the provisions of the Driftnet Impact Monitoring, Assessment, and Control Act of 1987; reference the U.N. resolution calling for a moratorium on the use of large-scale driftnets after 30 June 1992 and actions taken by South Pacific nations to prohibit driftnet fishing in the South Pacific Ocean; and establish as U.S. policies the implementation of the moratorium called for in the U.N. resolution, support of the Tarawa Declaration to prohibit driftnet fishing in the South Pacific, and the objective of securing a permanent ban on the use of large-scale driftnets and other destructive fishing practices beyond the exclusive economic zone of any nation.

In referencing the need for increased efforts to monitor, assess, and control adverse impacts of large-scale driftnets, the amendments expand the list of requirements to be included in international monitoring and enforcement agreements. Among other points, they require that:

- all driftnet fishing vessels of signatory nations be equipped with satellite transmitters that provide real-time position information;

- U.S. officials have the right to board driftnet vessels to inspect for violations when they are beyond the exclusive economic zone of any nation;

- all large-scale driftnets, insofar as feasible, be constructed with biodegradable materials that break into segments that do not threaten marine life;

- all driftnets be marked at appropriate intervals to identify the vessel and flag nation from which the driftnet came;

- measures be taken to minimize the take of species protected under international agreements; and

- parties comply with the spirit of other international agreements and resolutions concerning the use of large-scale driftnets beyond the exclusive economic zone of any nation.

In addition, the amendments changed the Marine Mammal Protection Act to prohibit fish from being imported into the United States if (1) they were harvested by large-scale driftnets in the South Pacific Ocean after 1 July 1991 or (2) they were harvested by large-scale driftnets in other high seas waters after 1 July 1992.

Other Actions in 1990

Actions by the United Nations and Related Organizations -- United Nations Resolution 44/225 on driftnets requested the U.N. Food and Agriculture Organization and other organizations within the U.N. system to study large-scale pelagic driftnet fishing and its impact on living marine resources and to report to the Secretary General. In response, the Food and Agriculture Organization convened an international group of experts on large-scale driftnet fisheries at its headquarters in Rome, Italy on 2-6 April 1990. Representatives of Australia, Canada, Fiji, France, Japan, the Netherlands, New Zealand, the Republic of Korea, Thailand, and the United Kingdom were invited.

The meeting produced no consensus as to whether or not driftnet fishing should be continued after the June 1992 date noted in the U.N. resolution. Whereas some participants suggested that a ban would be appropriate if there were great uncertainty as to the effects of driftnet fishing, others suggested that fishing should be allowed unless severe impacts to resources and habitats had been demonstrated. Participants recommended that a follow-up meeting be convened to consider the legal basis for regulating high seas driftnet fisheries under the Law of the Sea Convention.

As a related matter, the United Nations Law of the Sea Office was asked to prepare a report on the effects of large-scale pelagic driftnet fisheries for the General Assembly's 45th Session. To help assemble information for preparing the report, the Office circulated a request in March 1990 to various members and international organizations asking for views and information on large-scale pelagic driftnet fishing and actions called for in the U.N. resolution. In July 1990, the Department of State, in

consultation with the National Marine Fisheries Service, the Marine Mammal Commission, and other Federal agencies, submitted various reports to the Office, including a paper on U.S. policy concerning large-scale pelagic driftnets. The U.S. policy paper expressed strong support for international cooperation in carrying out the actions identified in Resolution 44/225. The report by the Law of the Sea Office was submitted to the U.N. General Assembly on 26 October 1990.

On 21 December 1990, during its 45th Session, the United Nations General Assembly adopted Resolution 45/197, which reaffirmed the points in the 1989 resolution and took note of progress in 1990 to address its provisions.

Other Actions by the United States -- The United States also proposed, encouraged, or joined in actions by numerous international organizations to support the spirit and provisions of Resolution 44/225. For example, as noted later in this Chapter, United States representatives proposed a resolution, adopted by the Commission for the Conservation of Antarctic Marine Living Resources in 1990, which calls upon members not to allow the use of gillnets in the Antarctic Convention Area.

Also, as noted earlier in this Chapter, the U.S. delegation to the June 1990 International Whaling Commission meeting introduced a resolution that expressed strong support for the provisions of Resolution 44/225 and asked that certain relevant information prepared by the IWC, including the report of the Conference on the Incidental Take of Cetaceans, be forwarded to the United Nations. The IWC resolution, co-sponsored by 20 other countries, was adopted at the IWC meeting by consensus.

In 1990, other international actions were taken that were either proposed or supported by the United States. Calls for greater control over the expansion and use of driftnets consistent with Resolution 44/225 were made by the following organizations: the Fisheries Committee for the Organization for Economic Cooperation and Development; the International Commission for Atlantic Tunas; the International North Pacific Fisheries Commission; the North Atlantic Salmon Conservation Organization; the Western Central Atlantic Fishery Commission of the Food and Agricultural Organization; and the World Conservation Organization (formerly the International Union for the Conservation of Nature and Natural Resources).

Actions by Driftnet Fishing Nations -- As noted above, the earlier U.N. resolution on driftnet fishing called for a cessation of driftnet fishing in the South Pacific Ocean by 1 July 1991. In September 1990, the Government of Japan advised the United Nations General Assembly that it had suspended permission for its fishermen to engage in driftnet fishing in the South Pacific Ocean as of 15 August 1990, more than a year in

advance of the date recommended in the resolution. Taiwan also announced its intention to stop driftnet fishing in the South Pacific Ocean by July 1991.

In mid-1990, the Italian Government adopted a ban on the use of large-scale driftnets by all vessels within its waters and by Italian fishing vessels outside of its waters. The action was a significant measure in efforts to control large-scale driftnet fishing for billfish in Mediterranean waters.

The Marine Mammal Commission views high seas driftnet fisheries as serious threats to many marine ecosystems. In 1991, it will continue to provide guidance and assistance to the Department of State, the National Marine Fisheries Service, and other agencies in their efforts to address the issue.

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. Two seal species, the antarctic fur seal and the southern elephant seal, were reduced to near extinction by unregulated hunting in the late 18th and early 19th centuries. Southern Ocean populations of humpback, blue, fin, sei, and sperm whales were severely depleted by poorly regulated commercial whaling that began in the Antarctic in the early 1900s. Populations of antarctic fur seals and southern elephant seals have since recovered although in recent years there have been unexplained declines in several southern elephant seal breeding colonies. It is possible that the Southern Ocean blue whale population is continuing to decline even though commercial exploitation has been prohibited since 1965. Available data are insufficient to determine whether other overexploited whale populations are increasing or decreasing.

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 the regulation of commercial sealing, should it ever resume in the Antarctic. In 1982, the International Whaling Commission agreed to a moratorium on commercial whaling, which took effect in the 1985/1986 whaling season. Although Japan continues to conduct "research" whaling in the Southern Ocean (see the discussion earlier in this Chapter on the IWC), 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*), and the possibility of exploration and development of non-living

resources, including oil and gas (hereafter referred to as mineral resources), pose threats to seals, whales, and other components of the Southern Ocean ecosystem. In some areas, construction of scientific stations and increasing tourism also pose threats.

Antarctic krill is a keystone of the Southern Ocean food web. It is one of the dominant herbivores in the Southern Ocean and the principal component in the diets of numerous species, including fin, blue, humpback, and minke whales; crabeater seals and antarctic fur seals; Adelie, chinstrap, macaroni, and rockhopper penguins; several other species of birds; and several species of fish and squid. Some of these krill consumers are eaten in turn by sperm whales, killer whales, leopard seals, and other higher order predators.

Because of the possible direct and indirect effects of fisheries, mineral development, and other activities on marine mammals, the Marine Mammal Commission has, since its inception in 1974, 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 monitoring programs and for international agreements to effectively regulate sealing, 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 to regulate exploitation of living and non-living resources in the Southern Ocean, and the annual meetings of the Commission and the Scientific Committee established by the Convention on the Conservation of Antarctic Marine Living Resources.

In 1990, Commission representatives participated in numerous interagency meetings to develop U.S. positions for the XIIth Special Antarctic Treaty Consultative Meeting and the 1990 meetings of the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources. In addition, the Commission's Scientific Program Director was a member of the U.S. delegation to the XIIth Special Consultative Meeting. Background information and a description of the results of these and other activities undertaken in 1990 are provided below.

The XIth Special Antarctic Treaty Consultative Meeting

As noted in previous Annual Reports, the Antarctic Treaty Consultative Parties concluded an agreement in June 1988 to

govern mineral resource activities in Antarctica, should such activities ever be deemed acceptable. The agreement -- the Convention on the Regulation of Antarctic Mineral Resource Activities -- provides that no mineral resource activities can take place in the Antarctic unless information is adequate to conclude that the activities would not have significant adverse effects on wildlife, the antarctic environment, or the scientific, historic, aesthetic, and wilderness values of the Antarctic. The agreement also provides for establishment of a Commission to oversee its implementation, regulatory committees to govern mineral resource activities judged to be acceptable, and a Scientific, Technical, and Environmental Advisory Committee to provide advice to the Commission and regulatory committees.

Environmental groups in Australia, France, New Zealand, the United States, and elsewhere believe that the Convention would lead inevitably to mineral resource development in Antarctica and have opposed its ratification. As noted in the Marine Mammal Commission's previous Annual Report, the Government of Australia announced in 1989 that it would not sign the Convention and, with the Government of France, proposed that a special consultative meeting be held in 1990 to negotiate a "comprehensive environmental protection convention" to augment the Antarctic Treaty system.

Prior to the Australian-French proposal, the Chilean delegation to the May 1989 preparatory meeting for the XVth Antarctic Treaty Consultative Meeting had proposed that a special consultative meeting be held in 1990 to consider comprehensive measures for the protection of the antarctic environment. As noted in the Commission's previous report, there was widespread support at the XVth Antarctic Treaty Consultative Meeting to hold a special consultative meeting, but views differed as to the purposes of the meeting. As noted above, France and Australia proposed that the meeting serve to initiate negotiation of a new agreement for protection of the antarctic environment. Chile, the United States, and other countries proposed that the meeting be used to review and determine steps that should be taken to overcome deficiencies in the environmental protection provisions of the existing components of the Antarctic Treaty system -- i.e., the Antarctic Treaty itself, the Agreed Measures for the Conservation of Antarctic Flora and Fauna, the Convention for the Conservation of Antarctic Seals, the Convention on the Conservation of Antarctic Marine Living Resources, the Convention for the Regulation of Antarctic Mineral Resource Activities, and the various recommendations adopted to give effect to the Antarctic Treaty. It was agreed that a special consultative meeting would be held in 1990 to explore all proposals for protection of the antarctic environment.

The Special Consultative Meeting was held in Vina del Mar, Chile, from 19 November to 6 December 1990. Delegations from all

26 Antarctic Treaty Consultative Parties and 10 of the 13 non-Consultative Parties attended the meeting.[1] The meeting also was attended by representatives of the Commission for the Conservation of Antarctic Marine Living Resources, the Scientific Committee on Antarctic Research (SCAR), the Commission of the European Communities, the Intergovernmental Oceanographic Commission, the International Union for the Conservation of Nature and Natural Resources, and the Antarctic and Southern Ocean Coalition.

The meeting recognized the need to develop and adopt legally binding measures for the protection of the antarctic environment and its dependent and associated ecosystems. It generally agreed that these measures should be in the form of a protocol to the Antarctic Treaty, rather than a free-standing legal instrument that might weaken or be viewed as supplanting the Antarctic Treaty. Meeting participants produced a draft protocol and agreed that a second session of the Special Consultative Meeting would be held in Madrid, Spain, in April 1991 to finalize a draft agreement that could be considered for final adoption at the regular Antarctic Treaty Consultative Meeting, to be held in Bonn, Germany, in October 1991.

The draft protocol includes general principles for the protection of the antarctic environment and dependent and associated ecosystems. It would require that each contracting party adopt laws and regulations or take other steps necessary to ensure compliance with its provisions. It would require establishment of a scientific and technical committee to advise the Antarctic Treaty Consultative Meetings of measures needed to effectively implement its provisions. It also would specify a mandatory dispute settlement mechanism and include annexes setting forth specific protective measures.

In addition to the draft protocol, meeting participants prepared draft annexes on environmental impact assessment, marine pollution, waste disposal, and conservation of antarctic flora

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[1] The signatory countries eligible to participate in the taking of decisions under the Antarctic Treaty (i.e., the Antarctic Treaty Consultative Parties) include Argentina, Australia, Belgium, Brazil, Chile, China, Ecuador, Finland, France, Germany, India, Italy, Japan, the Netherlands, New Zealand, Norway, Peru, Poland, the Republic of Korea, South Africa, Spain, Sweden, the Union of Soviet Socialist Republics, the United Kingdom, the United States, and Uruguay. Signatories not eligible to participate in the taking of decisions under the Antarctic Treaty (i.e., non-Consultative Parties) include Austria, Bulgaria, Canada, Colombia, Cuba, Czechoslovakia, Denmark, Greece, Hungary, Papua New Guinea, The People's Republic of Korea, Rumania, and Switzerland.

and fauna. The draft annexes would expand and make legally binding corresponding measures adopted in Antarctic Treaty Recommendations XIV-2 (Environmental Impact Assessment), XV-3 (Waste Disposal), and XV-4 (Prevention, Control, and Response to Marine Pollution). The draft annex regarding conservation of antarctic flora and fauna would update and make legally binding the provisions of the Agreed Measures for the Conservation of Antarctic Flora and Fauna, adopted in 1964.

In the course of the discussions, it was noted that the operation of the Antarctic Treaty system as a whole could be facilitated by the establishment of a permanent secretariat. It also was noted that operation of the system might be facilitated by holding regular Antarctic Treaty Consultative Meetings annually rather than biannually, as has been the practice in the past. It was agreed that establishment of a secretariat and scheduling of meetings should be considered at the Consultative Meeting to be held in Bonn, Germany, in October 1991.

With regard to mineral exploration and development, several delegations, led by Australia, New Zealand, France, Belgium, and Italy, advocated a permanent ban on such activities in lieu of the Mineral Resources Convention concluded in June 1988. Other delegations continued to support adoption of the Convention, which would allow mineral resource exploration and development in certain carefully prescribed circumstances. Still other delegations, including the U.S. delegation, desiring to restore consensus on this issue, expressed willingness to consider a lengthy moratorium on mineral resource activities, provided the 1988 Convention, or a comparable mechanism, is in place for making decisions when and if the moratorium were to expire. In this regard, it was noted that countries should continue to refrain from all mineral exploration and exploitation activities, in accordance with Recommendation IX-1, pending timely resolution of these issues.

Activities Related to Living Resources

In the early 1960s, the Soviet Union and Japan began experimental fisheries for antarctic krill, and the Soviet Union began commercial finfish fishing in the late 1960s. As noted in previous Commission reports, concerns that the developing fisheries, particularly the krill fishery, could affect seals, whales, and other non-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 the two bodies were held in 1982. The Marine Mammal Commission's involvement in negotiation of the Convention

and the first eight meetings of the Commission and Scientific Committee are described in previous Annual Reports.

The 1990 meetings of the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources were held in Hobart, Australia, from 22 October to 2 November 1990.[2] During the meetings, the Commission and Scientific Committee considered a broad range of issues, including finfish conservation, assessment and monitoring of exploited krill stocks, regulation of new and developing fisheries, use of driftnets in the Convention Area, and ecosystem monitoring.

Finfish Conservation -- Vessels from six member nations (Chile, Germany, Japan, the Republic of Korea, Poland, and the Soviet Union) carried out commercial fishing in the Convention Area during the 1989-1990 season. Chile, Germany, Japan, and Korea fished exclusively for krill; Poland and the Soviet Union fished for both krill and finfish. The total finfish catch in the 1989-1990 season was 47,720 tons, down significantly from the 104,409 tons in 1988-1989 and 88,254 tons in 1987-1988.

At the 1990 meeting, 10 new conservation measures for finfish were adopted. As in the past, conservation measures focused on fisheries in the area around South Georgia Island (statistical sub-area 48.3). Both finfish and krill fishing have tended to be concentrated in this area and have resulted in the over-exploitation of several finfish populations, particularly the population of *Notothenia rossii*.

Recovery of depleted fish populations has been hampered by both directed fisheries and the bycatch by other fisheries. To permit recovery, the Commission continued the existing prohibitions on directed fishing for *N. rossii*, *N. gibberifrons*, *N. squamifrons*, *Chaenocephalus aceratus*, and *Pseudochaenichthys georgianus*. The Commission also closed the fishery for *Patagonotothen brevicauda guntheri* in the South Georgia area, established a 26,000-ton total allowable catch of *Champsocephalus gunnari*, and limited the bycatch of protected species in the *C. gunnari* fishery to between 300 and 500 tons. In addition, the Commission established a 2,500-ton total allowable catch of *Dissostichus eleginoides* for the long-line fishery in the South Georgia area.

In addition to the preceding measures, the Commission, acting on the advice of the Scientific Committee, increased the

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[2] Reports of the meetings of the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources can be obtained from the Executive Secretary, Commission for the Conservation of Antarctic Marine Living Resources, 25 Old Wharf, Hobart, Tasmania 7000, Australia.

minimum legal mesh size from 80 to 90 mm for nets used in directed fisheries for C. gunnari; prohibited directed fishing for finfish in the Antarctic Peninsula area and the waters around the South Orkney Islands during the 1990-1991 fishing season; and established total allowable catch levels of 305 and 267 tons for N. squamifrons on Lena and Ob Banks (two seamounts in the Southern Indian Ocean), respectively.

Krill Assessment and Monitoring -- The total catch of krill during the 1989-1990 fishing season was 374,793 tons, down slightly from the catch of 394,531 tons during the 1988-1989 fishing season. As in the past, most of the catch was by Soviet vessels. However, much of the fishing effort shifted from the South Georgia area to the area around the South Orkney Islands. Also, there was a significant catch (30,000 tons) in the Indian Ocean sector.

As noted in the Marine Mammal Commission's previous report, concern about the possible effects of the krill fishery in the South Georgia area led the Living Resources Commission and its Scientific Committee in 1989 to consider imposing a precautionary limit on the krill catch in the area. Views differed as to the need for such a measure and the catch level that would be appropriately conservative. Therefore, to provide a better basis for considering this matter in 1990, the Living Resources Commission requested that the Scientific Committee provide the best possible estimate of krill biomass and potential yield in the South Georgia area, and advice on measures that may be needed to protect krill-dependent predators and young and larval fish in the South Georgia area.

The Commission's request was considered by the Scientific Committee's Working Group on Krill, which met in Leningrad from 27 August to 3 September 1990, and by the Scientific Committee itself. Both groups concluded that available information was insufficient to estimate the biomass or potential yield of krill in the South Georgia area, or what effect the krill fishery may have had, or be having, on krill, krill predators, and other species in the area.

Given these uncertainties, most members of the Commission and Scientific Committee advocated setting a precautionary limit on the krill fishery again in 1990. Japan and the Soviet Union opposed such an action, noting that they did not intend to significantly increase their fishing effort or krill catches in the near future and that there was no reason to believe that past or present krill catches had had adverse effects on even local populations of krill or krill predators. It was agreed that this matter should be kept under continuing review.

New and Developing Fisheries -- In 1990, the National Marine Fisheries Service issued a permit authorizing a Seattle-based

fishing vessel to conduct exploratory fishing for king and stone crabs in sub-areas 48.1, 48.2, 48.3, and 48.4 of the Convention Area. Several members of the Scientific Committee expressed concern that this fishery had been authorized without prior knowledge of the demographic parameters of the crab species, that the authorized catch of 1,000 tons could have a significant adverse impact on the affected populations, and that the intended method of fishing (crab pots) and use of traps to obtain bait could result in the taking of juvenile stages of several protected fish species.

The United States explained to the Living Resources Commission's satisfaction that the fishery was experimental and that it intended to place an observer aboard the vessel and to report the results at the next meeting. As a result of these and related discussions, the Commission agreed that, in the future, new fisheries should be structured so as to help develop an information base needed to ensure that the fisheries would not have unacceptable impacts as defined by Article II of the Convention. It also was agreed that, at its 1991 meeting, the Commission would consider the elaboration of measures to ensure that fisheries do not develop faster than the information base concerning the life history and demography of the affected species.

Prohibition of Driftnet Fishing -- As noted earlier in this chapter, driftnet fisheries in the North Pacific and elsewhere may be having significant adverse effects on marine mammals, seabirds, and other non-target species, as well as on the squid and finfish species targeted by the fisheries. In December 1989, the United Nations adopted a resolution calling for detailed assessments of the effects of such fisheries and a moratorium on their expansion into new areas. In light of this resolution, and a recommendation by the Scientific Committee on Antarctic Research that driftnet fishing be prohibited in the Convention Area, the Living Resources Commission adopted a resolution prohibiting the use of driftnets in the Convention Area.

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 procedures be established to afford special protection, when needed, to sites where land-breeding krill predators are being monitored.

The working group met for the fifth time in Stockholm, Sweden, from 6 to 13 September 1990, and its report was presented to the Scientific Committee at its October 1990 meeting in Hobart. The working group proposed that priority be given to developing procedures for factoring data on predator populations into the formal management deliberations of the Scientific Committee and Commission, that members submit monitoring data by 30 June each year, and that these data be analyzed annually to determine the magnitude, direction, and significance of overall and year-to-year trends in the predator parameters being monitored. It also recommended that steps to taken to protect sites where long-term monitoring of fur seals and seabirds is being done.

The Scientific Committee endorsed the working group's proposals and noted that the work of this group and the Working Group on Krill must be carefully coordinated. The Scientific Committee also pointed out the need for data on other important prey species being taken commercially, most notably Pleuragramma antarcticum and Electrona carlsbergi. The Scientific Committee recommended and the Commission adopted procedures for protecting land-based sites where colonies of seabirds and seals are being monitored as part of the ecosystem monitoring program.

The 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 to implement 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.[3]

In 1990, scientists from or supported by the National Marine Fisheries Service conducted research to help determine the relationships between antarctic krill, their predators, and key environmental parameters. Field studies were conducted aboard the NOAA ship Surveyor around Elephant Island and near Ross Island in the Weddell Sea, and at land based sites near Palmer Station and at Seal Island. Additional studies will be carried on in 1991 from the NOAA ship Surveyor and at land-based sites along the Antarctic Peninsula.

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 a 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 concerning funding and available ship support were preventing effective long-term planning and the ability of the United States to influence the direction of and participate in coordinated, multi-national research programs. In 1991, the Commission will continue to work with the National Marine Fisheries Service, the National Science Foundation, the Department of State, and other organizations to facilitate development of both basic and directed marine research programs in the Antarctic.

Continuing International Interest in Antarctica

As noted in previous Commission reports, international interest in Antarctica has increased in recent years. This increase reflects recognition of the unique scientific value of Antarctica, growing concern about global warming and the impact that human activities are having on the world's environment, and recognition of the influence of Antarctica on global climate and weather patterns. The increased interest also reflects efforts by a number of countries to identify and exploit undeveloped fishery resources in areas not under national jurisdiction and speculation about potential oil, gas, and other non-living

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[3] Details of the National Marine Fisheries Service's Antarctic Marine Living Resources Research Program can be obtained from the Director, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive, P.O. Box 271, La Jolla, California 92038.

resources in Antarctica. There also is a growing tourist industry in Antarctica.

Speculation about possible non-living resources, triggered by the 1981 decision of the Antarctic Treaty Consultative Parties to elaborate a regime to govern possible mineral resource activities in Antarctica, appears to have been a major factor in stimulating a 1983 initiative by Malaysia to involve the United Nations in antarctic matters. In 1990, the "Question of Antarctica" was raised again during the 45th session of the United Nations General Assembly. Subsequently, two resolutions were adopted -- one expressing concern about the continued participation of South Africa in the meetings of the Antarctic Treaty Consultative Parties and the other continuing to express the view that antarctic issues should be considered within the context of the United Nations system, rather than the Antarctic Treaty system. Among other things, the latter resolution requests that the Secretary General undertake a comprehensive study "on the establishment of a United Nations-sponsored station in Antarctica with a view to promoting co-ordinated international co-operation in scientific research for the benefit of mankind, particularly the importance of Antarctica to the global environment and ecosystems, as well as to act as an early-warning system on climate change and accidents...."

The Marine Mammal Commission believes that the Antarctic Treaty and the related agreements that form the Antarctic Treaty system provide the best basis for protecting and conserving marine mammals and their habitats in the Southern Ocean. In 1991, 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, and other Federal agencies to help improve and implement the Antarctic Treaty system. In this regard, the Commission will pay particular attention to preparations for the second session of the XIth Special Antarctic Treaty Consultative Meeting, to be held in Madrid in April 1991 to elaborate a protocol for the protection of the antarctic environment.

The Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention)

The Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, commonly known as the Cartagena Convention, is part of the Caribbean Environment Program, one of 11 Regional Seas Programs developed and sponsored by the United Nations Environment Program. Regional Seas Programs seek to protect marine resources and habitats that are vulnerable to human activities by encouraging nations with interest in particular regions to commit financial and human

resources to cooperative research and management programs. Each Regional Seas Program includes an action plan that outlines needed environmental conservation projects (e.g., watershed management, oil spill contingency planning, public awareness campaigns, environmental impact assessment, and protection and recovery of endangered species) and a convention to provide a framework for agreement among contracting parties to cooperate in protecting and managing the regional marine environment.

As noted in the Commission's previous Annual Report, the Action Plan for the Caribbean Environment Program was developed and approved in 1981. The Cartagena Convention, which provides the complementary legal framework for the Action Plan, was concluded in 1983 and entered into force in 1986. Eighteen nations have ratified or acceded to the Convention and its protocol on combatting oil spills. At the end of 1990, 35 states and territories, including the United States, were participating in the Caribbean Environment Program.

The Convention calls for cooperation in controlling marine pollution from ships, land-based and atmospheric sources, man-made structures at sea, and activities involving exploration and exploitation of the seabed; protecting and preserving rare and fragile ecosystems and the habitat of depleted, threatened, and endangered species; responding to emergencies caused by pollution; assessing the potential impacts of proposed activities on the environment and notifying any nation that could be affected by such impacts; and cooperating in scientific and technical matters, especially in exchange of data, that may be pertinent to the objectives of the Convention. The Convention provides for concluding detailed agreements or protocols, as needs arise, to implement or augment it. To date, only the previously mentioned protocol on combatting oil spills has been adopted.

Article 10 of the Convention calls upon Contracting Parties to "take all appropriate measures to protect and preserve rare or fragile ecosystems, as well as the habitat of depleted, threatened, and endangered species." When the Convention was concluded in March 1983, a resolution was adopted calling upon the Parties to develop a protocol to provide protection for special areas and wildlife in the wider Caribbean region. The resolution encouraged "competent governmental and non-governmental organizations to prepare proposals for submission to the first meeting of the Contracting Parties after entry into force of the Convention."

As noted in the Commission's previous Annual Report, the Parties decided at their first meeting, held in Guadeloupe on 26-28 October 1987, to develop a Protocol on Specially Protected Areas and Wildlife. As a first step, a meeting of experts was held in St. Croix, U.S. Virgin Islands, on 24-26 October 1988 to

prepare a draft protocol for consideration at the 1989 meeting of Parties. Commission efforts to assist in preparing for the St. Croix meeting are described in its Annual Report for calendar year 1988.

Although progress was made, the St. Croix meeting did not produce an agreed protocol text. A second meeting of experts was held in Kingston, Jamaica, on 19-23 June 1989 to continue efforts to develop a draft protocol. This meeting produced a draft text which most participants believed could be used as the basis for concluding the protocol at the next meeting of the Contracting Parties, then scheduled to be held in Cartagena, Colombia, on 23-26 October 1989.

The meeting scheduled for Colombia in October 1989 was canceled and rescheduled for Kingston, Jamaica, on 15-18 January 1990. To help Parties prepare for the meeting, the Coordinator of the Caribbean Environment Program provided lists, prepared by the World Conservation Monitoring Center, identifying species of flora and fauna in the wider Caribbean region that have been afforded, or might require, special protection. The lists were intended to be used in developing three annexes to the protocol which, at that time, were expected to be adopted at the same time the protocol was adopted.

By letter of 3 January 1990, the Marine Mammal Commission provided comments on the lists to the Department of State. The Commission noted that the lists classified species in ways that could not be directly translated into the classifications used in the draft protocol and that they therefore would be of little value in reaching agreement on species that should be included in the three annexes. The Commission also questioned whether the protocol, as drafted, would obligate the United States to prohibit taking of endangered and threatened species that otherwise could be authorized under the Endangered Species Act and other U.S. legislation.

With respect to marine mammals, the Commission noted that seven marine mammal species, listed as endangered under the Endangered Species Act, would be appropriate for listing on Annex II (endangered and threatened animal species). The Commission also noted two other marine mammal species, listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, that might merit listing in Annex II of the Protocol. The Commission provided a paper indicating the species of marine mammals that might be found in the wider Caribbean region seasonally or year-round.

At the January 1990 meeting in Kingston, a final text was agreed to and 13 countries signed the Protocol for Specially Pro-

tected Areas and Wildlife of the Wider Caribbean Region.[4] Among other things, the Protocol provides for the establishment of a Scientific and Technical Advisory Committee and for adopting annexes listing species of flora and fauna to be afforded different levels of protection under the Protocol. The Protocol will enter into force when formally ratified by 9 of the 13 signatories.

Recognizing that the Protocol might not come into force for several years, the Contracting Parties adopted a resolution at the January 1990 meeting calling for the establishment of an Ad Hoc Group of Experts to function as an interim Scientific and Technical Advisory Committee on Protected Areas and Wildlife. The resolution called upon each Contracting Party to designate an appropriately qualified expert to serve as a contact person and to participate in the ad hoc group. It also called upon the Regional Coordinating Unit of the United Nations Environment Program to compile, by 30 April 1990, a proposed list of species to be included in the three Protocol annexes and for the ad hoc group to meet by October 1990 to consider the draft list and, by 15 November 1990, prepare recommended annexes for consideration and adoption by the Parties.

As directed by the resolution, the Coordinator of the Caribbean Environment Program on 11 July 1990 distributed proposed lists of species for inclusion in the Protocol annexes. At its 5-8 November 1990 meeting in Martinique, the Ad Hoc Group of Experts used these lists to draft annexes for consideration by the Contracting Parties at their next meeting, to be held in Kingston, Jamaica, on 1-2 May 1991.

During preparations for the November 1990 meeting in Martinique, the Fish and Wildlife Service, the National Park Service, and the National Marine Fisheries Service -- the U.S. agencies that would have primary responsibility for implementing the Protocol -- raised questions about the statutory authorities under which they would be able to provide the required degree of protection to some of the species included on the draft list. These and related questions were considered during a series of interagency meetings convened by the Department of State in the autumn of 1990 to develop positions for the 5-8 November meeting. Commission representatives participated in these meetings, during which it was agreed that the Endangered Species Act provided sufficient authority for implementing the Protocol with respect to species listed as endangered or threatened under the Act. It also was agreed that the Lacey Act and the Convention on

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[4] The following countries signed the Protocol: Antigua and Barbuda, Colombia, Cuba, France, Guatemala, Jamaica, Mexico, the Netherlands, Saint Lucia, Trinidad and Tobago, the United Kingdom, the United States, and Venezuela.

International Trade in Endangered Species of Wild Fauna and Flora provided adequate authorities for implementing the Protocol for certain other species.

On 3 October 1990, the Commission wrote to the Department of State to point out that the Marine Mammal Protection Act is functionally equivalent to the Endangered Species Act in many respects and should be considered an adequate authority for implementing the Protocol with respect to marine mammals. The Commission noted that, while the definitions of "take" in the Marine Mammal Protection Act and the Endangered Species Act differ somewhat, both statutes provide general prohibitions against the take of covered species. It also noted that each statute sets forth certain exceptions to the prohibitions on taking, all of which appear to be consistent with exceptions set forth in the Protocol.

The Fish and Wildlife Service's Office of Scientific Authority compiled agency comments on the draft species list. By letter of 22 October 1990, the Commission reiterated the views set forth in its letters of 3 January and 3 October 1990 to the Department of State. The Commission also noted that all cetaceans are listed on Appendix I or Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora and that authority exists under the Marine Mammal Protection Act to protect these and other marine mammals based on the merits of any proposed listing.

At their first meeting on 5-8 November 1990, the Ad Hoc Group of Experts agreed that all species of sea turtles and marine mammals in the wider Caribbean region should be afforded complete protection and that certain species of critical importance to fragile ecosystems, such as corals, mangroves, and seagrasses, should be afforded some protection. The group agreed on draft annexes to be considered at the 1-2 May meeting of Contracting Parties.

In 1991, the Commission will continue to review and provide advice on specific measures needed to implement the Protocol with respect to marine mammals.

CHAPTER V

MARINE MAMMAL DIE-OFFS

Since the late 1970s, there appears to have been an increase in the incidence of abnormal marine mammal mortalities, most of which are described in previous Annual Reports. Examples are:

- In 1978, at least 50 endangered Hawaiian monk seals died on Laysan Island possibly due to ciguatoxin poisoning.

- Between December 1979 and October 1980, more than 400 harbor seals, most of them immature, died along the New England coast of acute pneumonia caused by an avian influenza virus.

- In February and March 1982, more than 30 manatees died in the vicinity of Fort Myers, Florida, apparently as the result of incidentally eating tunicates containing toxins from a red tide.

- In late November 1987, 14 humpback whales died in Cape Cod Bay after eating Atlantic mackerel containing saxitoxin, a dinoflagellate neurotoxin responsible for paralytic shellfish poisoning in humans.

- Between June 1987 and January 1988, more than 700 bottlenose dolphins died along the central and south Atlantic coast of the United States due possibly to consumption of fish containing toxins from a red tide originating in the Gulf of Mexico.

- From April through October 1988, more than 17,000 harbor seals died in the North Sea from a previously unknown morbillivirus that caused symptoms similar to canine distemper.

The Commission played a major role in organizing efforts to determine the cause, magnitude, and biological significance of the bottlenose dolphin die-off along the U.S. mid-Atlantic coast in 1987 and 1988. These efforts and the investigation itself are described in the Commission's Reports for calendar years 1987, 1988, and 1989.

In 1990, there were two incidents of unusually high bottlenose dolphin mortality in the northern Gulf of Mexico. There also was a catastrophic die-off of striped dolphins in the western Mediterranean. Commission efforts to facilitate actions

necessary to assess the magnitude, biological significance, and cause or causes of these unusual mortalities are described below.

Die-Off of Bottlenose Dolphins in the Gulf of Mexico

In January 1990, 23 dead bottlenose dolphins were found washed up on beaches in Matagorda Bay, Texas. Subsequently, unusually high numbers of dead bottlenose dolphins were found washed up on beaches in northwest Florida, Alabama, Mississippi, and Louisiana, as well as Texas. By 30 April, 274 carcasses had been recovered or reported along the Gulf coast from Tampa Bay, Florida, to the U.S.-Mexican border.

The Commission learned of the increased strandings in late February; it asked the National Marine Fisheries Service to review progress in its investigation during the 8-10 March 1990 meeting of the Commission and its Committee of Scientific Advisors. It learned that in late February the Service had started efforts to determine the magnitude and cause or causes of the increased mortality. It was also learned that the investigation was being coordinated by the Service's Southeast Fisheries Science Center, and that the Service was considering suspending live captures and removals of bottlenose dolphins from the Gulf of Mexico for purposes of public display and scientific research.

Based on the information provided, the Commission was unable to assess the adequacy of the ongoing investigation. Therefore, by letter of 16 March 1990, the Commission recommended that the Service immediately convene a group of experts -- to include an epidemiologist, a veterinary pathologist, a wildlife biologist familiar with bottlenose dolphins, and a toxicologist -- to evaluate the adequacy of the research protocols under which the investigation was being conducted. As noted in Chapter II, the Commission also recommended that all taking of bottlenose dolphins from Gulf waters for purposes of scientific research or public display be suspended until it could be determined that (1) the mortality was not being caused by a contagious disease that could be transmitted to captive populations, and (2) none of the affected population stocks had been reduced below its maximum net productivity level.

By letter of 30 March 1990, the National Marine Fisheries Service advised the Commission that a meeting had been held on 19 March to discuss research protocols, that written protocols were being prepared, and that the Service concurred with the Commission that it would be desirable to have an independent panel review the protocols. Subsequently, the Director of the Service's Office of Protected Resources consulted with the Commission on the composition of, and the terms of reference for, the independent review panel.

By letter of 6 April 1990, the Commission advised the Service of the types of background information that should be provided to the panel. It also recommended that, if the Service had not already done so, it send a representative subset of tissues from the stranded bottlenose dolphins to appropriate laboratories for standard histopathology and viral, bacterial, toxicological, and contaminant screens. The Commission further recommended that, if they were not already being done, surveys be undertaken in and near areas where bottlenose dolphins are taken for purposes of public display or scientific research to (1) obtain as reliable estimates as possible of the number of dolphins, by age and sex, that had died in each of these areas, and (2) determine the number of live animals present in each of the areas so as to estimate the proportion of animals affected.

The review recommended by the Marine Mammal Commission was held on 14-15 May 1990. At the request of the National Marine Fisheries Service, the newly formed Gulf of Mexico Die-Off Review Team was chaired by a member of the Commission's Committee of Scientific Advisors. To facilitate the review, the Commission had compiled and, on 10 May, provided to the Review Team information on previous marine mammal die-off investigations. In addition, the staff of the Service's Southeast Fisheries Science Center had prepared a report on the status of the investigation.

The Center's status report indicated that: a total of 274 dead dolphins had been recovered since the first of the year (161 in Texas, 35 in Mississippi, 33 in Alabama, 23 in Louisiana, and 22 in northwest Florida); the Center had initiated beach and aerial surveys to locate and recover dead and dying animals; and the Center was collecting and providing tissue samples to a variety of Federal, state, and private institutions for biotoxin, contaminant, viral, and bacteriological analyses. The report also noted that the 23 dolphins found in January in Matagorda Bay, Texas, might have died as a result of unusually cold weather in late December and that perhaps the increase in strandings, in at least some areas, might have been due to better reporting of strandings rather than higher mortality.

From the information provided during the 14-15 May meeting, the Review Team concluded that: the deaths of the 23 dolphins in Matagorda Bay may well have been caused by unusually cold weather; subsequent deaths, at least along the Texas coast, appeared higher than normal for the period January-March and merited further investigation; and the investigation started by the Service, while conceptually an adequate start, had been hampered by organizational, logistic, and funding problems. Among other things, the Team noted a number of deficiencies, among them that: there were no standard procedures or protocols in place to guide such investigations; of necessity, the investigation had had to rely heavily upon volunteers within the Southeast Marine Mammal Stranding Network; and a determination

had not yet been made as to what histopathology, virology, bacteriology, and toxicology screens should be done.

The Team recommended that a number of things be done to improve and expedite the ongoing investigation and to prepare to respond to future die-offs. Among other things, it recommended (1) that steps be taken immediately to ensure that key members of the Gulf of Mexico Stranding Network were aware of (a) the need for tissue samples and cultures from freshly dead animals and (b) how such materials should be collected, stored, and transported; (2) that government and private organizations in Mexico be contacted to determine whether unusual numbers of dolphins were dying in Mexican as well as U.S. waters; (3) that, if higher than normal numbers of animals were dying in Mexico as well, a coordinated international investigation be started; (4) that oceanographic data be compiled and analyzed to determine whether the increase in strandings might be due to a higher than normal proportion of dead animals washing up on beaches, rather than an increase in mortality; (5) that arrangements be made to have equipment and personnel ready to promptly capture and collect samples from any distressed animals reported; (6) that the Environmental Protection Agency, the Minerals Management Service, the National Ocean Service, the Fish and Wildlife Service, and relevant state and private organizations be consulted to identify contaminants from point and non-point sources which might have caused or contributed to the mortality; (7) that representative samples of tissues from stranded animals be sent immediately to the Environmental Protection Agency for preliminary contaminant screens and to the University of Miami for brevetoxin analysis; and (8) that the results of the preliminary histopathology, viral, bacterial, and fungal screens be reviewed as soon as they are available to determine what follow-up work should be done.

To better prepare for future die-offs, the Team recommended that criteria and procedures be established to assist in deciding whether and how to respond to apparent unusual events; that a contingency plan and contingency fund be established to permit prompt and appropriate investigation of unusual events; that steps be taken, including appointment of a national coordinator, to improve operation of the Regional Marine Mammal Stranding Networks; and that a groups of experts be constituted to assist the Service in determining when abnormal mortalities are occurring, when to mobilize a response, and what measures to take. It also recommended that necessary actions be taken to resolve critical uncertainties concerning the possible effects of natural and anthropogenic toxins on marine mammals and the ecosystems of which they are a part.

The increases in bottlenose dolphin strandings that were observed in the winter and early spring in the northern Gulf of Mexico did not continue into the late spring and summer.

However, between 31 October and 26 November 1990, 13 dead bottlenose dolphins were found on beaches near Galveston, Texas. Past stranding records indicated that an average of about one animal normally would strand in that area during that period. Concerned that this might be part of another episode of increased mortality, the Commission, by letters of 5 and 13 December 1990, recommended that the Service treat the unusually high mortality level as a possible precursor to a larger die-off; that the mechanisms be put in place immediately to ensure a strong response, should such become necessary; that the Service promptly designate a response team leader within the Service; that the Gulf of Mexico Die-Off Review Team be immediately reconvened; that the Service invite additional outside experts to join the Review Team in its deliberations; that the Team examine how carefully and the extent to which its earlier recommendations had been followed; that the Team examine the laboratory results from the earlier die-off for indications as to what might be at play now; that the Team be satisfied that the Service is taking the necessary steps to allow the stranding teams to respond adequately; that, if it had not already done so, the Service prepare written protocols for collection through analysis; and that institutions to carry out analyses and archive material be agreed upon. The Service concurred with the Commission's recommendations and reconvened the Review Team and other experts on 18 December 1990.

Participants in that review 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. They concluded that the Texas Marine Mammal Stranding Network was adequately investigating the present strandings, that the situation should be kept under continuing review, and that the response should be augmented if higher than usual numbers of dead dolphins were to continue to come ashore. They noted that the Service had taken positive steps to improve organization and operation of the Regional Marine Mammal Stranding Networks and had started, but not yet finished, developing standard protocols for the collection, storage, transport, and analysis of tissues from stranded marine mammals. They also noted that: arrangements had not yet been made to analyze all of the tissue samples collected during the spring 1990 die-off; no results of any tissue analyses from the January-March die-off were available; the Service had been unable to find out whether there had been comparable increases in bottlenose dolphin mortalities in Mexican waters in early 1990; and no cooperative programs had been developed with Mexican scientists.

Participants recommended that the Service immediately make arrangements to complete at least preliminary histopathology and contaminant analysis of tissue samples collected from bottlenose

dolphins that died in the spring of 1990. Noting the importance of developing standard protocols and priorities for collection of information during unusual events, they recommended that working groups be constituted to draft protocols for selecting, collecting, and transporting samples for (1) general life history studies; (2) gross pathology; (3) microbiology (i.e., viral, bacterial, and fungal isolations); and (4) toxicological screens. They recommended that the Review Team and others be convened again in early April to review the draft protocols, the results of the investigation of the spring 1990 die-off in the Gulf of Mexico, and the results of the ongoing efforts to develop an effective plan for dealing with future events.

Striped Dolphin Die-Off in the Western Mediterranean Sea

In mid-July 1990, boaters and fishermen began sighting dead striped dolphins (Stenella coeruleoalba) floating at sea along the Mediterranean coast of Spain. Over the next three months, at least 250 dead dolphins were found along Spain's east coast. By late 1990, dead dolphins were being found along the southern coasts of Spain and France, and the northwest coast of Italy. By the end of the year, the total number of animals actually recovered included 480 dolphins in Spain, 200 in France, and at least 60 in northern Italy. Additional dead dolphins had been reported in other parts of the western Mediterranean, including the north coast of Morocco and waters far from shore, suggesting that the recorded deaths may represent only a small portion of the actual deaths.

In October 1990, the Commission provided funds for two marine mammal veterinarians, experienced in investigating marine mammal mortalities, to travel to Spain. The purposes of the site visit were to provide the Spanish investigators information on the nature and results of previous die-off investigations; to obtain a first-hand report on the ongoing investigation; and to examine the striped dolphin die-off for any significant similarities to other die-offs, similarities that might be obvious only to persons who had participated previously in such studies. The Commission also provided funds for the Spanish team leader to hire two assistants to help manage the collection, handling, and disposition of tissue samples from dead animals.

Preliminary histopathologic analyses of tissues from some of the first dolphins necropsied revealed lung lesions characteristic of viral infections. Subsequent analyses confirmed the presence of a morbillivirus and a herpesvirus. Morbilliviruses are a small, closely related group of viruses that include the viruses that cause human measles and canine distemper. A morbillivirus, similar to the one that causes canine distemper, was determined to have been the cause of death of 17,000 harbor seals in the North Sea in 1988. Nearly all the striped dolphins

examined also had liver lesions, apparently unrelated to morbilliviruses, and high levels of polychlorinated biphenyls (PCBs), suggesting that other factors may have caused or contributed to the mortality.

In October and November 1990, six Mediterranean monk seals were reported dead, two in Spain and four in Morocco. This species is the most endangered of the world's seal species, and the reports raised concerns that monk seals, as well as striped dolphins, were being affected. Tissue samples from the two carcasses found in Spain were collected for analysis. Both carcasses were too decomposed to determine cause of death. No traces of morbillivirus were found in the tissue samples from either animal, and no tissue samples from the four animals that died off Africa were available for analysis.

At the end of 1990, the die-off of striped dolphins appeared to be continuing and spreading to additional areas in the Mediterranean. There were, however, no further reports of dead monk seals.

Improvement of the Regional Marine Mammal Stranding Networks

Marine mammals that strand alive or die and wash up on beaches can provide valuable and sometimes unique sources of information concerning the distribution, relative abundance, morphology, diseases, and natural history of marine mammals. In some cases, they may be good indicators of the status of a marine mammal population and the ecosystem of which it is a part. They can also contribute to studies to assess and monitor the fate and effects of environmental contaminants (e.g., naturally occurring hydrocarbons; man-made hydrocarbons, such as PCBs and refined petroleum products; fertilizers, herbicides, and pesticides; lost and discarded fishing gear; etc.), and they can be of value in assessing the species and numbers of marine mammals being taken incidental to commercial fishing operations.

In August 1977, the Commission sponsored a workshop to determine what might be done to learn more from stranded marine mammals. Among other things, workshop participants recommended that regional networks, corresponding to the regional offices of the National Marine Fisheries Service, be established to facilitate reporting, recovery, and study of both live- and dead-stranded marine mammals (see Appendix B, Geraci and St. Aubin 1979). In response to the workshop recommendations, loosely organized stranding networks were established in the northeast (New England, New York, New Jersey, Maryland, and Virginia), the southeast (North and South Carolina, Georgia, Florida, Alabama, Texas, Puerto Rico, and the U.S. Virgin Islands), the southwest (California), the northwest (Oregon and Washington), Alaska, and Hawaii. Each volunteer network has a designated individual or

organization that functions as the coordinator. Members of the networks are authorized to collect dead stranded animals and their parts, and, in some cases, to rescue and rehabilitate animals that strand alive. Rescue efforts are authorized by either scientific research permits or letters of authorization issued by either the National Marine Fisheries Service (for cetaceans and pinnipeds except walrus), or by the Fish and Wildlife Service (for manatees, sea otters, walruses, dugongs, and polar bears). The general objectives of the networks are to:

- minimize the possible threats of beached and stranded marine mammals to human health and safety;
- minimize the pain and suffering of live-stranded animals;
- derive the maximum possible scientific and educational benefit from both live- and dead-stranded marine mammals; and
- establish the long time series of data necessary to determine natural variation and detect changes in seasonal mortality levels and patterns, contaminant loads, and other variables that may be indicators of the status of coastal marine mammal populations and the ecosystems of which they are a part.

The groups of volunteers who make up the stranding networks have made great contributions. They have, however, been hindered in their efforts because of inadequate training, equipment and funding; at times a lack of interest in routine strandings; volunteer turnover; and inconsistent coordination and communication among regional coordinators and volunteer network members.

In 1989, the Marine Mammal Commission provided funds for workshops to review the organization and administration of the networks and identify ways in which they might be improved; develop teaching materials to show key network members the types of data and specimen material that should be collected from dead stranded animals and how they should be collected; and determine the amounts of money that would be needed to maintain basic stocks of expendable equipment and supplies and to reimburse volunteers for travel expenses essential to the effective operation of the networks. The Commission also gave money to the Texas Marine Mammal Stranding Network to buy expendable equipment and supplies.

The National Marine Fisheries Service, in recognition of the regional stranding networks' value, is doing a comprehensive review to identify steps that should be taken, nationally and within each region, to improve operation of the networks. In

cooperation with the National Institute of Standards and Technology and possible user agencies such as the Minerals Management Service and the Environmental Protection Agency, it has also taken steps to establish a National Marine Mammal Tissue Bank. In 1990, the Service, in consultation with a group of experts, developed a protocol for collecting tissue samples for deposit in the tissue bank, and conducted a pilot study in the Northeast to test the protocol and obtain tissues from incidentally caught harbor porpoise and mass-stranded pilot whales. The group of experts suggested studies to determine how detection of anthropogenic contaminants in marine mammals is affected by such things as the sections of organs sampled (e.g., the left vs. the right lobe of the liver), length of time after death before tissue samples are collected, and length of time that tissue samples are kept before the contaminant analyses are done. These studies will be conducted in 1991.

Recognizing that the Service's ability to implement improvements in the regional stranding networks and to investigate unusual marine mammal mortalities have suffered from a lack of funds, Congress provided $400,000 in the Service's FY 1991 budget for this purpose. In early 1991, the Commission, in consultation with its Committee of Scientific Advisors, will provide advice to the Service on how these funds might best be utilized.

Development of a Coordinated Interagency Die-Off Response Plan

Central to the Commission's concerns about the marine mammal die-offs, both explained and unexplained, have been the issues of improved response, maximizing the amount learned from each event, and making sure that what is learned is shared. In addition to undertaking the activities, making the recommendations, and providing support in selected areas as described above and in earlier Annual Reports, the Commission devoted considerable effort in 1990 to interagency consultations on the preparation of a national response mechanism. In the early spring of 1991, the Commission expects to provide other agencies a draft of a document that should serve as the basis for a formal interagency response mechanism.

CHAPTER VI

IMPACTS OF MARINE DEBRIS

Plastics and other synthetic materials lost or intentionally discarded into the marine environment can kill or injure marine life. For example, derelict fishing nets and traps, rope, line, strapping bands, and other such debris entangle marine mammals, seabirds, turtles, fish, lobsters, and crabs. Marine animals also confuse floating plastic bags, small plastic fragments, and other debris with natural prey and ingest them. Among the affected species are animals considered endangered or threatened and species of commercially valuable fish. Indeed, some of the marine animals killed and injured due to entanglement or ingestion of debris are among the country's most imperiled marine species (e.g., Hawaiian monk seals, right whales, humpback whales, West Indian manatees, Kemps Ridley sea turtles, and green sea turtles). Marine debris also poses 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 ways to better assess and mitigate problems caused by marine debris for marine mammals and other species. Among other things, the Commission provided the initial funding and terms of reference for the first international symposium on the issue in 1984. These and other past efforts are discussed in previous Annual Reports. Activities undertaken by the Commission and others in 1990 are discussed below.

Background

The amounts of marine debris have increased significantly in many areas since the 1950s. Among the factors contributing to this increase are the three which follow. First, synthetic materials which degrade slowly at sea have become the material of choice for manufacturing more and more items that are commonly lost and discarded at sea. As a result, the total debris load in a given area at a given time reflects an amount of material lost and discarded over significantly longer periods of time than was the case prior to 1950. Second, because synthetic materials are often less costly than the natural materials they replaced and because they are often used to make items intended only for one-time use (e.g., plastic bags, bottles, and cups), economic incentives for re-use or avoiding loss are reduced. Third, the number of ships and coastal residents responsible for losing and discarding debris have increased substantially in many areas.

As the amount of synthetic debris increases, so too does its threat to marine life. 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 synthetic objects may have digestive tracts blocked, stomach linings damaged, or feeding drives lessened by a false sense of satiation. Because of its increased strength and durability, synthetic materials are more likely to kill or injure animals then natural materials used previously. For example, plastic sheeting is more likely to remain lodged for long periods in an animal's digestive tract than paper. Similarly, monofilament netting will retain its ability to entangle animals over a much longer period than will cotton netting.

Until recently, the magnitude of the these effects has been masked by the size of the ocean, the deceptively simple nature of the threat, the erroneous perception that encounters between marine animals and debris are unlikely, and the apparent absence of large numbers 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 in coastal areas, drift lines, and current margins where marine mammals and other species are most likely to occur. In addition, many species actively seek out marine debris because of associated prey species attracted to the cover it provides, because it represents an object of play, or because the debris itself resembles natural prey. Thus, encounters between debris and certain marine species or age groups within species are not random events and may be relatively common. At the same time, evidence of encounters may not be readily apparent because affected animals may sink or be held below the surface, be eaten by predators, or be scattered by their own movements after becoming entangled or ingesting debris and before dying.

To provide a better basis for assessing the extent to which marine life was being affected by marine debris, the Commission recommended in 1982 that the National Marine Fisheries Service convene a workshop to examine information on the problem. The Service agreed and, with terms of reference and initial support provided by the Commission, it convened the International Workshop on the Fate and Impact of Marine Debris. The Workshop, held 27-29 November 1984 in Honolulu, Hawaii, was the first attempt to carry out a thorough review of the issue. Its findings, discussed in previous Annual Reports, alerted many governmental and non-governmental groups to the fact that marine debris constitutes a serious, widespread form of marine pollution.

Prompted by the Workshop's results, Congress began appropriating money to the National Marine Fisheries Service in 1985 to begin developing and implementing a responsive program. The Commission helped identify and organize the initial program efforts, which have since been carried forward by the Service through its Marine Entanglement Research Program, administered by the Northwest and Alaska Fisheries Center. The Program emphasizes tasks to educate seafarers and coastal residents as to the nature of the problem, to reduce and mitigate marine debris discharges, and to better identify and assess the nature and extent of associated problems.

Further efforts to address marine debris were taken in 1987 when the President and Congress took steps to ratify Annex V of the International Convention for the Prevention of Pollution of Ships. Annex V establishes a framework for international regulations governing the disposal of garbage from ships. Among other things, it prohibits the discharge of plastics at sea. Its provisions apply to all ships of signatory nations anywhere in the world and to all ships while they are within jurisdictional waters of a signatory nation. Ratification by the United States on 31 December 1987 brought the number of acceding nations to 31 (representing more than half of the world's commercial shipping tonnage) and triggered the Annex's entry into force. The provisions of Annex V became binding upon signatory nations one year later, on 31 December 1988.

As a closely related action in 1987, Congress passed and the President signed into law the Marine Plastic Pollution Research and Control Act of 1987. This legislation provides new authority and direction for a number of Federal efforts. Among other things, it provides the Coast Guard additional authority to limit discharges of plastics and other garbage from ships as required by Annex V; it directs the Department of Commerce and the Environmental Protection Agency to study certain problem areas; and it requires the National Oceanic and Atmospheric Administration, the Environmental Protection Agency, and the Coast Guard to conduct a joint public outreach program to secure public cooperation and involvement in reducing the loss and discard of garbage into the sea. As discussed in previous Annual Reports, the Commission has worked closely with the Congress, the Office of the President, and all the above agencies on needed actions.

Domestic Activities in 1990

As discussed below, significant progress was made during 1990 on implementing the Marine Entanglement Research Program and implementing domestic regulations under the Marine Plastic Pollution Research and Control Act of 1987 to give force to the provision of Annex V in the United States.

The U.S. Marine Entanglement Research Program

As noted above, Congress first appropriated funds to the National Marine Fisheries Service for work on marine debris problems in 1985. That year, it appropriated $1,000,000 to the Service to develop a responsive program. Since then Congress appropriated to the Service $750,000 for FY 1986 and FY 1987 and approximately $700,000 for each of fiscal years 1988 through 1991. It also directed that the Service obtain concurrence from the Marine Mammal Commission on how those funds should be spent.

To help determine the future direction of the Marine Entanglement Research Program, the National Marine Fisheries Service convened a program planning meeting on 5-6 June 1990 at the Northwest and Alaska Fisheries Center in Seattle, Washington. The purpose of the meeting was to review the status and results of recent marine debris-related research and to identify priority tasks to be carried out in FY 1991. Representatives of the Commission and other involved Federal agencies participated. Based on results of the meeting, the Service developed a proposed program plan for allocating $703,800 among 16 research and management tasks. The recommended plan was transmitted to the Commission for review on 18 October 1990, and on 3 December 1990 the Commission returned its comments and recommendations to the Service.

The proposed plan recommends continuing ten projects begun in previous years. These include (1) operating marine debris information offices for the U.S. Pacific coast and the Gulf of Mexico and Atlantic coasts; (2) printing and duplicating marine debris posters, videos, reprints, brochures, etc.; (3) organizing and recording results of volunteer beach clean-ups; (4) removing debris from beaches used by Hawaiian monk seals and from entangled seals; (5) evaluating the economic effects of marine debris; (6) developing a demonstration port reception facility for garbage in Puerto Rico; (7) conducting follow-up surveys of debris on certain Alaska beaches; (8) monitoring debris on beaches at selected National Seashores, Parks, and Refuges; (9) evaluating rates of entanglement and debris ingestion by sea turtles; and (10) monitoring entanglement of juvenile North Pacific fur seals at haulouts on the Pribilof Islands.

In addition, the plan proposes six new tasks: printing information packets on the requirements of Annex V and distributing them through the U.S. Coast Guard Auxiliary network; developing and supporting a traveling exhibit on regional effects and solutions to marine debris problems in Hawaii and the South Pacific islands; preparing a procedures manual for disentangling whales; conducting a survey of refuse reception facilities in Caribbean ports and convening a follow-up workshop to identify ways to expand those facilities; based on recent experience, developing suggested revisions to international guidelines

adopted by the International Maritime Organization on port reception facilities for garbage; and evaluating catch rates of lobster and other species in lost or discarded lobster traps.

The Commission's letter expressed the view that the proposed tasks were appropriate, and it noted that the Commission concurred with the proposed allocation of funding to the 17 tasks. It noted, however, that the proposed task to develop a procedures manual for disentangling large cetaceans raised a number of questions which suggested further thought should be given on how best to proceed with that effort. The Commission noted that the task likely would help address tasks in both the humpback whale and right whale recovery plans, but that it was not clear whether consideration had been given to experiences in freeing large whales from fishing gear in Canada, the possible need for different approaches for different species or entanglement in different types of gear, and whether the manual should be developed for fishermen and members of the public or for regional teams of experts trained, authorized, and equipped to respond quickly to entanglement incidents. The Commission therefore requested that the scope of work for this task be re-examined and revised as necessary in light of the uncertainties identified.

By letter of 7 December 1990, the Service responded to the Commission comments noting, among other points, that the points raised regarding the proposed task for the disentanglement manual were being reviewed to determine whether and how the project scope of work should be revised.

Domestic Regulations for the Disposal of Ship-Generated Garbage

To meet U.S. obligations for controlling disposal of ship-generated garbage as set forth in Annex V of the Convention for the Prevention of Pollution from Ships, Congress had to clarify and provide new Federal authority for restricting garbage discharges from ships. Authority and responsibility for this obligation was provided by Congress to the Coast Guard through the Marine Plastic Pollution Research and Control Act of 1987. The Act's provisions in this regard were set forth as amendments to the existing Act to Prevent Pollution from Ships.

To implement the new authority, the Coast Guard immediately began developing regulations to reduce the amount of plastics and other ship-generated garbage intentionally discharged into the marine environment. A request for comments on rulemaking was published in the Federal Register on 28 June 1988, proposed rules were published on 27 October 1988, and interim rules were published on 28 April 1989. On 6 September 1989, the Coast Guard also requested comments on proposed rules for three sections of the interim rules left blank and reserved for further action (i.e., for recordkeeping, waste management plans, and display of

Table 9. Summary of Garbage Discharge Limitations under the International Convention for the Prevention of Pollution from Ships (1973/1978) and the United States Act to Prevent Pollution from Ships as Amended.

Type of Garbage	Discharge Prohibitions for All Vessels		Discharge Prohibitions for Offshore Platforms and Associated Vessels***
	Outside Special Areas*	Inside Special Areas**	
Plastics - includes 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****	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	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	Limit for most hazardous component applies	Limit for most hazardous component applies	Limit for most hazardous component applies

* = 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.
** = Special Areas are the Mediterranean, Baltic, Red, and Black Seas and the Gulfs area.
*** = Offshore Platforms and associated vessels include all fixed or floating platforms engaged in exploitation or exploration of seabed minerals resources and all vessels alongside or within 500 m of such platforms.
**** = Comminuted or ground garbage must be able to pass through a 25 mm (1 inch) mesh screen.

placards). Commission comments on these rulemaking efforts are described in previous Annual Reports.

On 4 September 1990, the Coast Guard published a Federal Register notice announcing adoption of most of the interim rules as final. The sections not adopted as final included the sections on recordkeeping, waste management plans, and placards, which are still considered interim rules. A decision on finalizing these sections is expected in 1991.

The two central elements of the new regulations are (1) establishing discharge limitations for disposal at sea of garbage generated aboard ships, and (2) requiring that ports provide adequate reception facilities for receiving ship-generated garbage returned to port.

The garbage disposal restrictions prohibit the intentional at-sea discharge from ships of all synthetic plastics, including old fishing nets and net scraps. As indicated in Table 9, they also limit discharges of other domestic and operational wastes generated during the routine operation of ships. The regulations apply to all commercial vessels, fishing vessels, recreational boats, and virtually all waterborne craft other than certain government-owned ships registered in the United States. The exemption of the regulations for government-owned ships is scheduled to expire on 31 December 1993. The regulations also apply to foreign ships operating in U.S. waters.

The U.S. discharge restrictions exceed those of Annex V. Whereas Annex V applies only to waters seaward of the baseline of the territorial sea, the U.S. restrictions apply to all navigable waters, including rivers and lakes. The regulations also exceed Annex V requirements by requiring operators of vessels larger than a certain minimum size to prepare waste management plans for handling garbage aboard ship and to post placards listing garbage disposal restrictions.

The second major element of the U.S. regulations requires that all ports and terminals have adequate port reception facilities for garbage returned to port. Facilities must be convenient and capable of receiving all garbage that a vessel operator wants to discharge ashore with two exceptions. Ports are not obligated to handle spoiled or damaged cargo; nor must they accept garbage from ships not having commercial transactions with that port. Although specific requirements for port equipment or procedures are not set forth, the regulations provide that any ship operator may report ports with inadequate facilities to the Coast Guard. The Coast Guard is empowered to deny ships access to ports that it determines are not in compliance with the regulations. The Coast Guard also is authorized to require certain larger ports to obtain Certificates of Adequacy attesting to the sufficiency of port reception facilities for garbage.

International Activities in 1990

Plastics and other marine debris enter the world's oceans from ships and shores of all coastal nations. Much of this pollution may drift with ocean currents or be blown hundreds or thousands of miles from its points of origin. Therefore, eliminating or mitigating marine debris pollution demands international cooperation. To facilitate appropriate efforts, the Commission, in cooperation with other agencies and organizations, undertook the following actions.

Annex V of the Convention for the Prevention of Pollution from Ships

As noted above, Annex V of the Convention for the Prevention of Pollution from Ships provides an international framework for developing national programs on regulating at-sea disposal of ship-generated garbage. (Garbage generated on land and carried on barges or other ships for disposal at sea is regulated under the London Dumping Convention.) The Marine Environment Protection Committee of the International Maritime Organization is the international body charged with overseeing international cooperation on implementing Annex V.

Guidelines for Implementing Annex V -- To encourage international cooperation and action on implementing provisions of Annex V, the U.S. Coast Guard, which heads U.S. delegations to the Marine Environment Protection Committee, submitted a paper drafted by the Marine Mammal Commission for consideration at the Committee's 24th Session in London in February 1987. The paper urged the Committee to develop guidelines on steps to implement Annex V provisions. The paper was well received and the Committee agreed to do so. For consideration at the Committee's 25th session, the U.S. delegation submitted suggested draft guidelines prepared by the National Oceanic and Atmospheric Administration with assistance from the Marine Mammal Commission and others. These too were well received and, with some modifications, they were adopted by the Committee at its 26th Session in September 1988.

The resulting "Guidelines for the Implementation of Annex V, Regulations for the Prevention of Pollution by Garbage from Ships" include separate sections providing advice on training, education, and information; provisioning ships so as to minimize the amount of generated garbage; procedures for handling, processing, and storing garbage aboard ship; shipboard equipment for processing garbage; developing port reception facilities for garbage returned to port; and ensuring compliance with Annex V provisions.

When the Guidelines were developed, little information or experience was available regarding port reception facilities for

garbage. The section of the Guidelines on this matter therefore was brief and less helpful than would have been desired. Since then, however, useful new information and experience has been developed. For example, results were made available from a highly successful demonstration port project supported by the U.S. Marine Entanglement Research Program at Newport, Oregon. The results of this pilot project provide practical advice on a number of related tasks including organizing efforts to improve port refuse reception facilities, anticipating and recovering facility costs, and soliciting the cooperation and involvement of port users.

Some of this information was reviewed during the course of the Second International Conference on Marine Debris, held in Honolulu, Hawaii in April 1989 -- a conference first recommended and partially supported by the Marine Mammal Commission. The extent of new and developing information prompted the Conference's Working Group on Law and Policy, which included a representative of the Commission, to recommend that the Marine Environment Protection Committee review its Guidelines for Annex V with a view towards providing additional advice on ways to develop port reception facilities for garbage. The Marine Mammal Commission felt this recommendation had considerable merit, and on 25 September 1989 it wrote to the Coast Guard recommending that the U.S. delegation raise the matter with the Marine Environment Protection Committee.

In its letter, the Commission noted that enforcement of discharge restrictions would be extremely difficult because the limited numbers of enforcement officers were already overburdened with other responsibilities, and because illegal dumping, which likely would have to be observed first hand in order to initiate enforcement action, could occur anywhere in the oceans. The Commission therefore noted that compliance with discharge limitations likely would depend on soliciting the cooperation of seafarers by (1) clearly explaining why the new restrictions are needed and what is required, and (2) making compliance as easy as possible by ensuring that adequate port reception facilities are available and convenient.

The Commission's letter therefore recommended that the Coast Guard ask the Marine Environment Protection Committee to review and, as possible, strengthen the port reception facility section of its Guidelines for Implementing Annex V. To help in this regard, the Commission drafted and enclosed with its letter a suggested paper for submission by the U.S. delegation to the Committee's 29th Session in March 1990. The Coast Guard found the paper helpful and constructive but was unable to submit the paper for the 29th Session. The Commission therefore wrote to the Coast Guard on 16 March 1990 recommending that the paper be submitted for consideration at the Committee's 30th Session on 12-16 November 1990.

By letter of 3 July 1990, the Coast Guard responded positively and, with some modifications, it submitted the paper for consideration at the Committee's 30th Session. The paper invited the Committee to request that member nations submit information on their efforts to establish adequate port reception facilities for garbage, and it asked the Committee to consider revising the port reception facility section of its Guidelines on implementing Annex V. It also summarized recent lessons learned in the United States from experiences in setting up port reception facilities for garbage. In particular, it reviewed new advice on 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; recovering operating costs; educating port users on the availability and use of port refuse reception facilities; and projecting the amounts and types of garbage likely to be returned to port by ships.

During its 30th Session, the Marine Environment Protection Committee considered the U.S. paper, and the U.S. delegation offered to serve as the focal point for collecting and analyzing such information as might be submitted by member nations on port reception facilities. The Committee accepted the U.S. offer and asked its members to provide the relevant information directly to the U.S. Coast Guard. The Committee also agreed to consider the matter of revising the port reception facilities section of its guidelines at a future session based on results of the U.S. analysis.

Special Area Designations -- Regulation 5 of Annex V provides for establishing certain ocean areas where marine debris problems may be particularly severe as "Special Areas." More stringent garbage discharge limitations apply in these areas (see Table 9). The original Annex listed five Special Areas (the Mediterranean, Baltic, Black, and Red Seas and the Gulf of Oman/Persian Gulf). Additional areas may be established by amending the Annex to expand the list in Regulation 5. Before becoming effective, coastal nations surrounding a Special Area must notify the International Maritime Organization that adequate port reception facilities for garbage are in place in ports bordering the area.

When the U.S. Senate provided advice and consent on ratifying Annex V in 1987, it did so with the understanding that the U.S. Government would make every reasonable effort to amend Annex V after entry into force to designate the Gulf of Mexico as a Special Area. To assist in considering this matter, the Marine Mammal Commission provided the Coast Guard with the results of a study supported jointly by the Commission and the National Ocean Pollution Program Office summarizing available information on marine debris problems in the Caribbean area (including the Gulf

of Mexico) and certain other ocean areas (see Appendix B, Heneman 1988). The report recommended Special Area designation for the Gulf of Mexico and the Caribbean Sea.

During the 28th Session of the Marine Environment Protection Committee in October 1989, representatives of the United States and Mexico met informally to discuss the proposed designation of the Gulf of Mexico. Mexico's representatives indicated that Mexico supported the action, but, before taking further action, it wanted to consider the feasibility of ratifying the Convention.

For the 29th Session of the Marine Environment Protection Committee, the U.S. delegation submitted a report summarizing technical information supporting the designation of the Gulf of Mexico that had been prepared for the Environmental Protection Agency's Gulf of Mexico Program Office. The Report documented the serious litter problem on beaches along the U.S. Gulf of Mexico coast, particularly in Texas. During the meeting, representatives of Cuba stated that the Caribbean Sea should be designated a special area simultaneously with action on the Gulf of Mexico. Representatives of Venezuela also supported action throughout the wider Caribbean area. The representatives of Mexico stated that they would review the U.S. report before expressing a position on the matter.

At the Committee's 30th Session in November 1990, the U.S. proposal for designating the Gulf of Mexico as a Special Area under Annex V was referred to a drafting group composed of representatives from the Bahamas, Cuba, Mexico, Trinidad and Tobago, the United States, and Venezuela. The drafting group jointly developed a new proposal calling for designation of the entire Wider Caribbean Region as a Special Area. Recognizing that all countries in the region may not be able to develop port reception facilities within the same timeframe, the proposal provides for conferring Special Area status to sub-regions of the Wider Caribbean, such as the Gulf of Mexico, once nations surrounding a sub-region notify the International Maritime Organization that adequate reception facilities exist. The new proposal was considered by the Committee and approved unanimously. The Committee asked the Secretariat to circulate the proposal to member nations in anticipation of final adoption at its 31st Session in July 1991.

In addition to the above matter, the Marine Environment Protection Committee is pursuing efforts to establish other areas as Special Areas for purposes of Annex V. At the request of nations bordering the North Sea, the Committee previously adopted a proposal to amend the list of Special Areas in Regulation 5 of Annex V by adding the North Sea. That action was taken during the Committee's 28th Session in October 1989. The proposed amendment is now being reviewed by member nations under the

Committee's tacit amendment process. Unless a prerequisite number of parties file objections to the measure, the amendment will enter into force on 18 February 1991.

At the request of the United States, the Committee also is considering a proposal to designate the Antarctic Area south of latitude 60 degrees south as a Special Area for purposes of Annex V and Annex I. (Annex I includes regulations governing the discharges of oil from ships.) At its 29th Session, the Committee approved the U.S. proposal and asked the Secretariat to circulate it for review in hopes of final adoption at the 30th Session. At the 30th Session, the Committee unanimously adopted the amendment under the tacit amendment process. Unless a prerequisite number of parties object to the measure, it will enter into force on 16 March 1992.

Other Amendments to Annex V -- Regulation 6(c) of Annex V provides that discharge restrictions under Annex V shall not apply to synthetic materials discharged incidentally to the repair of fishing nets (e.g., net scraps and associated rope). Because such materials may entangle marine mammals and other marine species, the United States proposed that the Annex be amended to delete this exception. This proposal was put forward in 1984. At that time, Annex V had not yet been adopted and, to speed entry into force of other provisions contained in the Annex, it was agreed that the amendment should be tabled pending adoption of the Annex as initially proposed.

Following entry into force of Annex V on 31 December 1988, the proposed U.S. amendment was again taken up by the Committee. At its 28th Session in October 1989, the Committee unanimously adopted the proposal to delete this exception to the discharge regulations. The amendment is being considered under the tacit amendment process and, if member nations do not object to it prior to 18 February 1991, it will become effective at that time. The exception now allowing disposal of net scraps generated by the repair of fishing nets at sea will then be removed from the Annex.

CHAPTER VII

MARINE MAMMAL MANAGEMENT IN ALASKA

A number of states are confronted with important conservation problems that involve one or more species of marine mammals. Alaska, however, by virtue of its large populations of many different marine mammal species, its extensive coastline, the use of marine mammals for subsistence purposes, interactions with commercial fisheries, and many other management issues concerning marine mammals, presents extraordinary conservation challenges. In recognition of this fact, the Commission has devoted particular attention to marine mammal issues in Alaska.

During 1990, particularly important issues related to marine mammal management in Alaska included developing conservation plans for selected marine mammals, assessing the possibility of fundamental changes in the condition of the marine ecosystem in the Bering Sea and other parts of Alaska, and implementing a marking and tagging program to help monitor the number of marine mammals taken by Native subsistence hunters and to track certain subsistence by-products. Also in 1990, there were significant developments in several marine mammal-related court cases that could have a bearing on future marine mammal management actions. Developments in 1990 concerning these matters are discussed below. Actions important to marine mammal conservation also were taken with respect to exploring and developing offshore oil, gas, and hard mineral resources off Alaska. These are discussed in Chapter IX. Past activities are discussed more fully in previous Annual Reports.

Species Conservation Plans

With passage of the Marine Mammal Protection Act in 1972, authority of State governments to manage marine mammals was preempted and given to the Federal Government. The Act, however, included provisions whereby States could request and obtain a transfer of management authority for marine mammal species subject to certain requirements. As discussed in previous Annual Reports, the State of Alaska requested return of management authority for 10 species of marine mammals during the 1970s. State concern for these species derived in part from their importance as subsistence resources for State residents, particularly Alaska Natives, the likelihood that activities on State lands and in nearshore watrs might affect them, and, in some cases, from their interactions with commercial fisheries.

In 1976 the State received authority to manage walruses and expected to receive authority to manage the other nine species,

but instead, in 1979, it relinquished authority over walruses and withdrew its request regarding the other species. The action was taken, in part, because of inconsistencies between State law and the Marine Mammal Protection Act regarding the use of subsistence resources. Subsequently provisions for returning management authority under the Marine Mammal Protection Act were changed and, in 1982, the State indicated it was considering requesting return of management for 10 species: walrus (Odobenus rosmarus), polar bear (Ursus maritimus), ringed seal (Phoca hispida), bearded seal (Erignathus barbatus), ribbon seal (Phoca fasciata), spotted seal (Phoca largha), harbor seal (Phoca vitulina), Steller sea lion (Eumetopias jubatus), beluga whale (Delphinapterus leucas), and sea otter (Enhydra lutris).

Anticipating that the State would request and receive return of management authority, the responsible Federal agencies did little to develop long-range conservation programs. In view of this, the Marine Mammal Commission established a series of working groups in 1984 to develop species accounts with research and management recommendations for each of the ten species. The working groups included representatives of Federal and state agencies, Native groups, marine mammal scientists from the accademic community, and other interested parties. In doing so, it was the Commission's position that, whether management authority ultimately resided with the State, the Federal Government, or some cooperating group of interests, effective conservation programs for these species would require a foundation of carefully described and generally accepted research and management recommendations. The species accounts were intended to meet this need.

In March 1988, the State of Alaska announced that it would not seek return of management authority and instead would seek to help develop and implement management plans for Alaska marine mammals through Federal procedures and cooperative agreements. Later in 1988, the Marine Mammal Commission published the species accounts prepared by the Alaska marine mammal working groups (see Appendix B, Lentfer 1988). The accounts review pertinent biological information and identify research and management priorities for each species. They were distributed widely among Federal and State agencies, Native groups, and other interested parties.

As the Commission's species accounts neared completion late in 1988, Congress was concluding efforts to reauthorize and amend the Marine Mammal Protection Act. In doing so, it added a new section to the Act directing the National Marine Fisheries Service and the Fish and Wildlife Service to prepare conservation plans (similar to the recovery plans required under the Endangered Species Act) for all depleted marine mammal species. Because of particularly pressing problems facing depleted populations of North Pacific fur seals and Steller sea lions, the

amendments specifically directed that conservation plans for those species be prepared by 31 December 1989 and 31 December 1990, respectively. The Senate report on the amendments indicated Congressional intent that the new conservation plan provisions also be used, as appropriate, for non-depleted marine mammals.

It was the Commission's view that its Alaska species accounts with research and management recommendations provided a strong basis for developing conservation plans envisioned by the 1988 amendments to the Marine Mammal Protection Act. Therefore, in its 11 January 1989 letter to the Fish and Wildlife Service on implementing new requirements of the Act, the Commission recommended that the Service develop conservation plans for Alaska species under its jurisdiction (i.e., walruses, polar bears, and sea otters) using the species accounts prepared for the Commission on those species as a basis for doing so. The Service's 3 March 1989 reply expressed its intent to develop management plans for all three species that would satisfy the new provisions for conservation plans.

As discussed in Chapter II, the Service has begun developing plans for walruses and polar bears, but progress has been slow and it is not clear when work will be completed. Regarding the conservation plan for Alaska sea otters, the Service invited the Commission to participate in a December 1990 meeting to begin plan development. The meeting was subsequently rescheduled and, at the end of 1990, was to take place on 25 January 1991. During the meeting, participants are expected to review a draft outline for an Alaska sea otter management plan and to identify steps for completing the plan.

As indicated above, the National Marine Fisheries Service was directed to prepare conservation plans for North Pacific fur seals and Steller sea lions by the end of 1989 and 1990, respectively. In its 6 December 1988 letter to the National Marine Fisheries Service on implementing new requirements of the Act, the Commission noted that its recently completed species account on Steller sea lions should facilitate the development of a conservation plan for that species and it urged that prompt attention be given to completing plans for both Steller sea lions and North Pacific fur seals. Matters related to the development of plans for these species are discussed in Chapter II of this Report. At the end of 1990, the Commission was aware of no work by the National Marine Fisheries Service to develop conservation plans for other species addressed in the Commission's Alaska species reports (i.e., ringed seals, bearded seals, ribbon seals, spotted seals, harbor seals, and beluga whales).

The Bering Sea and Gulf of Alaska Ecosystems

In addition to substantial declines in North Pacific fur seal and Steller sea lion populations in the Bering Sea and Gulf of Alaska, there also have been substantial declines in the numbers of harbor seals and four species of fish-eating seabirds (common and thick-billed murres and red-legged and black-legged kittiwakes) in certain parts of the Bering Sea and Gulf of Alaska. Populations of other species, including endemic populations of harbor porpoise and other small cetaceans, may have declined without being detected. As noted in Chapter II, the Steller sea lion decline has been so precipitous that the species has been designated threatened under the Endangered Species Act. Also, the North Pacific fur seal has declined to the point where it has been listed as depleted under the Marine Mammal Protection Act.

The cause or causes of the various population declines have not been determined. Some, but not necessarily all, may have a common cause. Possible causes include entanglement in lost and discarded fishing gear; incidental take in driftnet, trawl, and other fisheries; decreased food availability due to over-harvesting of pollock or other finfish; decreased food availability due to climate or other natural changes affecting the distribution, abundance, or productivity of important prey species; natural diseases; and environmental pollution.

Many studies have been and are being done to assess and monitor marine mammal, seabird, and fish populations in the Bering Sea and Gulf of Alaska and to identify and determine how bottom topography, currents, wind, and other physical factors affect nutrient cycling, primary and secondary productivity, and other ecosystem processes. With a few exceptions, these programs have been designed and carried out independently. Further, there has been no effort to identify the critical uncertainties concerning the relationships among various biotic and abiotic components of the Bering Sea and Gulf of Alaska ecosystems or to determine what research would be required to resolve those uncertainties.

In May and June 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. Those consulted concurred with the Commission's view that available information should be compiled and evaluated as soon as possible to identify critical uncertainties and research needs relative to the key components of the Bering Sea and Gulf of Alaska ecosystems. While consulting on the issue, the Commission learned that the Alaska Sea Grant College Program was planning to hold a workshop in the spring of 1991 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 pollock or other finfish that are the primary prey of Steller sea lions, North Pacific fur seals, and other higher trophic level species. In consultation with the Director of the Alaska Sea Grant Program, the Commission determined that it would be desirable to hold a separate workshop, in advance of the spring 1991 Sea Grant workshop, to look at the broader range of factors that might be causing or contributing to the observed population declines.

On 30 July 1990, the Commission wrote to the National Marine Fisheries Service to find out whether the Service would be interested and able to provide funding for the project. The Service concurred that it would be desirable to undertake a comprehensive review of available information concerning the Bering Sea and Gulf of Alaska ecosystems, and it transferred funds to the Commission for this purpose.

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 to identify individuals who could contribute to meeting the workshop objectives. 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. Therefore, the Commission concluded that it might be useful to compare approaches to research in the two areas. The workshop objectives therefore were expanded to include consideration of how experience in the Bering Sea and Gulf of Alaska and the Southern Ocean might be used to improve research planning in both areas.

The workshop was held in Seattle, Washington, on 12-13 December 1990. Participating scientists from a variety of academic, state, and Federal institutions and agencies identified and outlined 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 observed population declines. With respect to marine mammals, participants concluded that the most critical uncertainties were the location and availability of key prey species in areas where Steller sea lions and harbor seals feed during the pupping and breeding seasons; the winter distribution, movements, and critical feeding areas of different age and sex classes of Steller sea lions and harbor seals; and the diet and principal feeding areas of North Pacific fur seals in their first two years of life.

Noting that it was important to continue to assess and monitor the status of the affected populations, the workshop participants recommended that: ongoing programs to assess and

monitor Steller sea lion and North Pacific fur seal colonies in the Bering Sea and Gulf of Alaska be continued; efforts to identify and monitor declining harbor seal populations be expanded; fishery survey data and data on fishery development, fish catches, and incidental take of marine mammals in the Bering Sea and Gulf of Alaska be compiled and compared with available data on the Steller sea lion, harbor seal, and North Pacific fur seal declines to look for correlations; efforts to use satellite-linked radio tags to determine the at-sea movements and important feeding areas of Steller sea lions be continued and expanded, as necessary, to obtain information by season, age, and sex; the satellite-linked radio tracking program be expanded to obtain information on the at-sea movements and important feeding areas of harbor seals in areas where declines have occurred and, if possible, to determine the movement patterns and possible critical habitats of fur seals during their first two years of life; and representative Steller sea lion, harbor seal, and North Pacific fur seal feeding areas be surveyed to establish baselines and monitor the availability and caloric content (quality) of food fish present in the areas.

At the end of the year, the workshop report was being prepared and a draft was expected to go workshop participants for comment by late January 1991. The final report, to be completed by the end of February 1991, will be provided to the Director of the Alaska Sea Grant Program to assist in preparing for the workshop to be convened in the spring of 1991. It will be used by the Commission, in consultation with its Committee of Scientific Advisors, in developing recommendations to the responsible regulatory agencies on steps that should be taken to resolve the identified uncertainties concerning the cause of the observed marine mammal population declines.

Federal Marine Mammal Marking and Tagging Regulations

In 1981, the Marine Mammal Protection Act was amended to provide 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 numbers of marine mammals taken for subsistence and handicraft purposes.

Marking and tagging regulations were published by the Fish and Wildlife Service on 28 June 1988. The regulations 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 taken 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 marine mammal 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 officials of the State of Alaska to implement the marking and tagging program. At present, approximately 90 individuals throughout coastal Alaska have been trained and authorized to tag marine mammal parts taken by Alaska Natives. The taggers include Native village residents working under contract to the Service as well as Service employees, generally stationed at National Wildlife Refuges. Taggers are responsible for specific geographic areas and, in addition to affixing official tags and marks to marine mammal parts, they collect information on the harvested animals. During 1990 the Service brought on line a computerized data management system to assist in monitoring harvest levels and other harvest information. Table 10 presents data on the number of marine mammals tagged through the end of 1990.

Table 10. Numbers of Sea Otters, Walruses, and Polar Bears Taken and Presented for Marking and Tagging by Alaskan Natives

Year	Sea Otters	Walruses	Polar Bears
Pre-rule*	470	1,249	24
1988**	52	0	115
1989	274	754	126
1990***	183	1,447	95

* "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.

** Figures include only marine mammals taken after 26 October 1988.

*** Preliminary estimate only. Submission of harvest certificates from remote villages may not be complete.

Litigation Related to Marine Mammals in Alaska

Katelnikoff v. U.S. Department of the Interior and Didrickson v. U.S. Department of the Interior -- As noted in previous Annual Reports, the Katelnikoff lawsuit, concerning the take of sea otters for handicraft purposes, was filed in 1985 in the U.S. District Court for the District of Alaska. 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 the type made prior to passage of the Marine Mammal Protection Act in 1972. It is the Service's view that the Act's exemption allowing Natives to take marine mammals for handicraft purposes applies only to traditional handicrafts commonly made before the Act was passed. The plaintiff challenged the validity of the Fish and Wildlife Service's regulatory definition of "authentic Native articles of handicrafts and clothing," arguing that the Act preserved the unfettered right of Alaska Natives to take marine mammals for handicraft purposes.

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 challenge claimed that the Service's regulation was unconstitutionally vague because, with respect to sea otters, it did not provide sufficient guidance to determine what handicrafts were commonly produced before 21 December 1972 when the Act became effective.

On 27 June 1988, the Court issued an order stating that it would entertain this constitutional challenge to the regulation. The order also strongly implied 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 reviewed the relevant information. Based on its review, the Service concluded that sea otters were not being taken for handicraft purposes when the Marine Mammal Protection Act was passed and, apparently, had not been taken legally by Alaska Natives for such purposes in living memory. Therefore, on 14 November 1988, the Service published a proposed rule providing additional guidance on allowable uses of sea otters in the making and selling of traditional handicrafts and clothing.

By letter of 7 December 1989, the Commission commented on the proposed rule, concurring with the Service's view that practice as of 1972 was an appropriate cutoff for determining what constitutes an allowable handicraft. The Commission noted, however, that it lacked sufficient knowledge to comment specifically about former uses of sea otters by Alaskan Natives. In addition, the Commission noted that, even if the proposed rule were adopted, it may be possible for Natives to pursue the manufacture and sale of non-traditional handicrafts under the Marine Mammal Protection Act's waiver provision.

After an extensive comment period on the proposed rule, the Service, on 20 April 1990, published a final rule amending its regulatory definition of "authentic Native articles of handicrafts and clothing" to indicate clearly 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, filing 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 prior to 1972 was 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 was granted intervenor status on 18 October 1990 and is participating in the lawsuit in support of the Service's final rule.

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. At the end of 1990, briefing of the case had been completed and oral argument was set for 24 January 1991.

United States v. Nusunginya -- In 1988, an Alaska Eskimo whaler was criminally prosecuted for allegedly hunting and killing a bowhead whale in excess of his village quota in violation of the Cooperative Agreement between the National Oceanic and Atmospheric Administration and the Alaska Eskimo Whaling Commission (see bowhead whale discussion in Chapter II). Under regulations implementing the Whaling Convention Act, it is illegal to take whales except in accordance with the Cooperative Agreement.

On 24 October 1988, the defendant filed a motion to dismiss the charges against him, arguing that the Cooperative Agreement was not in force when the alleged violations occurred because proper notice of its extension had not been published in the Federal Register; the Cooperative Agreement impermissibly delegated management and enforcement authority for subsistence whaling to the Alaska Eskimo Whaling Commission, a non-governmental body; and the charged offenses are unconstitutionally vague.

A United States magistrate in the District of Alaska reviewed the defendant's motion to dismiss and, on 15 November 1988, recommended that it be denied. In support of that recommendation, the magistrate found that: when read in concert, the three applicable statutes -- the Whaling Convention Act, the Marine Mammal Protection Act, and the Endangered Species Act -- authorized entry into the Cooperative Agreement; the defendant had actual notice of the applicability of the provisions of the Cooperative Agreement when he allegedly undertook the prohibited activities; under the regulatory scheme, whaling may be conducted only in accordance with the Cooperative Agreement and, if the Cooperative Agreement had lapsed, no whaling at all would have been authorized; and the statutes and regulations challenged by the defendant provided fair notice of the conduct that they forbade.

A trial was scheduled for 18 November 1988; however, when the District Court adopted the magistrate's recommended positions, the defendant entered a guilty plea but reserved the right to appeal the interpretations of the applicable law. The defendant was sentenced on 1 March 1989 to two months in a community treatment center, a fine of $3,000, and three years' probation, during which time he was forbidden from whaling.

The defendant filed a notice of appeal on 3 March 1989, arguing that the Federal Government does not have authority to regulate whaling by Alaska Natives. The Government in its 21 August 1989 reply brief countered that the defendant was precluded from challenging the authority of the United States before the appellate court because the issue was not raised at trial. In addition, the Government claimed that the defendant had not made the requisite factual showing to prove that he possessed legally recognizable aboriginal hunting rights. Further, it was argued that, even if such rights are presumed, those rights have been abrogated by subsequent Federal legislation, including the Whaling Convention Act, the Marine Mammal Protection Act, and the Endangered Species Act. Oral argument in the matter was heard by the Ninth Circuit Court of Appeals on 7 December 1989.

The Court of Appeals, on 6 August 1990, affirmed the lower court ruling. In an unpublished opinion, the Court found that

the appellant had waived his right to challenge Federal authority to regulate subsistence whaling because the issue had not been raised in the lower court proceeding.

United States v. Clark -- Another criminal prosecution of an Alaska Native involving the take of marine mammals occurred in 1989. The defendant, a Yup'ik Eskimo, was charged with taking marine mammals in a wasteful manner by failing "to salvage for human consumption the edible meat of approximately nine walrus." Prior to 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 is 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, upholding the conviction for wasteful taking in violation of the Marine Mammal Protection Act, was issued on 28 August 1990. 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. That petition was pending at the end of the year.

National Society for Animal Protection v. Turner -- On 13 November 1989, a complaint was filed in the District Court for the District of Columbia by an animal welfare group challenging the issuance of a permit for scientific research by the Fish and Wildlife Service under the Marine Mammal Protection Act. The permit at issue authorized the temporary capture and sampling of up to 650 Alaskan sea otters and the surgical implantation of radio transmitters in up to 275 of those otters. The research is part of the Service's efforts to determine the magnitude, extent, and duration of impacts from the Exxon Valdez oil spill on the affected sea otter population.

The plaintiffs charged that the permit violated the Marine Mammal Protection Act in that the authorized research would be unnecessarily duplicative and would not produce scientifically valid data. In addition, the plaintiffs asserted that the decision to authorize the research was premature because, although the study was to be conducted as part of the Natural Resources Damage Assessment Plan prepared pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act, the permit was issued prior to the close of the public comment period on the draft Assessment Plan and prior to approval of the Plan.

The defendant addressed these charges in its motion for partial summary judgment filed on 6 April 1990. The Service explained its rationale for the authorized sample sizes. It also explained that previous sea otter studies were not acceptable substitutes for the proposed study; it is essential that monitoring of a control group occur contemporaneously with research on otters in the oil spill area. In support of its position, the defendant noted that the Marine Mammal Commission had recommended approval of the research permit and that all conditions recommended by the Commission had been incorporated into the permit. Lastly, the Service asserted that, under applicable regulations, preparation of the Assessment Plan was optional and could not form the basis of a cause of action.

At the end of 1990, it was unclear if the National Society for Animal Protection intended to continue to pursue this lawsuit.

Alaska Wildlife Alliance v. Jensen -- As discussed elsewhere in this Report (see the discussion of humpback whales in Chapter II), the Fish and Wildlife Service authorized 109 cruise ship entries into Glacier Bay, Alaska, during 1990. As noted in that discussion, the Commission, by letter of 23 August 1990, questioned the procedures used by the National Park Service to

authorize entries in excess of the 107-entry ceiling imposed by Park Service regulations.

On 21 August 1990, the Alaska Wildlife Alliance filed a complaint challenging the 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 prepring a supplemental environmental assessment. The plaintiff 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.

Inasmuch as the plaintiff did not seek injunctive relief, none of the cruise ship entries authorized for 1990 was enjoined by the Court. The National Park Service filed its answer to the complaint on 3 December 1990.

CHAPTER VIII

THE EXXON VALDEZ OIL SPILL, PRINCE WILLIAM SOUND, ALASKA

Prince William Sound, which lies along the northernmost part of the 850-mile arc of the Gulf of Alaska, is one of the largest undeveloped marine ecosystems in the United States. It also is the site of the largest oil spill in U.S. history. Shortly after midnight on 24 March 1989, the tanker Exxon Valdez ran aground on Bligh Reef and ruptured its hull. The tanker was carrying more than 50 million gallons of crude oil, and, in less than five hours, approximately 11 million gallons poured into the Sound. Over the next two months, spilled oil was moved by wind and currents 500 linear miles west to waters and beaches along the southern Kenai Peninsula, Cook Inlet, the Barren Islands, Shelikof Strait, the Kodiak Archipelago, and the Alaska Peninsula. More than 1,000 miles of shoreline, including State and national refuges, parks, and forests, were fouled by moderate to heavy coats of oil.

Marine Mammal Impact Assessment and Mitigation Planning

At least nine marine mammal species inhabit or occur seasonally in Prince William Sound, including sea otters, Steller sea lions, harbor seals, harbor porpoise, Dall's porpoise, killer whales, humpback whales, minke whales, and fin whales. In addition, several other marine mammal species, including gray whales and northern fur seals, occur in the Gulf of Alaska. As discussed below, efforts begun in 1989 to assess and mitigate the spill's effects on marine mammals were continued in 1990.

Initial Response

Within 24 hours of the accident, marine mammal specialists with the Fish and Wildlife Service, the National Marine Fisheries Service, and the Alaska Department of Fish and Game were on site to begin assessing and determining how best to minimize the effects of the spill on marine mammals. Other marine mammal experts arrived in the ensuing days, including scientists contracted by Exxon Company USA to capture, clean, and rehabilitate oiled otters.

The Commission followed the initial response closely and, on 4 April and 6 April 1989, it wrote to the Fish and Wildlife Service and the National Marine Fisheries Service, respectively, to provide advice and recommendations. The Commission's letters described the short and long-term effects on marine mammals that might be expected, and they identified steps that should be taken to effectively assess and mitigate those effects.

Necessary response actions described in its letters included: (1) the capture, cleaning, rehabilitation, and release of oiled animals; (2) beach, boat, and aerial surveys to document the numbers of animals exposed to and affected by the spill; (3) complete necropsies, including tissue sampling and stomach analyses, of dead animals to document causes of death; (4) opportunistic studies to evaluate methods of capturing, handling, cleaning, and rehabilitating oiled animals, and to determine how various species react to oil spills and clean-up operations; and (5) long-term studies to determine the effect of the oil spill on species and their habitats. Noting that sea otters were the marine mammals most likely to be affected by the spill, the Commission also provided specific recommendations for assessing and treating effects on that species. The Commission's recommendations are discussed in greater detail in its previous Annual Report.

On 21-26 April 1989, the Commission's Scientific Program Director conducted a site visit to consult with representatives of the Fish and Wildlife Service, the State of Alaska, and others involved in the clean-up and damage assessment effort. Following the site visit, the Commission provided further comments to the Fish and Wildlife Service. By letter of 12 May 1989, the Commission suggested that the Service contract with an expert to serve as the Sea Otter Impact Assessment Coordinator. Draft terms of reference for the position were included with the letter. The Service agreed and subsequently contracted with a recognized sea otter expert to carry out this task.

Sea Otter Rehabilitation Program

The oiling and death of sea otters were the most immediately apparent effects on marine mammals. To minimize the death of oiled otters, the Department of the Interior requested and Exxon Company USA agreed to provide support for developing and operating a sea otter rehabilitation program. The effort began the day after the spill and continued through mid-September 1989. The program involved locating and capturing oiled otters; transporting them to rehabilitation centers for cleaning; cleaning and caring for cleaned animals; tagging and releasing rehabilitated animals back into the wild; transferring surviving animals not suitable for immediate release to oceanaria; and necropsying animals that did not survive the rehabilitation efforts.

As part of the program, two rehabilitation centers and a pre-release facility were constructed. The first rehabilitation center opened in Valdez on 30 March. It subsequently received and treated 156 oiled otters and closed on 15 September. In early May, as the spill moved west and more otters were affected, a second rehabilitation center was opened in Seward, about 100 miles west of Valdez. The Seward facility received 187 animals

and closed on 12 September. An additional 14 otters were taken to a temporary care facility at Homer. In late May a large pre-release center was opened in Little Jakolof Bay near Homer on the Kenai Peninsula. The pre-release center, capable of holding 94 animals at one time, received a total of 125 otters before closing on 6 September.

In all, 357 live otters were received at the rehabilitation centers for treatment. The degree of oiling ranged from animals with no visible oil to animals heavily oiled. Ninety-seven animals were classified as moderately to heavily oiled (i.e., 30 percent or more body coverage). Of the 357 animals received, 225 survived treatment. Following protocols developed by the Fish and Wildlife Service in July, 197 otters were released back into the wild and 28 were sent to oceanaria. Animals released back to the wild were released in Prince William Sound or along the south coast of the Kenai Peninsula. Animals sent to oceanaria included pups judged to be too young to survive without parental care and animals with obvious health problems. The remaining 132 otters died at the rehabilitation facilities or cooperating oceanaria.

During the first 90 days following the spill, mortality was correlated with the degree of external oiling. Mortality during and following cleaning was 75 percent for heavily oiled animals (60 percent or more body coverage), 41 percent for moderately oiled animals (30-60 percent body coverage), and about 25 percent for lightly oiled animals. Stress associated with capture, cleaning, and prolonged captivity also may have been a factor in the death of animals.

Forty-five of the otters treated successfully and released into the wild were outfitted with radio transmitters prior to their release in Prince William Sound. As of mid-1990, efforts to track and assess the fate of those animals had documented the death of 12 instrumented animals. The deaths suggest a mortality rate that is higher than that for unoiled otters caught, equipped with radio-tags, and released in non-oiled areas of Prince William Sound.

Damage Assessment and Restoration Planning

Federal and State agency responsibilities for responding to major oil spills are established by the Comprehensive Environmental Response, Compensation, and Liability Act, the Clean Water Act, and several other Federal and State statutes. Under the first of these laws, a Natural Resources Trustee Council was formed shortly after the Exxon Valdez oil spill to oversee efforts to minimize and assess damages to natural resources. The Council includes one representative from each of the following: the Alaska Department of Fish and Game for the State of Alaska; the Forest Service for the Department of Agriculture; the Fish and Wildlife Service for the Department of

the Interior; and the National Marine Fisheries Service for the Department of Commerce.

One of the Council's responsibilities is developing and overseeing implementation of a damage assessment and restoration plan. To begin developing the plan, State and Federal agency scientists and other experts, including a representative of the Marine Mammal Commission, met in Anchorage in April 1989 to identify and describe needed studies. From this beginning, a "State/Federal Natural Resources Damage Assessment Plan" was developed and implemented over the course of the coming year. The plan included 63 studies, seven of which focused on marine mammals. The projected cost of the seven marine mammal studies was approximately $1,900,000, nearly half of which was directed towards studies to assess effects on sea otters. The marine mammal studies included:

- surveys to identify any changes in the distribution and abundance of humpback whales in Prince William Sound, the Kodiak Archipelago, and Southeast Alaska;

- surveys to identify any changes in the distribution, abundance, and mortality of killer whales in the Sound, the Kodiak Archipelago, and Southeast Alaska;

- a study to locate and necropsy stranded cetaceans between the Prince William Sound and Unimak Pass at the eastern end of the Aleutian Islands;

- assessments of premature births, hydrocarbon contamination, changes in the size of rookeries, and other possible impacts on Steller sea lions in the Prince William Sound and adjacent areas;

- assessments of effects on harbor seal abundance, reproduction, tissue contaminant loads, and haulouts in the Prince William Sound and adjacent areas;

- salvaging and necropsying sea otter carcasses to determine causes of death, and surveying and tagging sea otters in oiled and non-oiled areas to determine abundance, feeding behavior, movements, and survival; and

- radio-tagging and monitoring released rehabilitated sea otters to determine their survival and ability to readapt to the wild.

Although the studies were identified and initiated promptly following the spill, the draft damage assessment plan was not circulated for public and agency comment until August 1989. As noted in its previous Annual Report, the Commission responded to the Council's request for comments on the draft plan by letter of

29 September 1989. In its letter, the Commission noted that the draft plan provided a comprehensive overview of the studies required to assess natural resource damage from the spill; however, it did not contain sufficient information on the individual studies to determine precisely what work would be done, whether it would, in fact, provide reliable assessments of natural resource damage, or whether the cost estimates were reasonable. Therefore, the Commission recommended, among other things, that, if it had not already done so, the Trustee Council: require development of comprehensive project descriptions, including detailed cost estimates; have the detailed project descriptions reviewed by groups of knowledgeable experts not associated with the damage assessment program; and revise the Plan, as appropriate, to take account of the expert review.

In August 1990, the Trustee Council released its Plan for damage assessment and restoration work in 1990. Regarding work on marine mammals, all of the studies begun in 1989, with the exception of the study to locate and necropsy cetaceans, were modified based on results of 1989 work and carried forward in 1990. Task descriptions for studies in the 1990 Plan were much more complete and detailed than those in the preceding Plan. The cost of marine mammal studies in the 1990 Plan were again projected to total about $1,900,000.

Among other things, the 1990 Plan placed increased emphasis on assessing studies of the capacity of the sea otter population to recover to pre-spill levels. Nearly two-thirds of the Plan's projected funding for marine mammal work was directed to sea otter studies. New and continued work on sea otters during the second year of work included (1) surveys of the abundance of sea otter in oiled and non-oiled areas; (2) histopathologic and toxicologic analyses of tissues collected from animals that survived the spill and from carcasses collected during the spill; (3) analyses of survival, reproduction, and movements of adult females and pups in oiled and non-oiled areas; (4) analyses of the structure of the affected sea otter population based on the age, sex, and reproductive conditions indicated by examination of carcasses collected in the spill area; (5) studies to collect and compare post-spill mortality rates in Prince William Sound with mortality data collected in the Sound before the spill; (6) a drift study to determine whether dead sea otters collected outside Prince William Sound after the spill may have died within the Sound; and (7) studies to radio tag and assess the fate of rehabilitated and released sea otters.

The 1989 studies of humpback whales and killer whales in Prince William Sound, Southeast Alaska, and the Kodiak Archipelago were continued in 1990 with major efforts on counting and individually identifying animals to detect any significant changes in distribution or abundance. Studies of Steller sea lions were continued to document possible changes in the rate of

premature pupping, to estimate and evaluate trends in pup production at rookeries in the spill area, and to perform contaminant and histopathological analyses on seal tissue samples. Work on harbor seals in 1990 focused on completing histopathological and toxicological analyses of seal tissues, monitoring abundance at oiled and non-oiled haulouts during pupping and molting seasons in 1990 and 1991, and analyzing results to detect possible changes in distribution or abundance following the oil spill.

Clean-Up of Ushagat Island

During a spring 1990 beach survey, an intertidal deposit of oil from the Exxon Valdez oil spill was found on Ushagat Island in the Alaska Maritime National Wildlife Refuge. The Island, located in the mouth of Cook Inlet about 25 miles southwest of the tip of the Kenai Peninsula, is an important wildlife habitat. It also is within about eight miles of Sugarloaf Island, which contains one of the world's largest Steller sea lion rookeries. The contaminated sediment lay several feet below the surface. Based on an August 1990 survey to determine the extent of the contaminated sediment, it was estimated that 1,000 or more gallons of oil were present.

To prevent possible release of the oil by storms in the spring of 1991, when several species of wildlife return to the area, the Coast Guard authorized and directed Exxon to excavate the oil from the intertidal zone with a bulldozer and move it to a site just above the beach berm. Doing so was expected to facilitate slow release and natural degradation of the remaining oil over the course of the coming winter storm season. The work was carried out on 2-5 September 1990.

As noted in Chapter II, the Steller sea lion has been designated threatened under the Endangered Species Act. Upon learning of the action, the Steller Sea Lion Recovery Team wrote to the National Marine Fisheries Service on 5 September 1990. In its letter, the Team expressed concern about possible effects of the released oil on Steller sea lions and the large sea lion rookery on nearby Sugarloaf Island. The Team also noted that bagging and removing the contaminated sediment was a preferable mitigation action, and that, in the apparent absence of formal consultations between the Service and the Coast Guard on the matter pursuant to section 7 of the Endangered Species Act, Federal approval of the action may be a violation of the Act's provisions.

On 24 September, the Service responded to the Team, noting that the Service had been actively involved in decisions regarding clean-up work on Ushagat Island, and that it would ensure that future proposed clean-up activities were properly considered pursuant to section 7 of the Act. On 31 October 1990,

the Service wrote to the Coast Guard advising it of the need to enter into section 7 consultations on any future clean-up activities that may affect listed endangered or threatened marine mammals.

The Commission received copies of the above correspondence and reviewed them in consultation with its Committee of Scientific Advisors. The Commission shared the expressed concerns regarding possible effects on Steller sea lions and, based on its review, it wrote to the Coast Guard on 29 November 1990. In its letter, the Commission commented that the Service's 31 October recommendation for future section 7 consultations may be insufficient. The Commission noted that the Coast Guard presumably retained authority to direct Exxon to carry out additional clean-up and restoration work, and that Federal agencies have a continuing obligation to consult pursuant to section 7 as long as they retain any discretionary involvement or control over an activity.

The Commission recommended that the Coast Guard immediately determine whether any oil remained on Ushagat Island and, if so, consider options to prevent or minimize any further releases into the ocean. In this regard, the Commission suggested that bagging contaminated sediments for off-site disposal be considered. It also noted that any decision that may affect Steller sea lions or other endangered or threatened species, including a decision not to require further treatment, constituted an agency action for purposes of section 7 of the Endangered Species Act.

On 14 December 1990, the Coast Guard responded to the Commission, describing the actions that had been taken in approving oil spill clean-up work on Ushagat Island. In its letter, the Coast Guard noted that bagging the contaminated sediment for off-site disposal had been considered and rejected, in part, because of considerable logistical problems attendant with the Island's remote location. The Coast Guard also noted that scientists with the National Oceanic and Atmospheric Administration and other officials involved in the decision-making process did not believe that the recommended clean-up measure was likely to jeopardize Steller sea lions or adversely modify their habitat, and thus formal consultations had not been considered necessary. It also reported that the disposal site was resurveyed on 27 November 1990, virtually all remaining oil apparently had been dissipated by storms in September, and the area would be resurveyed by an interagency group in spring 1991 to confirm that no oil remains.

Oil Spill Legislation

In the months following the Exxon Valdez oil spill, ten Congressional committees held hearings on the spill and more than

20 pieces of legislation were introduced on tanker safety and pollution liability. On 4 August 1989, the Senate passed the Oil Spill Liability and Compensation Act of 1989. Similar, but not identical, legislation passed the House of Representatives on 9 November 1989. Differences between the two bills were addressed by a Senate-House conference committee early in 1990. The resulting agreement -- the Oil Pollution Act of 1990 -- was passed by the Senate on 2 August 1990 and by the House of Representatives on the following day.

In adopting the Oil Pollution Act, Congress attempted to design a statute that would help prevent future oil spills, and, when spills do occur, provide quick and efficient clean-up, 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.

A major feature of the Oil Pollution Act is creation of a new $1 billion fund to be used for clean-up response, damage assessment, and payment of claims. The Act increases the liability limits for tankers to $1,200 per gross ton or $10 million, whichever is greater. Liability for offshore facilities is set at the total of removal costs plus $75 million. The liability limit for onshore facilities and deepwater ports is $350 million. These upper limits on liability do not apply in cases of gross negligence, willful misconduct, or violation of Federal operations or safety standards. In addition, the Act gives states the authority to impose stricter liability standards.

The Act establishes a new national planning and response system under the Federal Water Pollution Control Act. The system includes a National Response Unit, Coast Guard Strike Teams, Coast Guard District Response Groups, Area Committees, Area Contingency Plans, and vessel and facility response plans. The National Response Unit is located at Elizabeth City, North Carolina. Its mission is to (1) compile a list of oil spill removal resources, personnel, and equipment worldwide; (2) coordinate private and public personnel and equipment; (3) administer Coast Guard strike teams and providing technical assistance; and (4) review and keep on file area contingency plans.

The Act identifies six categories of damages for which compensation may be sought. Included are damages for injury to, destruction of, loss of, or loss of use of natural resources, including the reasonable costs of assessing the injury, destruction, or loss. Sums recovered are for use only to restore, replace, or acquire the equivalent of the harmed natural resources. The Act directs the National Oceanic and Atmospheric Administration to establish a system for assessing damages equal to the costs of restoring, replacing, or acquiring equivalent resources and the diminution in value of those resources pending

restoration. The Act also provides a right of recovery for loss of subsistence use of natural resources, without regard to the ownership or management of those resources.

Title VII of the Act establishes an oil pollution research and development program. Program priorities include work on preventing oil discharges, speeding and improving the effectiveness of oil clean-ups, and improving information on environmental effects of oil discharges.

The Act substantially increases penalties under the Federal Water Pollution Control Act for failing to report a discharge. It establishes criminal penalties of up to three years in prison and fines up to $250,000 for an individual or $500,000 for an organization for failure to report a spill. Civil penalty authority is also revised upward to $25,000 per day of violation or $1,000 per barrel of oil. In case of gross negligence or willful misconduct, the penalty imposed shall not be less than $100,000.

The Act also establishes the Prince William Sound Oil Spill Recovery Institute, based in Cordova, Alaska, to conduct research and carry out educational and demonstration projects relating to the Exxon Valdez spill. Overseeing the activities are an Advisory Board and a Scientific and Technical Committee. Funding is authorized at $5 million for FY 1991 and $2 million annually for nine subsequent fiscal years.

The Oil Pollution Act requires that all newly constructed tankers be equipped with double hulls. Exception is made for tankers of less than 5,000 gross tons when equipped with double containment systems determined to be as effective as a double hull, and vessels to be used only to respond to spills. Also excepted until 1 January 2015 are vessels unloading oil in bulk at deepwater ports or in lightering zones. To ensure continued shipping capability, the Act provides a 10-year phase-out schedule for existing single hull vessels, beginning with the oldest vessels first in 1995.

CHAPTER IX

OUTER CONTINENTAL SHELF OIL, GAS, AND MINERAL DEVELOPMENT

Activities and environmental contamination associated with 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 predicting, detecting, and mitigating the adverse effects of OCS exploration and development in offshore water beyond state jurisdiction. The National Marine Fisheries Service and the Fish and Wildlife Service are responsible, under the Marine Mammal Protection Act and the Endangered Species Act, for reviewing proposed actions and advising the Minerals Management Service of measures that may be needed to assure that those actions will not have adverse effects on marine mammals or species listed as endangered or threatened. 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 1990 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. As discussed below, the Commission commented on four proposed lease sales off Alaska and five proposed lease sales in the Gulf of Mexico during 1990.

Oil and Gas Lease Sale #124, Beaufort Sea

Proposed Lease Sale #124 involves up to 4,095 blocks (approximately 22.1 million acres) of submerged lands in the Beaufort Sea from 3 to 140 nautical miles off the north coast of Alaska. The sale is tentatively scheduled for April 1991. In preparation for the sale, the Minerals Management Service prepared a Draft Environmental Impact Statement on the proposed action and distributed it to the Commission and others for review and comment on 8 March 1990.

The Draft Statement noted that bowhead whales and gray whales are the endangered marine mammals most likely to be affected by the proposed action. It concluded that there would be no effect from which recovery to pre-lease conditions would not occur within one to three years for the bowhead whale and within one year for the gray whale.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the Draft Statement and, by letter of 8 May 1990, provided comments to the Minerals Management Service. In its letter, the Commission noted that the Statement made reference to recommended actions to protect marine mammals contained in a 1988 Arctic Region Biological Opinion prepared by the National Marine Fisheries Service on offshore oil and gas-related activities. The actual recommendations, however, were not identified in the Statement, nor was the Opinion appended to the Draft Statement with other relevant correspondence on Biological Opinions. The Commission recommended that the Final Environmental Impact Statement on the proposed lease sale include the Arctic Regional Biological Opinion and identify the extent to which any recommended actions had been incorporated in the proposed action or, if they had not been incorporated, explain the reasons they were not adopted.

The Commission further noted that the Draft Statement identified a number of potential stipulations and "information to lessees" notices that could reduce possible impacts on marine mammals. The Commission recommended that these measures be modified and adopted as part of the proposed action. Specifically, the Commission recommended that a Stipulation requiring an industry site-specific bowhead whaling monitoring program be expanded, or that a new stipulation be included, to require lessees to report all observed approaches or interactions between marine mammals and field operations to the lease manager. In this regard, the Commission recommended that the Minerals Management Service consult with the National Marine Fisheries Service and the Fish and Wildlife Service to identify appropriate procedures and requirements for planning, conducting, and reviewing results of industry site-specific monitoring and reporting programs for bowhead whales and other species of special concern likely to occur near offshore facilities and activities.

In its letter, the Commission also recommended that the Draft Statement be modified to: (1) consider effects on polar bears and other wildlife possibly resulting from their attraction to offshore facilities and operations by lights, smells, noise, or other factors; (2) reassess analyses and conclusions regarding cumulative effects on pinnipeds, polar bears, and beluga whales and, as appropriate, indicate that the expected cumulative effects on these species could be high; (3) better indicate the importance of the Service's Environmental Studies Program in detecting and mitigating possible unforeseen impacts; and (4) ensure that all statements regarding the status of marine mammals and studies of the effects of pollutants on marine mammals are supported by data and analyses or cited references.

Proposed Oil and Gas Lease Sales #131, #135, and #137, Central, Western, and Eastern Gulf of Mexico

In May 1989, the Minerals Management Service issued a "Call for Information and Notice of Intent" to prepare an environmental impact statement on three proposed lease sales in the Gulf of Mexico. Sale #131 (scheduled for March 1991) would involve up to 5,657 blocks or 30.5 million acres of submerged lands in the central Gulf; sale #135 (August 1991) would involve 5,072 blocks or 26.1 million acres in the western Gulf; and sale #137 (November 1991) would involve 8,345 blocks or 47.5 million acres in the eastern Gulf.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the Service's Notice and, by letter of 12 June 1989, forwarded comments and recommendations to the Service. In its letter, the Commission noted, among other things, that the bottlenose dolphin is the marine mammal species most likely to be exposed to and affected by the proposed action. It further noted that available information indicates that bottlenose dolphins are not distributed uniformly throughout their range and appear to be composed of a number of more or less discrete "local" populations or subpopulations. It also noted that cumulative effects of deliberate and incidental take by commercial fishermen and habitat degradation and destruction on local populations must be considered when assessing possible effects of offshore oil and gas exploration and development in the Gulf of Mexico.

The Commission recommended that, if the Service had not already done so, it consult with the National Marine Fisheries Service to (1) obtain the best available information on the distribution, discreteness, size, productivity, essential habitats, and status of bottlenose dolphin populations that could be affected by the proposed action; and (2) determine research and monitoring programs that would be required to accurately assess and detect the possible effects of activities related to the proposed action on these populations and their habitat.

Subsequently, the Minerals Management Service prepared a Draft Environmental Impact Statement on the proposed action. The Draft Statement indicated that 25 species of cetaceans, the West Indian manatee, and feral California sea lions have been sighted in the northern Gulf of Mexico. It noted that: six species of cetaceans (the right, blue, sei, fin, humpback, and sperm whales), as well as the West Indian manatee, are listed as endangered under the Endangered Species Act; bottlenose dolphins are the most common non-endangered species in the proposed lease sale areas; and the West Indian manatee and sperm whale are the most common endangered marine mammals in the areas. The Draft Statement concluded that no marine mammal, other than West Indian manatees, likely would be affected to an extent that complete

recovery to pre-lease conditions could not occur within a single generation. Regarding the West Indian manatee, the document noted that populations along the west coast of Florida could be affected in ways that would require one or two generations to recover to pre-lease conditions.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the Draft Statement and, by letter of 9 May 1990, provided comments to the Service. In its letter, the Commission noted that the Draft Statement did not provide a thorough and objective review of the best available information concerning the marine mammal species or populations that could be affected by the proposed sales. The Commission pointed out that the Draft Statement did not provide data, analyses, or references to support its conclusions concerning likely effects of the proposed actions on marine mammals. The Commission also pointed out that the Draft Statement provided no information on the distribution, discreteness, size, productivity, essential habitats, or status of "local" bottlenose dolphin populations in the Gulf of Mexico. Similarly, it provided no information on the species and size classes of fish eaten by bottlenose dolphins or other marine mammals in the areas or how essential prey species might be affected by disturbance, oil spills, drilling muds, etc., that might result from oil and gas exploration and development in the Gulf.

For these reasons, the Commission recommended that the Draft Statement be revised to provide a more complete and objective assessment of the possible effects of the proposed actions on marine mammals. In particular, the Commission recommended that the document be expanded to provide a more complete description of the demography, diet, essential habitats, and present levels of live captures and removals and incidental take from local stocks of bottlenose dolphins. The Commission also recommended that it provide a more thorough and objective review and assessment of information on the demography, natural history, and possible effects of the proposed action on sperm whales, pygmy and dwarf sperm whales, false killer whales, short-finned pilot whales, grampus, beaked whales, and the various species of the genus Stenella that occur in the Gulf of Mexico.

The Commission again recommended that the Service, if it had not already done so, consult the National Marine Fisheries Service to obtain the best available information on populations of bottlenose dolphins and other marine mammals that possibly could be affected by the proposed actions. The Commission further recommended that, if it had not already done so, the Service should re-initiate section 7 consultations with the Fish and Wildlife Service to identify measures that may be necessary to better assess and avoid or mitigate possible adverse effects of the proposed lease sale on manatee populations and habitat along the west coast of Florida.

Subsequently, with respect to section 7 consultations, the Fish and Wildlife Service wrote to the Commission on 18 May 1990 asking for comments on a draft Biological Opinion it had prepared for the Minerals Management Service on proposed sales 131, 135, and 137. Among other things, the draft opinion noted that the probability of an oil spill occurring and contacting manatee habitat in Florida as a result of the proposed action was low, and that manatees probably would avoid spilled oil. However, increased ship traffic in and out of ports between Cedar Key and Key West, Florida, other than Tampa/Port Manatee, is likely to jeopardize the continued existence of manatees in Florida.

On 8 June 1990, the Commission, in consultation with its Committee of Scientific Advisors, wrote to the Service to provide comments. In its letter, the Commission noted that the draft opinion appeared to underestimate the possible effects of a large oil spill on manatees. It questioned the basis for concluding that manatees likely would avoid spilled oil and noted that, if a spill the size of the Exxon Valdez spill occurred and contacted manatee habitat, it seemed likely, if not probable, that it would jeopardize the species' continued existence or result in the degradation or destruction of critical habitat. In this regard, the Commission noted that the draft opinion did not consider possible effects of inhaling toxic vapors from a spill or ingesting oil that sinks and fouls grassbeds on which manatees feed.

It also was not clear whether the Service had considered the possible cumulative effects of an oil spill in addition to record levels of boat kills and other deaths, which have increased dramatically in recent years. In this regard, the Commission questioned the exception of Tampa/Port Manatee from the list of ports whose use as a vessel supply base possibly could jeopardize manatees. The Commission noted that Tampa Bay includes important manatee habitat; it advised the Service that the State of Florida was considering additional regulations to prevent vessel traffic from killing animals in the bay and suggested that the exception for Tampa Bay be deleted. Doing so would require the Minerals Management Service to re-initiate consultations with the Fish and Wildlife Service if specific plans were developed to use Tampa/Port Manatee as a vessel supply base, thereby affording an opportunity to ensure that such an action would not adversely affect manatees or their habitat.

The Fish and Wildlife Service provided its final Biological Opinion to the Minerals Management Service on 26 July 1990, addressing most of the Commission's comments. The principal exception was that the Service continued to allow Tampa/Port Manatee to be used as a vessel supply base without further consultations.

Proposed OCS Lease Sale #139, Central and Western Gulf of Mexico

The Minerals Management Service is tentatively planning to hold two lease sales in the Gulf of Mexico in 1992. The two sale areas are in the central Gulf (Sales #139) and in the western Gulf (not yet numbered). On 8 May 1990, the Service issued a call for information and nominations and a notice of intent to prepare an environmental impact statement on the proposed lease sales. The Commission, in consultation with its Committee of Scientific Advisors, responded by letter of 20 June 1990.

In its letter, the Commission noted that 30 species of marine mammals, including the endangered West Indian manatee and six species of endangered whales, have been observed in the northern Gulf of Mexico. It also noted that available information concerning the species had been reviewed and evaluated during a Service-sponsored workshop on the status of marine mammals and sea turtles, held in August 1989.

To reliably assess the potential effects of the proposed lease sales on marine mammals, the Commission once again recommended that, if it had not already done so, the Service consult with the National Marine Fisheries Service to obtain the best available information on the distribution, abundance, seasonal movement patterns, diet, essential habitats, and present levels of live captures and removals and incidental fisheries takes from local stocks of bottlenose dolphins and other marine mammals that could be affected by the proposed action. It also recommended that the National Marine Fisheries Service be consulted to (1) determine the extent to which local populations or stocks of bottlenose dolphins may have been affected by the unusual mortality that occurred in late 1989 and early 1990; (2) identify and determine how best to obtain additional information needed to assess the possible effects of the proposed actions on endangered sperm whales and on populations of bottlenose dolphins and other non-endangered cetaceans that occur commonly in the northern Gulf; and (3) determine the kinds and scale of monitoring programs required to verify the predicted effects and to detect possible unforeseen effects of offshore oil and gas exploration and development on marine mammals in the northern Gulf of Mexico. The Commission further recommended that, if it had not already done so, the Service consult the Fish and Wildlife Service to determine what if any additional measures are necessary to assess and avoid the possible adverse impacts of the proposed actions on endangered Florida manatee populations.

With regard to points (2) and (3) above, the Commission noted that the Service's August 1989 workshop had recommended placing high priority on the design and implementation of surveys to determine when, where, and how many marine mammals, by species, age and size, and sex, occur in the northern Gulf, how distribution and abundance vary within and between years, and

what factors determine or affect distribution and abundance. The Commission concurred with the workshop findings and further recommended that the Minerals Management Service, in consultation with the Commission and the National Marine Fisheries Service, contract with a qualified individual or organization to develop a cost-effective plan for obtaining the necessary baseline data and conducting follow-up monitoring studies.

Proposed OCS Lease Sale #107, Navarin Basin

Lease Sale #107, tentatively scheduled for mid-1991, involves leasing up to 5,036 blocks (approximately 28.2 million acres) of submerged lands 48 to 360 km west of St. Matthew Island, Alaska, in the Bering Sea. Six species of endangered cetaceans, along with walrus, polar bears, and non-endangered species of cetaceans and pinnipeds, occur in the area.

The Minerals Management Service prepared a Draft Environmental Impact Statement on the proposed action and, by letter of 18 May 1990, distributed copies to the Commission and others for review and comment. The Draft Statement concluded that impacts of the proposed action on endangered whales would be low and that affected populations would recover to pre-lease conditions within three years.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the Draft Statement and, by letter of 17 July 1990, forwarded comments to the Service. In its letter, the Commission noted that the Biological Opinion, prepared by the National Marine Fisheries Service pursuant to section 7 of the Endangered Species Act, concluded, among other things, that the proposed sale could jeopardize the continued existence of endangered right whales. The Commission concurred with this conclusion and recommended that the Draft Statement be revised to indicate that the impacts of the proposed action on right whales could range from very low to very high.

The Commission further recommended that the Draft Statement be expanded to indicate the post-lease research and monitoring program that will be in place to address information-gathering needs identified in the Biological Opinion. The Commission also noted that, since the Biological Opinion was prepared, the Steller sea lion was listed on an emergency basis as threatened under the Endangered Species Act. The Commission recommended that, if the Minerals Management Service had not already done so, it re-initiate consultations with the National Marine Fisheries Service to consider possible effects of the proposed action on this species.

With respect to marine mammals other than endangered whales, the Draft Statement concluded that impacts on northern fur seals would be moderate and that the population would return to its

former pre-lease status within one generation. Impacts on walruses, pinnipeds (including Steller sea lions), polar bears, and non-endangered cetaceans were projected to be low. In its letter, the Commission noted that the Pribilof Islands fur seal population had declined by more than 50 percent since the late 1950s and that Steller sea lions appear to have declined by an even greater amount and at an increasing rate in recent years. In light of this, the Commission questioned whether either species would be able to recover from impacts, should they occur, within one generation or less. The Commission therefore recommended that the assessment of possible impacts on fur seals and Steller sea lions be reexamined. It also recommended that the Draft Statement be revised to evaluate possible effects on local sea otter populations due to activities that may be based on Unalaska Island or to oil spills.

Finally, the Commission recommended that information on the status of marine mammal populations be updated and that analyses of possible impacts on them be revised, as necessary, to better reflect current understanding and knowledge.

Proposed OCS Mining Program Lease Sale, Norton Sound, Alaska

A lease sale of submerged lands for purposes of hard mineral exploration and development was scheduled by the Minerals Management Service for July 1989, but was later rescheduled. The proposed sale involved 178,282 acres (or 40 blocks), 5 to 22 km offshore Nome, Alaska, in water depths of 20-30 meters. The Minerals Management Service's Draft Environmental Impact Statement on the proposed sale was provided to the Commission and others for review and comment in November 1988.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the Draft Statement and, by letter of 13 January 1989, provided comments to the Service. In its letter, the Commission noted that the Draft Statement did not fully assess the status of all marine mammal species likely to be found in the proposed lease sale area. It recommended, among other things, that the Draft Statement be expanded to identify and describe the types of monitoring programs that would be undertaken by the Alaska Regional Studies Program and lessees after the award of tracts to ensure possible unforeseen effects on marine mammals are detected and mitigated. At the end of 1989, the Commission was advised that the Minerals Management Service had decided to substantially modify the Draft Statement to address certain public health issues and other concerns.

On 15 June 1990, the Service distributed a Second Draft Environmental Impact Statement for the proposed Norton Sound lease sale, rescheduled for 1991. The second Draft Statement examined the possible effects of four alternative actions on five species of non-endangered marine mammals and endangered gray

whales. It concluded that the effects of the preferred alternative (or base-case scenario) on those species would be minor.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the second draft document and, by letter of 30 July 1990, provided comments to the Service. In its letter, the Commission noted that the document still did not provide a thorough assessment of what species and populations of marine mammals that could be affected, and the degree to which they could be affected, if mining exploration and development proceed as proposed. The Commission recommended that the Final Environmental Impact Statement provide a more thorough assessment of possible effects and support the draft's contention that insignificant numbers of polar bears, harbors seals, North Pacific fur seals, minke whales, killer whales, and harbor porpoise occur in or near the lease sale area. The Commission also recommended that, in view of the emergency listing of Steller sea lions as threatened under the Endangered Species Act, the Service re-initiate section 7 consultations with the National Marine Fisheries Service to determine whether the proposed action would jeopardize this species or adversely affect habitat critical to its survival.

As regards possible effects of this proposed ocean mining on the marine environment, the Commission reiterated recommendations in its January 1989 letter to the Service. Specifically, it recommended that the Service: (1) take steps to obtain reliable baseline information on mercury levels and monitor levels of mercury in human populations and key components of marine food chains that could be affected; and (2) adopt measures to minimize the spread of fine sediments, including down-shunting dredge tailings directly to the sea floor.

In its 30 July 1990 letter, the Commission further recommended that the Final Statement be expanded to more completely evaluate: (1) the numbers of marine mammals that could be affected; (2) the proportions of species or populations that could be affected; (3) the extent to which these populations are already being affected by other human activities not associated with the proposed action; (4) how individuals of various species might be affected by the proposed activities; (5) habitats essential to the welfare and maintenance of marine mammals that could be affected; and (6) measures that would be taken to avoid or mitigate these potential impacts. The Commission recognized that obtaining all the information needed to make these assessments would involve enormous costs and lengthy delays. It therefore recommended that, if the proposed mining activity were authorized, the Minerals Management Service consult with the National Marine Fisheries Service, the Fish and Wildlife Service, and the Alaska Department of Fish and Game to develop and implement monitoring programs to verify predicted effects and

detect any possible unforeseen mining effects on marine mammals in time to initiate meaningful mitigation measures.

Proposed OCS Lease Sale #126, Chukchi Sea

Lease Sale #126, tentatively scheduled for August 1991, involves leasing up to 4,319 blocks (approximately 23.7 million acres) of submerged lands in the Chukchi Sea, ranging from 3.5 to 200 miles off northwest Alaska. Marine mammals occurring in the proposed lease sale area include four species of endangered cetaceans (bowhead, gray, fin, and humpback whales), polar bears, walruses, beluga whales, and several species of pinnipeds.

The Minerals Management Service prepared a Draft Environmental Impact Statement on the proposed lease sale and, by letter of 6 July 1990, provided copies to the Commission and others for review and comment. The Draft Statement determined that bowhead whales and gray whales are the species most likely to be affected by the proposed action. It concluded that, under all leasing alternatives, impacts on the bowhead and gray whales were likely to be very low.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the Draft Statement and, by letter of 10 September 1990, forwarded comments to the Service. In its letter, the Commission noted, among other things, that the Draft Statement appeared to underestimate possible effects on bowhead whales. The Commission further noted that, since the Service had initiated consultations with the National Marine Fisheries Service pursuant to section 7 of the Endangered Species Act, the Steller sea lion had been listed as threatened on an emergency basis. The Commission recommended that, if the Minerals Management Service had not already done so, it contact the National Marine Fisheries Service to ask if consultations should be expanded to consider the Steller sea lion.

As regards non-endangered marine mammal species, the Commission noted that the Draft Statement did not address the possibility of polar bears' being attracted to offshore facilities by smells, lights, noise, or other factors, and being killed or injured through interactions with equipment, supplies, or people. The Commission recommended that the Draft Statement be revised to indicate that such effects or contact with large oil spills could cause impacts on polar bears ranging from very low to moderate levels.

The Draft Statement described a number of potential lease stipulations and notices to lessees that could reduce possible impacts on marine mammals and other wildlife. The Commission recommended that the measures be modified and adopted and that two additional mitigation measures be included in the Final Environmental Impact Statement. The first would require lessees

to develop and implement polar bear interaction plans to minimize the likelihood of interactions between bears and oil and gas activities and to minimize the adverse effects on both bears and workers, should any interactions occur. The second measure would impose a seasonal drilling restriction in the bowhead whale migratory corridor to prohibit exploration activities from incidentally taking any whales during the species' spring migration.

Small-Take Exemptions

Section 101(a)(5) of the Marine Mammal Protection Act provides for the incidental, but not intentional, taking of small numbers of marine mammals by other than commercial fishing operations, provided that the total taking will have a "negligible impact" on the affected species or stock. On 3 October 1989, the National Marine Fisheries Service published in the Federal Register a proposed rule to authorize for five years the take of six species of marine mammals by harassment incidental to oil and gas activities in the Chukchi and Beaufort Seas.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the proposed rule and, by letter of 9 February 1990, provided comments to the Service. In the letter, the Commission noted that it appeared that the proposed taking would have no more than a negligible impact on the six species of marine mammals covered by the proposed rule. However, the Commission pointed out that, due to the deliberately imprecise definition of the term, it was not clear that only "small numbers" of marine mammals, particularly bowhead whales, would be taken.

Consequently, in its letter, the Commission recommended that the Service estimate the numbers of each species of marine mammal that may be taken and fully explain its determination as to whether those numbers can be appropriately characterized as "small." In addition, the Commission recommended that the proposed rule be amended to provide the Commission and the public an opportunity to review and comment on specific survey and exploratory activities for consistency with regulatory requirements before the letters of authorization are issued.

As regards monitoring and reporting requirements, the Commission recommended that the Service and/or the applicant: (1) determine more precisely the net annual recruitment rate of bowhead whales and the annual variation therein; (2) develop and use a population simulation model to estimate the time that it will take for the bowhead whale population to recover to its maximum net productivity level, given the annual recruitment estimate; and (3) design and implement a program to verify that oil and gas exploration does not significantly affect the time required for the species to recover to its optimum sustainable

population level. Finally, the Commission recommended that, prior to authorizing the requested take, the Service develop a bowhead whale recovery plan and, based on the recovery plan, determine that: (1) the activities will not significantly affect the time it will take the 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 affect the population's recovery rate.

On 18 July 1990, the National Marine Fisheries Service published a final rule, allowing for an incidental take of small number of marine mammals as a result of oil and gas exploration in the Chukchi and Beaufort Seas. The rule is in effect for a five-year period, beginning 17 August 1990.

On 10 August 1990, the Fish and Wildlife Service published a notice in the Federal Register, announcing that it had received a request from Shell Western E&P, Inc., seeking promulgation of regulations to allow the incidental take of small numbers of polar bears and walruses during oil and gas exploration in the Chukchi Sea over the next five years. At the end of 1990, the Service had not published a proposed rule.

On another matter related to small-take exemptions, the National Marine Fisheries Service published a Federal Register notice on 30 January 1990 announcing receipt of a petition from the American Petroleum Institute. The petition requested that the Service promulgate regulations under section 101(a)(5) to permit removal of offshore oil and gas structures and related facilities in the Gulf of Mexico. The petitioners proposed to use explosives to remove 670 oil and gas structures during the next five years, and estimated that some 5,500 structures would need to be removed over the next 35 years. In their request, the petitioners stated that small numbers of bottlenose dolphins and other marine species could be affected by exposure to sound and pressure waves associated with use of explosives to remove the structures. They concluded that the most likely form of incidental take would be harassment from low-level sound pressure waves, although animals close to a detonation site could be killed.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the petition and, by letter of 30 March 1990, provided comments to the Service. In it, the Commission noted that the petitioners did not indicate the numbers of dolphins or other marine mammals that possibly could be affected, or how the effects might be compounded by such things as incidental take during commercial fishing operations, live captures for public display, and the unusual dolphin mortality that was occurring in the Gulf of Mexico at that time. The Commission further noted that, without reliable information on the number of dolphins that might be affected, and how the

populations are being affected by other human activities or natural factors, it was not possible to make the findings necessary to obtain a small-take exemption under section 101(a)(5).

In light of this, the Commission recommended that the petition be granted provided that: (1) the applicants provide information indicating that only small numbers of various marine mammal species will be taken; and (2) a monitoring program is undertaken to verify the predicted effects and to detect any unforeseen effects of the proposed structure removals on bottlenose dolphins and other marine mammals.

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; Los Angeles, 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 6 February 1990, the Marine Mammal Commission provided comments on the draft Pacific Regional Studies Plan for fiscal years 1991-1992 as it relates to marine mammals. In its letter, the Commission noted that the Plan provided for obtaining data needed to determine when, where, and how many marine mammals and seabirds might be affected directly by oil spills, etc., but did not appear to provide for obtaining information needed to determine possible indirect (e.g., food chain) effects on the species. The Commission suggested that, if

the Service had not already done so, it review available life history, food habit, and habitat-use data on marine mammals occurring in the Pacific OCS region to identify critical data gaps concerning the possible indirect impacts of offshore oil and gas exploration and development, and that the Studies Plan be expanded accordingly.

In addition to commenting on the draft Studies Plan, the Commission's Scientific Program Director participated in a Workshop on Protected Species, held by the Minerals Management Service on 26-28 June in conjunction with the meeting of its Scientific Committee. Also, on 14 November 1990, the Commission's Assistant Scientific Program Director convened an informal meeting of scientists to discuss marine mammal research activities in the Gulf of Mexico. The meeting was held in conjunction with the Minerals Management Service's Gulf of Mexico OCS Region Information Transfer Meeting in New Orleans, 13-15 November 1990.

CHAPTER X

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 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 1990, 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. Those departments, agencies, and offices were 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 Minerals Management Service; the National Aeronautics and Space Administration; the National Institutes of Health; the National Marine Fisheries Service; the National Ocean Service, Office of Ocean and Coastal Resources Management; the National

Park Service; the National Science Foundation; the Office of Oceanography and Marine Assessment; the National Ocean Pollution Program Office; the National Sea Grant College Program; the Smithsonian Institution; and the U.S. Fish and Wildlife Service.

Responses to requests for information concerning projects undertaken in FY 1990 and planned for FY 1991 had been received from most of the agencies by December. This information will be summarized in early 1991 and made available in the Commission-sponsored report "Survey of Federally-Funded Marine Mammal Research and Studies" (see below).

Research Program Reviews, Workshops, and Planning Meetings

In 1990, the Commission, in consultation with its Committee of Scientific Advisors, reviewed, commented on, and/or made recommendations on actions concerning bottlenose dolphins; harbor porpoise off California, Alaska, and New England; Hawaiian monk seals; humpback whales; North Pacific fur seals; polar bears; right whales; 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; and entanglement of marine mammals in lost and discarded fishing gear and other marine debris.

The Commission also convened, co-sponsored, provided background information for and/or participated in meetings and workshops to review and evaluate efforts to implement the Hawaiian Monk Seal Recovery Plan; review and assess the status of Steller sea lions and walruses; develop recovery plans for endangered right and humpback whales; determine critical data needs with regard to the effects of offshore oil and gas activities on marine mammals; assess available information and determine additional research needed to resolve uncertainties concerning unusual marine mammal mortalities; evaluate plans for improving the regional marine mammal stranding networks and marine mammal tissue bank being administered by the National Marine Fisheries Service; identify additional boat speed regulations and other measures needed to protect and prevent further decline of manatee populations in Florida; review measures being taken by the National Marine Fisheries Service to encourage foreign tuna fishing fleets to reduce the incidental take of porpoise to levels comparable to that achieved by the U.S. fleet; review measures taken by the International Whaling Commission and U.S. domestic policy concerning the conservation of endangered whales; strengthen international guidelines for reducing marine debris pollution from ships; identify priority research and management tasks for the U.S. Marine Entanglement Research Program; assess available information and determine additional research needed to resolve uncertainties concerning the observed decline of Steller sea lions, harbor seals, North

Pacific fur seals, and other components of the Bering Sea ecosystem; and review and assess progress to develop an international regime for the protection of the arctic environment.

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 identify and evaluate threats to marine mammal populations. 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 700 projects, ranging in amounts from several hundred dollars to $150,000. The amounts annually spent on research and studies since 1986 have averaged about $100,000. In Fiscal Year 1991, the figure will be less.

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.

Projects undertaken by the Marine Mammal Commission in calendar year 1990 are summarized below. These include projects co-sponsored by the Department of Agriculture and the National Marine Fisheries Service. In 1990, these agencies transferred $38,500 to the Commission in partial support of certain projects. Jointly supported projects are so identified in the project summaries.

Final reports from Commission-sponsored studies completed in 1990 and earlier are available from the National Technical Information Service; they 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.

Project Summaries

Review of Gulf of Mexico Bottlenose Dolphin Die-Off Investigation

(John S. Reif, D.V.M., Department of Environmental Health, Colorado State University, Fort Collins, Colorado, and Randall S. Wells, Ph.D., Conservation Biology Department, Brookfield Zoo, Brookfield, Illinois)

As noted in Chapter V, 240 dead bottlenose dolphins were found washed up on beaches in Texas, Louisiana, Mississippi, Alabama, and northwest Florida in the first four months of 1990. Because the stranding rate was much higher than normal, the National Marine Fisheries Service began studies in late February to try to determine the magnitude, biological significance, and cause of the increased mortality. The contractors participated on a panel convened by the Service on 14-15 May, in response to a Marine Mammal Commission recommendation, to review and provide advice on ways to improve the investigation. The panel identified steps that should be taken to expedite the ongoing investigation and to be better prepared to deal with such events in the future. Details of the review are provided in Chapter V.

On-Site Evaluation of the Striped Dolphin Die-Off in the Western Mediterranean

(Joseph R. Geraci, V.M.D., Ph.D., Pathology Department, Ontario Veterinary College, University of Guelph, Ontario, Canada, and W. George Miller, D.V.M., Ph.D., Naval Oceans System Center, San Diego, California)

Unusually high numbers of striped dolphins began to die in the western Mediterranean Sea in mid-July 1990. Because the die-off continued through the late summer and fall, the Marine Mammal Commission contracted in October 1990 with two investigators, both experienced in investigating such unusual mortalities, to travel to Spain to obtain a firsthand report on the situation; provide the Spanish investigators information on methods and procedures that had proved useful in previous die-off investigations; and examine the findings for similarities that might exist with respect to other die-offs. The contractors' report, received on 8 November 1990, indicated that the cause of the increased mortality was unknown, that its impact on the population also was unknown, that a virus of the type responsible for the mass mortality of harbor seals in the North Sea in 1988 had been detected, that high levels of organochlorines also had been found in some animals, and that the present research

protocol did not include studies to detect possible naturally occurring biotoxins. Details of the die-off and continuing investigation are provided in Chapter V.

Expedite Investigation of the Striped Dolphin Die-Off
(Alex Aguilar, Ph.D., University of Barcelona, Barcelona, Spain)

Information obtained during the site visit described above indicated that investigation of the striped dolphin die-off in the western Mediterranean was being impeded by a lack of trained assistants to archive and analyze specimen materials that had been collected. The Commission therefore provided money for two graduate students to assist in archiving and analyzing specimen materials and to report on samples that have been collected and the analyses that have been or will be done. A draft report is due on 1 March 1991.

World Conservation Union/Species Survival Commission Cetacean Action Plan
(Center for Marine Conservation, Washington, D.C.)

The World Conservation Union (formerly the International Union for Conservation of Nature and Natural Resources) Species Survival Commission's Cetacean Specialist Group prepared and published an international plan for the conservation of dolphins, porpoises, and whales. In order to help implement the plan, the Center for Marine Conservation was provided funds to help the Cetacean Specialist Group cover the initial salary and related expenses of a professional to assist the group's chairman. It is the Commission's belief that effective implementation of the action plan will further the conservation of dolphins, porpoises, and whales in both developing and developed countries.

Workshop To Develop a Recommended Protocol for Evaluating Swim-with-the-Dolphin Programs
(Randall S. Wells, Ph.D., Conservation Biology Department, Brookfield Zoo, Brookfield, Illinois, et al.)

In recent years, four facilities have been permitted, on an experimental basis, to allow members of the public to enter the water and interact in various ways with bottlenose dolphins being maintained for public display. To determine how best to resolve uncertainties concerning possible risks to dolphins and people, the Marine Mammal Commission, at the request and with the support of the National Marine Fisheries Service, organized and held a workshop on 9 August 1990 to identify critical uncertainties relating to risks and benefits of swim-with-the-dolphin programs. The workshop was asked to describe how the uncertainties might be resolved and to estimate the time, money, and special equipment

Report. Papers resulting entirely or in part from Commission-sponsored activities and published elsewhere are listed in Appendix C.

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or logistic support that would be required to accomplish this. The results of the workshop are described in Chapter XI.

International Workshop on the Ecology and Management of Walrus Populations
(Francis H. Fay, Ph.D., Institute of Marine Science, University of Alaska, Fairbanks, Alaska)

Walrus populations occur in areas under the jurisdiction of the United States, Canada, the Soviet Union, and several other Arctic countries. The purposes of this workshop, held in Seattle, Washington, on 26-30 March 1990, were to facilitate communication, encourage coordination, and generate cooperation among researchers and managers responsible for conservation of the world's walrus populations. Support for the workshop was provided by the Marine Mammal Commission, the Fish and Wildlife Service, the University of Alaska, and the National Marine Fisheries Service. Participants included representatives from Canada, Greenland, Norway, the Soviet Union, and the United States. The workshop report, published and provided to workshop participants and others in October 1990, reviews the history and present status of world walrus stocks and describes actions that should be taken, both domestically and internationally, to better assess and conserve those stocks. The results are more fully described in Chapter II.

Workshop on the Bering Sea and Southern Ocean Ecosystems
(Katherine A. Green-Hammond, Ph.D., Albuquerque, New Mexico; EBASCO Environmental, Seattle, Washington; and Gordon L. Swartzman, Ph.D., University of Washington, Seattle, Washington)

The Marine Mammal Commission and its Committee of Scientific Advisors are deeply concerned about substantial declines since the mid-1970s in populations of Steller sea lions, harbor seals, fur seals, and several bird species in the Bering Sea and Gulf of Alaska. The Commission therefore proposed and organized this workshop to identify critical gaps in knowledge concerning the causes and possible relationships among the observed population declines, describe the research that would be required to resolve the uncertainties, and compare approaches to fisheries-related research and management in the Bering Sea and the Southern Ocean (the sea surrounding Antarctica). Funded by the National Marine Fisheries Service and the Commission, the workshop was held in Seattle, Washington, on 12-13 December 1990. Participants included scientists from the academic community and state and Federal agencies. The contractors helped compile and evaluate background information, arrange meeting logistics, and prepare the workshop report. The principal findings and conclusions of the workshop as they relate to marine mammals are described in Chapter VII.

Bottlenose Dolphins as Possible Environmental Indicators
(Bernd Würsig, Ph.D., Texas A&M University at Galveston, Galveston, Texas)

To test the hypothesis that bottlenose dolphins may be sensitive indicators of the health of the marine ecosystem of which they are a part, in this case, a part of the Gulf of Mexico, the contractor has started a long-term study of the distribution, home range, health, behavior, and social organization of bottlenose dolphins in the Galveston area. The study includes observation of individuals and groups of animals to determine daily and seasonal habitat-use patterns; it also includes the recovery and necropsy of dead animals to determine cause of death. The National Marine Fisheries Service and the Texas Sea Grant Program provided funding for initial baseline studies. The Commission provided supplementary funding to continue behavioral, photographic identification, and ecological studies. The National Marine Fisheries Service and the Texas Sea Grant Program are expected to provide the support necessary to complete the project. The results should indicate whether bottlenose dolphins in the Galveston area are being affected adversely by industrial and other development, as well as the potential value of bottlenose dolphins as ecological indicators.

Review of Information Concerning Small Cetacean Populations in the Black Sea
(Stephen T. Buckland, Ph.D., Scottish Agricultural Statistical Service, Aberdeen, Scotland)

Papers presented at the June 1990 meeting of the International Whaling Commission's Scientific Committee indicated that fishery managers in Turkey were considering culling dolphin populations in the Black Sea because they were believed to have been responsible for collapse of the anchovy fishery there. The Scientific Committee questioned the dolphin population estimates. It recommended that the estimates receive rigorous independent review and that they not be used as a basis for management action. In support of the Scientific Committee's recommendations, the Marine Mammal Commission contracted for such a review. The contractor identified three potentially major sources of bias and cast serious doubt on the validity of the population estimates. Given the depleted state of cetacean populations in the Black Sea, the contractor concluded that it is unlikely that cetaceans were responsible for the collapse of the anchovy fishery; the rationale for a cetacean cull is not well established; and such a cull may have little impact on the status of the anchovy fishery. The results of the review were conveyed to the Turkish Government and are discussed further in Chapter IV.

Communication of Information Concerning Conservation of Manatees and Dugongs
(Daryl P. Domning, Ph.D., Howard University, Washington, D.C.)

The contractor summarizes information on the conservation and protection of Sirenians (manatees and dugongs) in a newsletter published by the World Conservation Union, Species Survival Commission's Sirenia Specialist Group. The newsletter is distributed to scientists, government agencies, and the public throughout the world. In 1989 and again in 1990, the Marine Mammal Commission provided funds to help cover printing and mailing costs for the newsletter.

International Conference on Northern and Southern Elephant Seal Populations
(Burney J. LeBoeuf, Ph.D., University of California, Santa Cruz, California)

Elephant seal breeding colonies occur in a number of remote coastal areas in California, Baja California, Mexico, southern Argentina, southern Chile, and many of the sub-Antarctic islands. All populations have been heavily exploited and are now protected. Many have grown rapidly in recent years and now are at or near historic levels. The purposes of this workshop, to be held in Santa Cruz, California, in May 1991, are to assess the status and trends of various populations; review available information on diving, foraging, and movement patterns to identify possible important feeding areas; and determine how natural and anthropogenic factors may be affecting the status and trends of the populations. The workshop report should be useful to those responsible for the conservation of elephant seals and their habitat worldwide. Workshop support has been provided by the Commission and several other organizations, including the Scientific Committee on Antarctic Research and the Scientific Committee for the Conservation of Antarctic Marine Living Resources. Participants will include scientists from Australia, Japan, the United Kingdom, and the United States.

Tugidak Island Harbor Seal Survey
(Alaska Department of Fish and Game, Anchorage, Alaska)

As noted in Chapter II, harbor seal populations in parts of Alaska have been declining since at least 1976. Although the Alaska Department of Fish and Game developed a biennial survey program to monitor population trends in these areas, it has not always had enough money to do the surveys. Therefore, in 1988 and again in 1990, the Marine Mammal Commission supported repeat surveys in areas where the declines have been greatest. The survey results, described in Chapter II, indicate that harbor

seal numbers are continuing to decline on Tugidak Island and possibly in other parts of Alaska.

Review of Information Concerning Humpback Whales in Hawaii
(Richard L. Townsend, Townsend Environmental, Vienna, Virginia)

A large part of the North Pacific humpback whale population spends the winter months in waters around the main Hawaiian Islands. Because coastal development, whale watching, and other activities may be affecting the whales and their habitat adversely, the Marine Mammal Commission contracted for this review of available information on the status, trends, and effects of human activities on the whales and their habitat. The report, expected to be completed early in 1991, will be given to the National Marine Fisheries Service and other appropriate agencies with recommendations on actions to improve protection of humpback whales and their habitat in Hawaiian waters.

Identification of Critical Right Whale Habitat
(Robert D. Kenney, Narragansett, Rhode Island, and Scott D. Kraus, New England Aquarium, Boston, Massachusetts)

As noted in Chapter II, the National Marine Fisheries Service appointed a Recovery Team to help develop and oversee implementation of a plan to facilitate recovery of right whale populations in U.S. waters. Although the Recovery Team recommended on 18 May 1990 that three areas along the east coast of the United States be designated as critical right whale habitat under the Endangered Species Act, it did not provide sufficient justification for so designating the three areas. Believing the development of adequate justification to be essential, the Marine Mammal Commission contracted for the compilation of right whale sighting, habitat use, habitat requirement, and other relevant data needed to more clearly describe the areas and justify critical habitat designation. The contractors' assessment, expected to be completed early in 1991, will be given to the National Marine Fisheries Service with such recommendations as may be appropriate for designating right whale critical habitat along the U.S. east coast.

Development of a Computerized Cetacean Bibliography
(William A. Watkins, Ph.D., Woods Hole Oceanographic Institution, Woods Hole, Massachusetts)

Thousands of scientific papers, books, and other documents bearing upon the conservation and protection of cetaceans have been written. These documents are of limited value unless they can be readily accessed by researchers, decision-makers, and members of the public. To facilitate access, the contractor has

developed a computerized storage system which permits accessing cetacean citations by author, journal, genus and species, geographic area, and a variety of topic areas. Both the computer software and the literature data base are being made available to other investigators. In 1990, the Commission provided continued support to help update the computer software.

Training Course for Veterinary Inspectors of the Animal and Plant Health Inspection Service
(William Medway, D.V.M., Ph.D., University of Pennsylvania, Philadelphia, Pennsylvania, et al.)

The National Marine Fisheries Service, the Fish and Wildlife Service, and the Department of Agriculture's Animal and Plant Health Inspection Service are jointly responsible for ensuring that facilities maintaining marine mammals in captivity comply with standards and regulations established under the Marine Mammal Protection Act and the Animal Welfare Act. To help meet these responsibilities, the Animal and Plant Health Inspection Service conducts periodic inspections of facilities holding marine mammals. At the request and with the financial support of the Service, the Marine Mammal Commission organized a marine mammal training course for Service veterinarians responsible for facility inspections. The course, held in Orlando, Florida, on 10-15 September 1990, was organized and chaired by William Medway, D.V.M., Ph.D., a member of the Commission's Committee of Scientific Advisors. The faculty included experts in all relevant aspects of marine mammal medicine and husbandry.

Handbook on Antarctic Seal Research Methods and Techniques
(Scientific Committee on Antarctic Research, Scott Polar Research Institute, Cambridge, England)

The 1972 Convention for the Conservation of Antarctic Seals calls upon the Scientific Committee on Antarctic Research to compile and conduct a continuing review of information concerning the status of Antarctic seal stocks. To help meet this responsibility, the Scientific Committee constituted a Group of Specialists on Seals. This group, in turn, undertook development of a handbook describing the best available methods and techniques for assessing the demographic parameters of Antarctic seal stocks. The Commission provided funds in 1990 to facilitate completion and publication of the handbook in 1991. The book should prove useful to scientists studying all species of seals.

Development of a Global Marine Conservation Ethic
(Stephen R. Kellert, Ph.D., Yale School of Forestry and Environmental Studies, New Haven, Connecticut)

It is becoming increasingly clear that coastal and marine development, dumping and dredging, poorly regulated fisheries, and a wide variety of other activities are adversely affecting the world's oceans. It is also clear that human welfare will depend upon the success of steps taken now to protect and conserve marine resources and the ecosystems of which they are a part. Recognizing this, the Marine Mammal Commission is supporting the contractor in undertaking preparatory work for an international symposium, the purpose of which would be to define a new marine conservation ethic.

Tern Island Site Survey
(Robert A. Justman, Pearl Pacific Enterprises, Honolulu, Hawaii)

The beaches of Tern Island, part of French Frigate Shoals in the leeward Hawaiian Islands, are critical habitat for about 10 percent of all remaining endangered Hawaiian monk seals. As noted in Chapter II, the sea walls protecting the island are being eroded by wave action and the integrity of the island itself is jeopardized. This project was undertaken in March 1990 to photo-document the condition of the sea walls and the threats posed by erosion and the surfacing of long-buried hazardous materials to Hawaiian monk seals, sea turtles, and seabirds. Survey results have been used by the Commission, in consultation with its Scientific Committee, to encourage the Fish and Wildlife Service, the Navy, and the Army Corps of Engineers to take the necessary steps to restore the island as suitable habitat for these species.

Survey of Federally-Funded Marine Mammal Research
(George H. Waring, Ph.D., Southern Illinois University, Carbondale, Illinois)

As required by law, the Marine Mammal Commission annually reports on marine mammal research conducted or supported by Federal agencies in the preceding fiscal year and on research plans for the current fiscal year. Early in 1991, the contractor's draft report summarizing information obtained in 1990 will be sent to Federal agencies to verify the accuracy of the reported data. In the spring, the final report will be provided to the agencies conducting or supporting marine mammal research 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 needed to better develop, focus, and coordinate Federal marine mammal research programs.

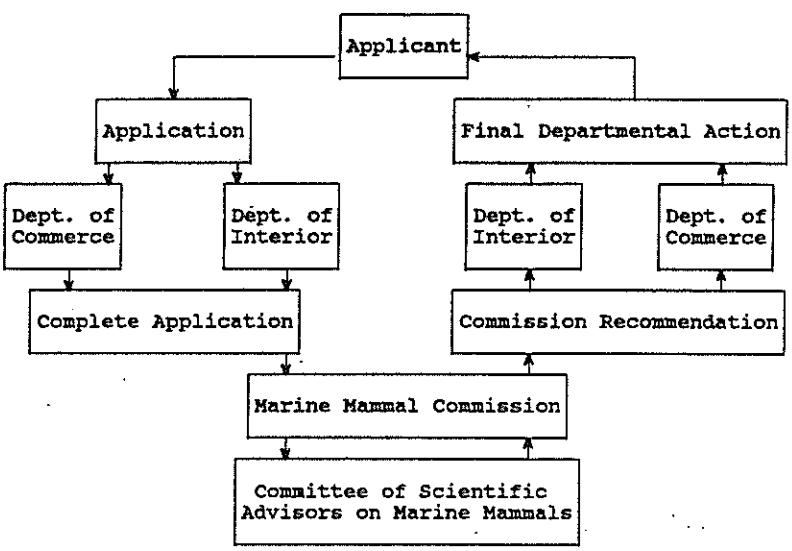
CHAPTER XI

PERMIT PROCESS

The Marine Mammal Protection Act placed a moratorium, with certain exceptions, on the taking and importing of marine mammals and marine mammal products. One exception is the provision 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 or public display. 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 three stages: (1) receipt and initial review of the application at either the Department of Commerce or the Department of the Interior, publication of a notice of receipt of the application in the Federal Register, and transmittal to the Marine Mammal Commission; (2) review of the application by the Commission, in consultation with its Committee of Scientific Advisors, and transmittal of its recommendation to the Department; and (3) final processing by the Department, including consideration of all comments and recommendations of the Commission and the public, resulting in the approval or denial of the permit. The following is a schematic representation of this process.



The total review time (initial receipt of application until final Departmental action) depends on many factors, including the sufficiency of the information provided by the applicant; special requirements, such as an inspection, should such be deemed necessary, of an applicant's marine mammal holding facilities; and the efficiency and thoroughness of those responsible for the agency review.

During 1990, the Commission made recommendations on 18 applications submitted to the Department of Commerce, including two applications that were received in 1989 but did not receive final action until 1990, and five applications submitted to the Department of the Interior. The Commission's average review time for complete applications was 53 days (median, 48 days). Not included in the preceding statistics are recommendations on eight applications that were awaiting final action by the Department of Commerce and one application awaiting final action by the Department of the Interior at year's end and one application that was under Commission review at year's end. The Commission, in consultation with its Committee of Scientific Advisors, also made recommendations on 34 requests to modify permits and other related permit actions during 1990. The average time required for Commission review of these matters was 45 days.

For the 18 applications processed by the Department of Commerce during 1990, it took an average of 165 days (median, 132.5 days) from the date the application was received by the Department until final action was taken. The five permit applications submitted to the Department of the Interior were processed in an average of 181 days (median 127 days). If calculated from the date of receipt of a complete application by the Departments, the average processing times for the Departments of Commerce and the Interior were 131 and 164 days, respectively, compared to 145 and 70 days, respectively, in 1989.

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 discussed below, several provisions were amended and a provision authorizing permits for actions to enhance the survival and recovery of marine species and stocks was added. 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.

By letter of 24 August 1989, the Commission provided extensive comments on the discussion paper. Among other things, the Commission: proposed a 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.

Beginning in October 1989, the Service convened a series of working sessions on various aspects of its permit program to solicit additional public comment and to foster greater discussion of the major issues. Workshops were held to address the definition of public display, scientific research permits, care and maintenance standards for captive marine mammals, and public display education and conservation programs. Two additional working sessions on the application of the National Environmental Policy Act to the permit process were held in January 1990.

The Commission, by letter of 12 March 1990, provided the Service with supplemental comments on steps that should be taken to streamline and improve the permit process. In particular, the Commission noted that there was a need for improved permit application procedures to facilitate submission of adequate, accurate permit requests. In this regard, the Commission recommended that the Service: (1) revise existing permit application instructions based on information obtained and regulations issued as a result of the Service's permit program review; (2) write and publish articles on how to prepare adequate permit applications for scientific research, public display, and enhancement activities, clearly explaining the factors considered in reviewing each type of application and their relative importance in the decision-making process; (3) develop additional policy statements, guidelines, and issuance criteria for staff review of permit applications, including guidelines for denying or returning applications and operational definitions of all

issuance criteria; (4) establish an informal preliminary review mechanism to determine completeness of an application prior to publication of a notice of receipt in the Federal Register and public distribution; (5) prepare summary documents (e.g., draft decision memoranda) on all permit applications to identify key issues, facilitate review, and allow timely preparation of environmental documents; (6) establish and maintain comprehensive, up-to-date files on applicants' facilities, inventories, and personnel to reduce duplicative filings by applicants; and (7) hold annual seminars with regional marine mammal coordinators and the Commission to review permit requirements, discuss issuance criteria, and review and discuss emerging permit issues. Many of these suggested improvements can and should be implemented without waiting for publication of revised permit regulations.

Monitoring and enforcement of marine mammal permits is another area identified by the Commission where reforms are necessary. In its 12 March letter, the Commission recommended that the Service: (1) revise and update its general permit conditions to incorporate certain special conditions routinely recommended by the Commission and other reviewers; (2) establish a system for timely, expert review of permittees' reports (e.g., necropsy reports, collection reports, and annual research reports) to identify possible cumulative impacts on marine mammal populations, to monitor compliance with permit conditions, to determine if modifications are necessary or appropriate, and to assess whether ongoing research is bona fide; (3) develop closer coordination with Regional Offices on permit matters; (4) establish policies and logistic protocols for animals confiscated from facilities in the event of permit revocation; (5) consider using Federal-State cooperative agreements to obtain monitoring and enforcement assistance; (6) establish criteria under which permits would be denied or revoked for repeated noncompliance of a facility with Animal and Plant Health Inspection Service standards; and (7) implement procedures, including inspections, to determine if education programs proposed by public display facilities in their applications have been implemented. While implementation of most of these recommendations is being deferred pending publication of revised permit regulations, the Service has announced that it intends to hire a qualified marine mammal veterinarian to assist in monitoring compliance with applicable permit conditions, review necropsy reports, etc.

Based upon its discussion paper, comments on the discussion paper, 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 review in early 1991.

On 12 March 1990, the Commission 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 indicated verbally that it is considering adopting revised regulations either similar to or identical to those being developed by 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 authorize activities designed to enhance the survival or recovery of marine mammal populations. Also, under the amendments, marine mammals that were pregnant at the time of taking, 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 Service is required to determine that the proposed taking is required 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 and, in the case of lethal research involving depleted marine mammals, a take 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 1991.

The Service published an interim policy with respect to education and conservation programs on 22 May 1989. Under that interim policy, the Service, when reviewing a public display permit application, judges whether an education or conservation program is a component of the proposed display; whether the program provides accurate information that is consistent with the purposes and policies of the Marine Mammal Protection Act; and whether the facilities are open on a regularly scheduled basis without limitation other than the charging of an admission fee. As noted above, the Commission, by letter of 12 March 1990, recommended that the Service establish procedures, including inspections, to determine if education programs proposed by public display facilities in their applications have, in fact, been implemented.

The Commission also wrote to the Fish and Wildlife Service on 12 March 1990 recommending, among other things, that it adopt a policy similar to that published by the National Marine Fisheries Service for determining whether a public display facility offers an acceptable education or conservation program. The Fish and Wildlife Service has yet to formulate such a policy.

The Fish and Wildlife Service has adopted a policy with respect to the lethal take of marine mammals for public display. Patterned after the Marine Mammal Protection Act amendment restricting lethal research, the Service policy requires that: (1) an applicant demonstrate that it has exercised due diligence in trying to locate an alternative specimen; (2) no suitable specimen has become available from alternative sources within a two-year period after contacting potential sources; and (3) it is unlikely that a suitable specimen can be obtained within the foreseeable future by means other than a directed, lethal take.

During 1990, no applications for Marine Mammal Protection Act enhancement permits were received by the National Marine Fisheries Service or the Fish and Wildlife Service. Certain activities previously characterized as research (e.g., the

Hawaiian monk seal "head start" program) may, more appropriately, be characterized as enhancement activities, and the Commission expects that permits will soon be issued under this new authority.

A public display permit was applied for on 16 August 1990 seeking authorization to import orphaned walrus pups from the Soviet Union. Prior to enactment of the 1988 amendments such a request could not be considered inasmuch as importation of unweaned marine mammals was prohibited except for purposes of scientific research. While the material originally submitted with the application was insufficient to make the required showing that the importation was necessary for the protection or welfare of the animals, upon receipt of additional information the Commission recommended issuance of the permit.

Swim-with-the-Dolphin Programs

Since 1985, four public display facilities have been authorized by the National Marine Fisheries Service to conduct programs in which members of the public are allowed to enter the water and interact with bottlenose dolphins being maintained in captivity under public display permits. Because of possible health and safety risks to both dolphin and human participants, the Commission and the National Marine Fisheries Service consider these swim-with-the-dolphin programs to be experimental, and the programs have been authorized by the Service on a provisional basis.

By letter to the Service of 2 July 1987, the Commission expressed its continued concern about the potential for injury to individuals participating in swim-with-the-dolphin programs and recommended that: (1) swim program operators be required to inform participants of potential hazards and ways in which indications of a problem may be recognized early and possibly avoided; (2) complete records of any unfavorable interactions be retained and copies immediately forwarded to the Service; (3) any animal which displays unacceptable behavior that cannot be brought under control be prevented from further participation in such activities; and (4) swim program operators adhere strictly to all applicable federal laws, regulations, and guidelines relating to the welfare of both the humans and the dolphins. Further, the Commission noted that the four facilities currently authorized to conduct human-dolphin swim programs have open water systems and that additional problems are presented by closed water systems. Consequently, it recommended that the Service, in consultation with the Animal and Plant Health Inspection Service, undertake a prompt evaluation of the suitability of closed systems for such programs.

On 25 August 1988, the Service initiated a review of swim-with-the-dolphin program operations and their effects. In order to gather information for this purpose and to ensure the safety of both humans and dolphins during the proposed review period (ending 31 December 1989), the Service modified the four swim program operators' permits to require, among other things, submission of program protocols and detailed quarterly reports and continuous monitoring and strict supervision of swim sessions by program personnel. 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 on a provisional basis until 31 December 1989.

On 1 November 1989, the Service issued a Draft Environmental Impact Statement intended to evaluate the continued use of dolphins in swim-with-the-dolphin programs. The Statement examined, among other things, the cumulative effects of possible increased demand for dolphins for aquaria, zoos, amusement parks, and hotel/resort facilities, as well as health and safety issues, including possible disease transmission and injuries. Four public hearings were held during November and December 1989, one in Washington, D.C., two in Florida, and one in Hawaii. On 19 December 1989, in consideration of the anticipated time needed to conclude the decision-making process, the Service extended the four swim programs authorizations until 30 April 1990.

The Commission commented on the Draft Environmental Impact Statement by letter of 5 February 1990. The Commission noted that, due to the absence of reporting and inadequate reporting of essential data by swim program operators and inadequate and inconsistent monitoring and enforcement of the program by the National Marine Fisheries Service, many questions remained unanswered with respect to the effects of swim-with-the-dolphin programs on both humans and dolphins. It noted that, if authorization for continuation of swim programs was to be granted, additional information was needed with respect to the likelihood of disease transmission among dolphins and humans; the occurrence and incidence of stress-induced disease in dolphins used in the programs; the potential for human injury as a result of dolphin aggression; the types and numbers of injuries to humans since the inception of swim programs; uncertainties surrounding the disposition of animals that are considered no longer suitable for swim programs (e.g., their maintenance and usefulness in other types of displays); the capability of the National Marine Fisheries Service to monitor the programs and enforce reporting and other requirements imposed on program operators; and the effect of removals from the wild of dolphins for swim programs in conjunction with other authorized captures and takings incidental to commercial fishing and other activities.

Consequently, the Commission recommended that: no additional animals be removed from the wild for swim programs; no additional swim programs be authorized; 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 by the National Marine Fisheries Service be established and carried out to ensure that they are being conducted as responsibly and safely as possible and that required reports are submitted as specified.

On 1 May 1990, the Service extended swim program authorizations until 30 June 1990 to allow time for public comment on the Final Environmental Impact Statement, which was issued on 2 May 1990. The preferred alternative discussed in the Final Environmental Impact Statement called for acquisition of additional information before a final decision can be reached on the potential environmental effects of swim-with-the-dolphin programs; extending the four existing experimental swim program authorizations until 31 December 1991; implementation of a greatly expanded and enforced monitoring program; prohibition of additional swim programs and expansion of existing programs; and prohibition of captures of dolphins from the wild for use in human-dolphin swim programs.

On 29 June 1990, the Service modified the four swim program permits to authorize the conduct of the programs until 31 December 1991 and to require, among other things, cooperation with the Service and its agents in a study to investigate the effects of swim programs; compilation and submission of baseline information on various aspects of the swim program; maintenance of comprehensive daily behavior, feeding, and health records; additional program restrictions; and comprehensive quarterly reporting requirements.

On 9 August 1990, the Commission, at the request of the National Marine Fisheries Service, convened a workshop to develop a recommended protocol(s) 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 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; and 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. The final workshop report is expected to be completed in January 1991, at which time the

Commission will transmit it to the Service with the recommendation that the Service convene a meeting with research project personnel and swim program operators and their staffs to review the report and finalize research methodologies and schedules.

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 might be 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" and, by letter of 21 December 1989, recommended that the permit be denied. Among the considerations which led to this 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, could, however, be legally conducted 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 a dolphin feeding permit, citing its belief that these programs are not consistent with the purposes and policy of the Marine Mammal Protection Act. Consistent with

that determination, the Service, on 29 August 1990, published a policy statement in the Federal Register that it would no longer accept or review public display permit applications seeking authorization to feed marine mammals in the wild.

In addition, to avoid any possible misunderstanding as to whether or not feeding wild marine mammals is 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 rule would clarify that "feeding or attempting to feed a marine mammal in the wild in any manner" constitutes a take. As proposed, the rule would apply to feeding all wild marine mammals, not only dolphins. As such, the new definition would pertain to other situations, including the feeding of California sea lions from the wharf in Monterey, California.

By letter of 11 December 1990, the Commission supported adoption of the proposed rule. 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." Publication of a final rule is expected early in 1991.

CHAPTER XII

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. Recent activities in that regard are discussed below.

Animal Welfare Act

On 17 August 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 and, in particular, 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.

On 20 September 1979, after lengthy and extensive correspondence, consultation, and rulemaking, the Department of Agriculture's Standards and Regulations for the Humane Handling, Care, Treatment, and Transportation of Marine Mammals went into effect. These standards were promulgated by the Department under the Animal Welfare Act in response to recommendations by the Commission.

The standards establish minimum requirements for the care, maintenance, and transportation of captive marine mammals and 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 a license from the Department of Agriculture's 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 modification of existing facilities, construction of new facilities, or other actions necessary to achieve full compliance.

The standards were last amended by the Service on 28 June 1984. Significant areas covered by the amendments included space requirements for primary enclosures for certain marine mammals, new procedures for the granting of 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.

Maintenance of Marine Mammals in Isolation

The Commission believes that maintenance of captive marine mammals in isolation (i.e., without the companionship of other animals of the same species or a compatible species of the same order) is inappropriate except for purposes of medical treatment or on a temporary basis in other special situations. As discussed in its previous Annual Report, the Commission has written to the Animal and Plant Health Inspection Service on several occasions since 1987 regarding the issue of holding captive animals in isolation.

In its letters, the Commission has expressed concern about the Animal and Plant Health Inspection Service's interpretation of that section of the Animal Welfare Act standards that address separation of animals being held in captivity, particularly with respect to those species considered by the Service as suitable companion animals for marine mammals. The Commission, in reacting to the Service's having found a sea turtle to be a suitable companion for a bottlenose dolphin, recommended that the regulations not be interpreted so broadly as to undermine their effectiveness and enforcement. The Commission also recommended that the Service undertake an investigation to identify facilities maintaining marine mammals in isolation so that corrective action could be taken. In a 17 February 1989 letter to the Service, the Commission raised the isolation issue specifically with respect to a manatee reportedly being held in captivity in violation of the Service's standards. By letter of 9 March 1989, the Service indicated that it had conducted a field survey of the facilities, but had yet to compile and review the results. The issue of captive isolation was again raised by the Commission in a 31 July 1990 letter concerning a bottlenose dolphin being maintained alone. In that letter, the Commission asked the Service to advise it of whether the results of the earlier field survey of facilities had been compiled and analyzed. At the end of 1990, the Commission had not yet received a reply to its 31 July 1990 letter. While the

Commission considers the need for re-examination of this issue to be clear, the Service's intentions with respect to reconsideration of its interpretation of the isolation regulation are not certain.

Pre-Act Marine Mammals

The Marine Mammal Protection Act does not apply to marine mammals taken before its effective date, 21 December 1972. In contrast, the Animal Welfare Act applies to all captive marine mammals regardless of when they were taken. Because the National Marine Fisheries Service and the Fish and Wildlife Service do not regulate the maintenance of so-called "pre-Act" marine mammals, the Commission, on 25 May 1989, wrote to the Animal and Plant Health Inspection Service recommending that it inspect all facilities maintaining exclusively pre-Act marine mammals to ensure compliance with applicable Animal Welfare Act regulations. The Commission again recommended in a letter of 31 July 1990 that inspection of facilities holding exclusively pre-Act marine mammals be conducted. At the end of 1990, the Commission had yet to be advised by the Service if the recommended inspections had been undertaken.

Review and Revision of the Maintenance and Care Standards

As stated in the its previous Annual Report, the Commission wrote to the Animal and Plant Health Inspection Service on 18 October 1988 and 2 May 1989, recommending that the Service, in consultation with appropriate government agencies, public display facilities, and scientific, environmental, and animal welfare organizations, define more clearly and, if necessary, revise its existing regulations under the Animal Welfare Act. The Commission noted that such a review was necessary in order to facilitate compliance by public display and research facilities, assist Animal and Plant Health Inspection Service officials in conducting facility inspections, and improve the effectiveness and fairness of the administration and enforcement of the regulations. During the National Marine Fisheries Service's 29 November 1989 permit review workshop on marine mammal care and maintenance, Animal and Plant Health Inspection Service representatives made known their view that a review of the standards was needed.

On 12 March 1990, the Commission wrote to the Animal and Plant Health Inspection Service, noting that the consensus of the 29 November 1989 permit review workshop was consistent with the Commission's previous letters to the Service. The Commission also noted that, by letter of 24 August 1989, it had recommended to the National Marine Fisheries Service that a review of care and maintenance requirements be conducted. The Commission recommended that the Animal and Plant Health Inspection Service

promptly arrange with the National Marine Fisheries Service to initiate such a review.

A meeting to develop a schedule for review of the standards, to identify issues in need of examination, and to discuss the need to enlist assistance of outside experts (e.g., marine mammal veterinarians and behaviorists) was held on 29 May 1990. Participating were representatives of the Animal and Plant Health Inspection Service, the National Marine Fisheries Service, the Fish and Wildlife Service, and the Marine Mammal Commission. The group developed a general schedule consisting of three phases: (1) development of a preliminary rough draft by the Commission staff in consultation with the three Services; (2) review and revision of the preliminary draft by a working group of representatives from the public display, research, and environmental communities and the government agencies; and (3) initiation of the in-house process by the Animal and Plant Health Inspection Service leading to publication and general distribution of the draft regulations for a 60-day comment period. At year's end, the Commission staff was in the process of developing the preliminary rough draft.

Veterinary Training Seminar

Since 1985, the Commission, in cooperation with the Animal and Plant Health Inspection Service and the National Marine Fisheries Service, has sponsored training seminars for Animal and Plant Health Inspection Service veterinary inspectors. The most recent seminar was held on 10-15 September 1990 in Orlando, Florida. Seminar topics included the biology, physiology, and behavior of marine mammals; maintenance requirements for captive marine mammals; capture, transport, restraint, and examination of marine mammals; water quality; and discussions of how best to carry out the duties and responsibilities of inspectors in this specialized area. Visits to two public display facilities were conducted as part of the training. It is anticipated that a fourth seminar will be conducted in either 1991 or 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.

However, the new regulatory provisions drew a significant number of adverse comments after the final rule was published but before it became effective. Commenters noted that compliance with the regulations could result in inhumane treatment of some animals. It was also 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 were to take effect, the Service postponed the effective date until 1 August 1988 to enable it 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. The Service published a notice of intent, indicating those provisions of the rule that warranted amendment or clarification. Based upon that review, the Service, by Federal Register notice of 15 October 1990, proposed 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 the proposed regulations and at the end of 1990 was preparing its response. The Commission expected to support adoption of the proposed rule with certain recommendations for modification. In addition, the Commission anticipated recommending 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 seek agreement on terms consistent with those issued under the Animal Welfare Act and the Lacey Act Amendments of 1981.

APPENDIX A

COMMISSION RECOMMENDATIONS: CALENDAR YEAR 1990

2 January	Commerce, modification of scientific research permit, Bernd Würsig and Salvatore Cerchio.
3 January	Commerce, commenting to the National Oceanic and Atmospheric Administration on Norwegian research whaling activities and the application of relevant U.S. domestic authorities; noting that Norway has not withdrawn its objection to the International Whaling Commission's moratorium on commercial whaling; and concluding that there is justification for certifying to the President that Norway's research activities are diminishing the effectiveness of the International Whaling Commission's conservation program.
17 January	Commerce, scientific research permit application, National Zoological Park.
31 January	Commerce, modification of scientific research permit, Kenneth S. Norris and William T. Doyle.
31 January	Commerce, modification of scientific research permit, Dan R. Salden.
31 January	Commerce, modification of scientific research permit, Center for Coastal Marine Studies.
31 January	Interior, modification of scientific research permit, Southwest Fisheries Center.
31 January	Commerce, commenting to the National Marine Fisheries Service on the status of the Steller sea lion and recommending, among other things, that the Service: (1) publish an emergency rule listing the species as endangered under the Endangered Species Act; (2) take steps to publish a permanent rule to be effective after the emergency period; (3) expedite preparation of a draft Conservation Plan for the species; (4) constitute and convene a meeting of a Steller Sea Lion Recovery Team as soon as possible; and (5) review existing legal authorities to identify actions to halt the continuing decline of the Steller sea lion population.
5 February	Commerce, commenting to the National Oceanic Atmospheric Administration on reports of the ill-health of two Atlantic bottlenose dolphins being maintained at Hawk's Cay, Florida, and recommending that the Service engage qualified veterinarians to inspect the animals and the facility.
5 February	Commerce, commenting to the National Marine Fisheries Service on the Draft Environmental Impact Statement on swim-with-the-dolphin programs; noting, among other things, that the Draft Statement's discussion of the effect of removing bottlenose dolphins from the wild for use in such programs does not take into consideration the cumulative effects of such removals along with other authorized captures and incidental taking; and recommending, among other things, that the Service provide the Commission with a detailed report of the circumstances surrounding the death of two dolphins that may have participated in a swim-with-the-dolphin program and determine to what extent the animals' deaths may have been caused by the program.
6 February	Interior, commenting to the Minerals Management Service on the Pacific Outer Continental Shelf Draft Regional Environmental Studies Plan; noting that the Draft Plan includes studies for obtaining data on when, where, and how many marine mammals might be affected directly by oil and gas activities, but does not provide for obtaining basic data on indirect effects on those species; and recommending that the Service: (1) review available information on life history, diet, and habitat of marine mammals; (2) identify critical gaps that must be filled in order to assess possible direct and indirect impacts of the offshore oil and gas development on them; and (3) expand the studies plan accordingly.
8 February	Interior, public display permit application, Marine World, Umino-Nakamichi.

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9 February	Commerce, commenting to the National Marine Fisheries Service on a draft position paper for U.S.-Japanese talks on high seas driftnet fishing and recommending that the draft be expanded to: (1) include specific provisions for assessing the extent to which changes in fishing gear and practices would help reduce the incidental take of non-target species; and (2) provide background information needed to judge whether Japan's proposed observer program will provide statistically reliable data and whether the proposed system for automatically locating and tracking fishing vessels is technically and economically feasible.
9 February	Commerce, commenting to the National Marine Fisheries Service on its proposed rules for issuing a five-year authorization for the take of "small numbers" of six species of marine mammals incidental to oil and gas-related activities in the Beaufort and Chukchi Seas; noting that the term "small numbers" is purposefully imprecise; and recommending, among other things, that the Service: (1) estimate the numbers of each species of marine mammal that may be taken in order to determine if those numbers are appropriately small; (2) amend the proposed rules to provide the Commission and the public an opportunity to comment on findings; and (3) develop a recovery plan for endangered bowhead whales prior to authorizing the proposed exploration activities.
16 February	Commerce, commenting to the National Marine Fisheries Service on a workshop being planned by the Pacific Marine Fisheries Commission to assess issues of concern regarding the Steller sea lion and recommending that the Service, in consultation with industry groups: (1) develop hypotheses concerning the ways in which fisheries may have caused or contributed to the Steller sea lion decline; and (2) design a program to test the hypotheses while minimizing impacts on fisheries.
23 February	Commerce, modification of scientific research permit, C. Scott Baker.
23 February	Commerce, modification of scientific research permit, Southwest Fisheries Center.
1 March	Commerce, scientific research permit application, Southwest Fisheries Center.
1 March	Commerce, scientific research permit application, Daniel P. Costa.
2 March	Interior, commenting to the Fish and Wildlife Service on manatee mortality in the southeastern United States; noting that the Service had not yet met its research and management commitments described in the West Indian Manatee Recovery Plan; and recommending that the Service commit itself to carrying out a five-year program for manatee research and management activities at the following levels: $898,000 in 1991; $925,000 in 1992; $964,000 in 1993; $945,000 in 1994; and $953,000 in 1995.
8 March	Commerce, scientific research permit application, Thomas R. Kieckhefer.
12 March	Commerce, commenting to the National Oceanic and Atmospheric Administration on the paper, "Options for Consideration by U.S. Whale Policy Review Task Force," and recommending that the agency set forth the desired policy objectives against which the various options can be measured.
12 March	Commerce, commenting to the National Marine Fisheries Service on its public display and scientific research permit program review and recommending, among other things, that the Service: (1) revise the existing permit application instructions; (2) prepare literature on applying for permits; (3) expand staff permit review guidelines; (4) establish procedures with the Commission to determine completeness of applications; (5) prepare permit summaries for application reviewers; (6) establish up-to-date files on permit applicants; (7) revise its standard permit conditions to include those routinely recommended by the Commission; (8) re-examine the legal status of the progeny of pre-Act marine mammals; (9) establish a system for timely review of permittee reports to monitor compliance with permit conditions; (10) improve coordination between permit review staff and the Regional Offices; (11) establish policies and protocols for handling animals confiscated from facilities whose permits are revoked; (12) as appropriate, enter into cooperative agreements with interested state governments under section 109(k) of the Marine Mammal Protection Act to assist permit monitoring and enforcement efforts; (13) determine whether repeated noncompliance of a facility with Animal and Plant Health Inspection Service stand-

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ards is grounds for permit denial or revocation and, if so, establish criteria for making such determinations; (14) undertake measures to determine if public display facility education programs are being implemented; and (15) promptly consult with the Fish and Wildlife Service, the Animal and Plant Health Inspection Service, and the Marine Mammal Commission on permit program changes.

12 March — Agriculture, commenting to the Animal and Plant Health Inspection Service on a series of working group meetings convened by the National Marine Fisheries Service on issuing public display and scientific research permits; noting that there is a need to review and, as appropriate, revise existing care and maintenance standards for marine mammals; and recommending that the Animal and Plant Health Inspection Service consult with the National Marine Fisheries Service on this matter.

12 March — Interior, commenting to the Fish and Wildlife Service on the National Marine Fisheries Service review of the public display and scientific research permit program; requesting that the Commission be advised if the Fish and Wildlife Service amends or is contemplating changes in its permit policies and procedures; and recommending, among other things, that the Fish and Wildlife Service consult with the National Marine Fisheries Service and the Animal and Plant Health Inspection Service in reviewing and revising the care and maintenance standards for captive marine mammals, and that the Service take an active role in the National Marine Fisheries Service's permit review.

12 March — Commerce, commenting to the National Marine Fisheries Service on the tuna vessel observer program; noting that the kill rate of porpoise on unobserved trips is higher than that on observed trips; and recommending that the Service: (1) examine its rationale for assuming that data from observed trips are representative of the fleet as a whole; (2) require observer coverage on all U.S. tuna vessels; and (3) adopt a method of direct comparison between U.S. and foreign porpoise mortality rates.

12 March — Commerce, commenting to the National Marine Fisheries Service on the importation of yellowfin tuna from foreign nations; noting that foreign nations are required to implement porpoise-saving programs that are comparable to U.S. programs; and recommending that comparability determinations take into account restrictions on incidental take of marine mammals by means of harassment, encirclement, and serious injury, as well as mortality.

14 March — Commerce, public display permit application, Marineland of Canada.

14 March — Commerce, two scientific research permit applications, Southwest Fisheries Center.

16 March — Commerce, commenting to the National Marine Fisheries Service on its investigation of the ongoing die-off of bottlenose dolphins in the Gulf of Mexico and recommending that a group of experts not involved with the present investigation or with the 1987-1988 dolphin die-off along the U.S. east coast be convened to examine the adequacy of the research protocols.

16 March — Transportation, forwarding to the Coast Guard a draft paper proposing a revision of International Maritime Organization guidelines for port reception facilities under Annex V of the Convention for the Prevention of Pollution from Ships and recommending that the Coast Guard consider the draft paper as the basis for a U.S. submission to the next meeting of the Organization's Marine Environment Protection Committee.

16 March — Commerce, commenting to the National Marine Fisheries Service on the ongoing die-off of bottlenose dolphins in the Gulf of Mexico and recommending that permit authorization for live-capture and removal of animals from the Gulf of Mexico for purposes of public display be suspended until the cause of mortality is known.

20 March — Commerce, scientific research permit application, Mats Amundin.

22 March — Commerce, modification of scientific research permit, National Ocean Survey.

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22 March	Commerce, commenting to the National Marine Fisheries Service on the Draft National Recovery Plan for the Northern Right Whale; noting that the Draft Plan identifies a number of actions necessary to protect right whales and their habitat, but that it does not clearly identify or justify many of the recommended actions; and recommending that the Recovery Team or an outside expert be asked to revise substantially the Recovery Plan to address a number of specific comments suggested by the Commission.
26 March	State of Hawaii, commenting to the Department of Land and Natural Resources on a proposal to designate certain waters near Kilauea Point as a Marine Life Conservation District and recommending that the proposed designation be approved.
26 March	Commerce, modification of scientific research permit, Alaska Fish and Wildlife Research Center.
27 March	Commerce, modification of scientific research permit, LGL, Ltd., Environmental Research Associates.
30 March	Commerce, commenting to the National Marine Fisheries Service on a paper entitled "Public Review of Task Force Findings Regarding U.S. Whale Policy" and recommending that the paper be revised to, among other things, better indicate the contingencies under which the United States would reconsider the current International Whaling Commission moratorium on commercial whaling.
30 March	Commerce, commenting to the National Marine Fisheries Service on the possible effects of removing offshore oil and gas structures in the Gulf of Mexico on populations of bottlenose dolphins and other marine mammals; noting that a pending request for authorization to remove such structures did not indicate the numbers of dolphins or other marine mammals that possibly could be affected or the cumulative effects of the proposed removal and other sources of mortality, including the unusual dolphin mortality that was occurring in the Gulf of Mexico at that time; further noting that, without reliable information on the number of dolphins that might be affected by the proposed action, other human activities, and natural events, it was not possible to make the findings necessary to grant a "small take" exemption under section 101(a)(5) of the Marine Mammal Protection Act; and recommending that the request be granted only if: (1) the applicant's present information indicating that only small numbers of various marine mammal species will be taken; and (2) a monitoring program is undertaken to verify predicted effects and detect unforeseen effects of structure removals on bottlenose dolphins and other marine mammals.
2 April	Commerce, commenting to the National Marine Fisheries Service on its program to reduce the incidental take of porpoises in the eastern tropical Pacific tuna fishery; commending the Service's Southwest Region and Southwest Fisheries Center on work done to date; recommending that the Service initiate all possible efforts between now and spring 1992 to: (1) obtain reliable indices of the size and trends of affected porpoise stocks; (2) develop gear and fishing practices that will further reduce incidental mortality and injury of porpoise in U.S. and foreign tuna fisheries; and (3) ensure that incidental take levels will not cause porpoise stocks to be reduced or maintained below their minimum net productivity level; and further recommending that the Service: (1) evaluate how changes in fishing gear and practices might further reduce porpoise mortality; (2) provide funding to the Inter-American Tropical Tuna Commission to investigate such changes; (3) advise Congress, the tuna industry, and interested environmental groups of the possible or expected results of ongoing studies; and (4) provide the Southwest Fisheries Center with supplemental funds to support additional analyses.
2 April	Interior, commenting to the Fish and Wildlife Service on the "Public Review Draft of the Fishery Management Plan, Togiak National Wildlife Refuge Fiscal Year 1990-1994"; noting the possibility that yellowfin sole trawlers operating in the area may disturb walrus hauling out in the Refuge and at Round Island; recommending that the Service consult with the National Marine Fisheries Service, the North Pacific Fishery Management Council, the Alaska Board of Fisheries, and the Alaska Department of Fish and Game to establish walrus-related management measures in the

Refuge within three miles of shore that are equivalent to those recently adopted for areas outside three miles; and further recommending that the Plan include measures to protect the harbor seals and Steller sea lions from disturbance and incidental take.

6 April — Commerce, commenting to the National Marine Fisheries Service on research protocols for the die-off of bottlenose dolphins in the Gulf of Mexico; recommending that a representative subset of tissues collected to date be provided to appropriate laboratories for certain standard analyses to help identify possible causes of the die-off or possible public health concerns; and further recommending that boat and aircraft surveys be undertaken in areas where bottlenose dolphins are taken for purposes of public display or scientific research in order to estimate the number of dolphins, by age and sex, that are dying in those areas and the proportion of the population being affected.

12 April — Commerce, recommending to the National Marine Fisheries Service that it monitor all future bottlenose dolphin capture operations.

13 April — Commerce, modification of scientific research permit, North Gulf Oceanic Society.

13 April — Commerce, commenting to the National Marine Fisheries Service on reports that activities related to the clean-up of the *Exxon Valdez* oil spill may have caused humpback whales to leave Prince William Sound, and recommending that the Service advise Exxon and others involved in clean-up operations that it is illegal to approach, follow, or interfere with the activities of whales without permit authorization.

18 April — Commerce, modification of scientific research permit, Southwest Fisheries Center.

23 April — Commerce, commenting to the National Marine Fisheries Service on the Conservation Plan for Northern Fur Seals, *Callorhinus ursinus*; noting that the Plan provided a useful overview of information on past exploitation, life history, population status and trends, and possible causes of the decline in the Pribilof Islands fur seal populations, but that it lacked a clear statement of goals and objectives and a clear outline of recommended actions; and recommending, among other things, that the Plan be revised to include: a clear statement of objectives; a step-down outline clarifying research and management tasks; an expanded narrative describing the rationale, nature, and scope of recommended actions; a more specific list of actions for determining and protecting important habitats and promoting recovery to optimum sustainable population levels; and a revised implementation schedule.

27 April — Florida Public Service Commission, commenting on its finding that the public education materials produced by Florida Power & Light Company are unnecessary expenses; noting that the Company has done an outstanding job educating the public on manatee conservation needs and biology; and urging the Public Service Commission to reconsider its finding and recognize these Florida Power & Light Company efforts as legitimate business expenses.

27 April — Commerce, commenting to the National Marine Fisheries Service on proposed recovery planning guidelines; noting that the guidelines provide useful descriptions of the type of information to be considered and the procedures to be followed in developing conservation and recovery plans for endangered and threatened marine mammals; and recommending that the guidelines be adopted with certain modifications.

3 May — Commerce, scientific research permit application, Southwest Fisheries Center.

4 May — Commerce, modification of scientific research permit, Jan S. Ostman, Kenneth S. Norris, Randall S. Wells, and William T. Doyle.

8 May — Interior, commenting to the Minerals Management Service on the Draft Environmental Impact Statement for a proposed oil and gas lease sale in the Beaufort Sea; noting that the Draft Statement identified a number of potential stipulations and "information to lessees" notices that could reduce possible impacts on marine mammals; recommending that these measures be modified and adopted as part of the proposed action; and further recommending that the Draft Statement be modified to: (1) consider effects on polar bears and other wildlife caused by their attraction to offshore facilities and operations by lights, smells, noise, or other factors; (2) reas-

sess analyses and conclusions regarding cumulative effects on pinnipeds, polar bears, and beluga whales and, as appropriate, indicate that the expected cumulative effects on these species could be high; (3) better indicate the importance of the Service's Environmental Studies Program in detecting and mitigating possible unforeseen impacts; and (4) ensure that all statements regarding the status of marine mammals and the effects of pollutants on marine mammals are supported by data and analyses or cited references.

9 May — Interior, commenting to the Minerals Management Service on the Draft Environmental Impact Statement for three proposed oil and gas lease sales in the Gulf of Mexico; noting that the Commission had previously recommended that the Service contact the National Marine Fisheries Service to obtain the best available information on local bottlenose dolphin populations and to determine the monitoring programs needed to accurately assess the impacts of the proposed activities on the dolphin populations; and recommending that the Draft Statement be revised to provide a more complete and objective assessment of the possible effects of the proposed actions on marine mammals.

18 May — Commerce, commenting to the National Marine Fisheries Service on the proposed emergency listing of the Steller sea lion as threatened under the Endangered Species Act and recommending that the Service: (1) implement blanket prohibitions on taking and importing Steller sea lions; (2) consider additional protective measures, including designation of critical habitat; (3) advise the public and the Commission of all exemptions issued under the blanket prohibition and the reasons for such exemptions; and (4) use its authority to place observers aboard vessels engaged in fisheries known to take Steller sea lions.

18 May — Interior, modification of scientific research permit, Smithsonian Institution.

25 May — Commerce, commenting to the National Marine Fisheries Service on development of a policy and rules concerning "public welfare" provisions of the Marine Mammal Protection Act that would allow government officials to take marine mammals for purposes of protecting other natural resources; noting that the State of Washington had requested authorization to kill California sea lions in response to seal predation on steelhead at Ballard Locks; recommending that the Service not publish proposed rules; and further recommending that the State of Washington be requested to seek a waiver of the Act's moratorium on taking under section 101(a)(3)(A).

1 June — Commerce, modification of two scientific research permits, National Marine Mammal Laboratory.

8 June — Interior, commenting to the Fish and Wildlife Service on the Florida manatee portion of its Draft Biological Opinion concerning proposed oil and gas activities in the eastern Gulf of Mexico; noting that the Opinion appeared to underestimate the potential effect of a large oil spill on manatees; and suggesting that the Opinion be expanded to: (1) include a worst case assessment; (2) consider the implications resulting from the extraordinarily high number of manatee deaths in Florida in 1989; and (3) provide documentation for various statements and conclusions regarding possible effects on manatees.

11 June — Commerce, commenting to the National Marine Fisheries Service on the take of Hawaiian monk seals incidental to long-line swordfish fisheries in the Northwest Hawaiian Islands and recommending that the Service place observers aboard a number of the vessels to obtain more reliable information on the nature and extent of interactions between seals and the fishery.

12 June — Commerce, modification of scientific research permit, Randall S. Wells.

12 June — Commerce, modification of scientific research permit, C. Scott Baker.

12 June — Commerce, modification of scientific research permit, Oregon Department of Fish and Game.

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20 June	Commerce, commenting to the National Marine Fisheries Service on a proposal to reprogram funds in the Marine Entanglement Research Program to support work on developing guidelines for port reception facilities and to monitor seal entanglement on the California Channel Islands and recommending that steps be taken promptly to reprogram the funds as proposed.
20 June	Interior, commenting to the Minerals Management Service on a notice of intent to prepare an environmental impact statement for two proposed lease sales in the Gulf of Mexico; noting that 30 species of marine mammals, including endangered West Indian manatees and six species of endangered whales, occur in the Gulf of Mexico and may be affected by the proposed lease sale; and recommending that the Service: (1) consult with the National Marine Fisheries Service to obtain information on local populations of bottlenose dolphins and other marine mammals that could be affected by the proposed action; (2) identify the best method to detect and monitor effects of the proposed action; and (3) consult with the Fish and Wildlife Service to determine any additional measures that may be necessary to assess and avoid adverse impacts on manatees.
27 June	Interior, commenting to the Fish and Wildlife Service on the status of conservation plans for Alaskan marine mammals; forwarding a discussion paper entitled "Polar Bear/Human Interactions Related to Alaskan Oil and Gas Exploration and Development"; noting that the discussion paper concludes, among other things, that lessees of federal and state offshore lands should be required to develop and implement polar bear interaction plans; and recommending that the research and management actions set forth in the discussion paper be adopted and factored into the conservation plan being developed for polar bears.
28 June	Interior, public display permit application, Paul Jensen Arctic Museum.
2 July	Commerce, commenting to the National Marine Fisheries Service on proposed 1990 subsistence harvest levels for North Pacific fur seals on the Pribilof Islands; urging the Service to publish notices of proposed harvest levels in a more timely manner; noting that the proportion of seal carcasses going unused has increased significantly in the past two years; and recommending that the 1990 fur seal harvest on St. Paul Island be set at 1,145 seals, and that steps be taken to eliminate the provision for extending the harvest beyond the first week in August.
5 July	Interior, commenting to the Fish and Wildlife Service on the death of a sea otter under an authorized scientific research permit and recommending that certain steps be taken to reduce the chance of similar mortalities in the future.
6 July	Commerce, modification of scientific research permit, Deborah Glockner-Ferrari and Mark J. Ferrari.
12 July	Commerce, providing the National Marine Fisheries Service with recommended guidelines for managing the incidental take of marine mammals in commercial fishing operations after 1993; recommending, among other things, that the post-1993 program governing such incidental take: (1) reaffirm the goal of the Marine Mammal Protection Act to reduce the incidental kill and serious injury of marine mammals to insignificant levels approaching zero; (2) reinstate the requirements of the General Permit and "small take" provisions of the Act; (3) allow the incidental take of marine mammals listed as endangered or threatened if, among other things, a recovery plan has been put in place, the taking will be observed, and the take will not be detrimental to the population; (4) authorize, on an experimental basis and under certain conditions, the incidental take of marine mammals from populations whose status is uncertain; (5) continue vessel registration and reporting programs; (6) grant the Secretary of Commerce authority to place observers on any U.S. commercial fishing vessels; and (7) provide funding or collect user fees to support recommended observer and monitoring programs; and further recommending that the Service, in consultation with the Commission and the Fish and Wildlife Service, organize and convene a series of workshops in 1991 or 1992 to identify and evaluate possible procedures for assessing interactions between fisheries and marine mammals and ensuring that fisheries do not directly or indirectly disadvantage marine mammals.

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13 July	Commerce, commenting to the Fish and Wildlife Service on the use of a newly acquired site on Kings Bay, Florida, as a National Wildlife Refuge headquarters and an interpretive education center for manatees and urging that the Service move its headquarters staff to the site by the fall 1990 manatee season and, pending further evaluation of the site's use as an interpretive center, provide a modest visitor information center to disseminate information about manatees.
16 July	Congress, advising the U.S. Senate and the U.S. House of Representatives that the Commission had met its statutory charge to provide the National Marine Fisheries Service with recommended guidelines for governing the incidental take of marine mammals, other than southern sea otters, by commercial fisheries after 1 October 1993.
17 July	Interior, commenting to the Minerals Management Service on a Draft Environmental Impact Statement on an oil and gas lease sale in the Navarin Basin, Alaska; noting that the Biological Opinion prepared by the National Marine Fisheries Service concluded, among other things, that the proposed sale could jeopardize the continued existence of endangered right whales; recommending that the Draft Statement be revised to indicate that impacts on right whales could range from very low to very high and to describe the post-lease research and monitoring program that will be in place to address information gathering needs identified in the Biological Opinion; and further recommending that, if the Service had not already done so, it consult with the National Marine Fisheries Service to consider possible effects of the proposed action on the Steller sea lion.
18 July	Commerce, scientific research permit application, Folsom Children's Zoo and Botanical Gardens.
23 July	Commerce, scientific research permit application, Steven K. Katona.
30 July	Interior, commenting to the Minerals Management Service on the second version of a Draft Environmental Impact Statement for a proposed 1991 outer continental shelf mining program lease sale in Norton Sound, Alaska; noting that the Draft Statement did not provide a thorough assessment of all species and populations of marine mammals that could be affected or the degree to which they could be affected by the proposed action; recommending that the Final Statement support the contention that insignificant numbers of polar bears, harbors seals, and certain other marine mammals occur in or near the lease sale area; and further recommending that the Service: (1) re-initiate section 7 consultations with the National Marine Fisheries Service to determine whether the proposed action could adversely affect Steller sea lions or their critical habitat; (2) take steps to obtain reliable baseline information on mercury levels and monitor levels of mercury in human populations and key components of marine food chains that could be affected; and (3) adopt measures, such as downshunting dredge tailings directly to the sea floor, to minimize the spread of fine sediments.
31 July	Agriculture, commenting to the Animal and Plant Health Inspection Service on the maintenance of an Atlantic bottlenose dolphin at the Sugar Loaf Lodge in the Florida Keys; noting that the facility was the subject of previous complaints; repeating recommendations provided on 25 May 1989 in response to the earlier complaints; and recommending that the Service: (1) advise the Commission of the results of its investigation of the previous allegations; (2) promptly conduct a follow-up inspection of the facility; (3) advise the Commission of the results of the follow-up inspection; and (4) advise the Commission of the results of inspections of all other facilities maintaining only "pre-Act" marine mammals.
31 July	Commerce, modification of scientific research permit, Southwest Fisheries Center.
31 July	Commerce, modification of scientific research permit, Nancy Black and Bernd Würsig.
2 August	Florida Department of Natural Resources, Division of Marine Resources, commenting on proposed State regulations related to the transport of marine mammals and suggesting certain changes in a draft rule to clarify Federal and State authorities.

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4 August	Commerce, modification of scientific research permit, West Coast Whale Research Foundation.
7 August	Commerce, public display permit application, Philadelphia Zoological Gardens.
7 August	Commerce, modification of scientific research permit application, Paul K. Dayton and Timothy J. Ragen.
8 August	Commerce, modification of scientific research permit, Marine Life Aquarium.
14 August	Interior, scientific research permit application, Fish and Wildlife Service.
17 August	Commerce, commenting to the National Marine Fisheries Service on the list of fisheries covered under the interim exemption for incidental taking of marine mammals by commercial fishermen and recommending, among other things, that the classification of fisheries on the list be re-examined at least once a year and that certain fisheries now classified as Category III fisheries be upgraded to Category II.
20 August	Interior, modification of scientific research permit, Carle Foundation Hospital.
28 August	Interior, modification of scientific research permit, Alaska Fish and Wildlife Research Center.
28 August	Commerce, commenting to the National Marine Fisheries Service on a request by the Department of the Air Force to take small numbers of marine mammals incidental to the launch of Titan IV space vehicles; noting that information is lacking as to the number of pinnipeds that could be affected by the proposed action and the proportion of these numbers relative to local populations; and recommending, among other things, that the Service: (1) determine the number of animals by species and population percentage that could be affected; (2) determine whether the planned monitoring program would be sufficient to verify predicted effects and to detect unforeseen effects of the proposed action on marine mammals; and (3) as necessary, undertake section 7 consultations to identify measures that would be required to ensure that the proposed action does not adversely affect Steller sea lions or their critical habitats.
29 August	Defense, commenting to the Department of the Air Force on a Biological Assessment concerning proposed construction of a space launch complex at Vandenberg Air Force Base, California; noting that information was inadequate to support the Assessment's conclusion that the effects of the proposed action on marine mammals would be insignificant; recommending that, if it had not already done so, the Air Force consult with the National Marine Fisheries Service and the Fish and Wildlife Service to: (1) obtain the best available information on the numbers of animals by species and the proportions of the resident or seasonal populations that may be affected; and (2) determine the most cost-effective way to monitor affected marine mammal populations, verify predicted effects, and detect any unforeseen effects; and further recommending that the Air Force consult the National Park Service and the Channel Islands National Marine Sanctuary to determine what, if any, marine mammal monitoring programs they are sponsoring in the region.
30 August	Commerce, modification of scientific research permit, Southwest Fisheries Center.
7 September	Interior, scientific research permit application, Alaska Fish and Wildlife Research Center.
7 September	Commerce, scientific research permit application, Gerald L. Kooyman.
10 September	Interior, commenting to the Minerals Management Service on a Draft Environmental Impact Statement on a proposed offshore oil and gas lease sale in the Chukchi Sea, Alaska; noting, among other things, that the Draft Statement appeared to underestimate possible effects on bowhead whales, and that, since the time that the Service had initiated consultations with the National Marine Fisheries Service pursuant to section 7 of the Endangered Species Act, the Steller sea lion had been listed as threatened on an emergency basis; recommending that, if the Service had not already done so, it contact the National Marine Fisheries Service to ask if consultations should be expanded to consider the Steller sea lion; recommending that the

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	Draft Statement be revised to indicate that effects or interactions with large oil spills could cause impacts on polar bears ranging from very low to moderate levels; and further recommending that the Final Environmental Impact Statement be expanded to include two additional lease stipulations to: (1) require lessees to develop and implement polar bear interaction plans, and (2) impose a seasonal drilling restriction in the bowhead whale migratory corridor to prohibit exploration activities from incidentally taking any marine mammals during the species' spring migration.
11 September	Interior, modification of scientific research permit, Alaska Fish and Wildlife Research Center.
11 September	Commerce, scientific research permit application, Daniel P. Costa and Graham A. J. Worthy.
11 September	Commerce, scientific research permit application, Scott D. Kraus.
11 September	Commerce, scientific research permit application, Southwest Fisheries Center.
24 September	Commerce, modification of scientific research permit, C. Scott Baker.
24 September	Commerce, modification of scientific research permit, Alaska Fisheries Science Center.
25 September	Interior, public display permit application, Robert Dean Keeler.
3 October	State Department, commenting to the Bureau of Oceans and International Environmental and Scientific Affairs on a protocol for Specially Protected Areas and Wildlife in the Caribbean Sea region and recommending that the Marine Mammal Protection Act be considered as adequate domestic authority for implementing the requirements of the Protocol for any marine mammal species included on the annexes.
10 October	Commerce, commenting to the National Marine Fisheries Service on the incidental take of harbor porpoise by commercial fishermen in the Gulf of Maine and elsewhere; requesting that the Service advise the Commission of the results of harbor porpoise observer programs and the steps the Service is taking to assess and monitor the status of harbor porpoise populations along the northeast Atlantic and along the west coast of the United States; and recommending that the Service consult with the responsible Canadian officials to develop a coordinated research and management program.
16 October	Interior, modification of scientific research permit, Robert L. Brownell, Jr.
16 October	Commerce, scientific research permit application, Alaska Fisheries Science Center.
23 October	Commerce, scientific research permit application, Susan H. Shane.
24 October	Commerce, scientific research permit application, Kenneth C. Balcomb.
26 October	Commerce, scientific research permit application, Deane Renouf.
26 October	Commerce, modification of scientific research permit, Janice M. Straley.
26 October	State, commenting to the Bureau of Oceans and International Environmental and Scientific Affairs on arrangements to monitor high seas pelagic drift net fisheries in the North Pacific; noting that the United States must be ready to present its assessments of the effect of catches of non-target species in those fisheries at certain upcoming international meetings; recommending that, to prepare those assessments, the State Department, in cooperation with the National Marine Fisheries Service: (1) convene a meeting of U.S. experts in the immediate future; and (2) convene a second meeting with international experts familiar with the issue in the North Pacific Ocean in the spring of 1991; and further commenting on points to be addressed in those meetings.
31 October	Commerce, public display permit application, Singapore Zoological Gardens.
31 October	Commerce, public display permit application, Kamogawa Sea World.

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5 November	Transportation, commenting to the Coast Guard on the potential impact on manatees of a planned boat race in Tampa Bay, Florida; noting that the course of the proposed race is near a warm-water refuge used by endangered West Indian manatees; supporting a Fish and Wildlife Service recommendation to hold the boat race offshore away from areas used by manatees; and urging that the Coast Guard deny authority to hold the race in Tampa Bay.
19 November	State, commenting to the Bureau of Oceans and International Environmental and Scientific Affairs on a Turkish survey to assess cetacean populations in the Black Sea; noting that the survey methodology was flawed and insufficient for developing reliable estimates of cetacean abundance in the Black Sea; and recommending that the State Department forward to the Government of Turkey a report prepared for the Commission evaluating the survey results, and that it urge the Turkish Government to undertake further assessments of Black Sea cetacean populations before making any management decisions.
27 November	Florida Department of Community Affairs, commenting on a proposed State land acquisition project in the Crystal River-Homosassa River area of Florida; noting that the property was important for complementing and consolidating other area land acquisition projects already listed; and urging that the property be accorded a high ranking and that all listed projects in the area be acquired as quickly as possible.
29 November	Commerce, modification of scientific research permit, C. Scott Baker.
29 November	Commerce, modification of scientific research permit, Southwest Fisheries Science Center.
29 November	Interior, scientific research and public display permit application, Chicago Zoological Society, Brookfield Zoo.
29 November	Transportation, commenting to the Coast Guard on the use of Ushagat Island to dispose of oil recovered during the *Exxon Valdez* oil spill clean-up and recommending that, in light of possible threats to Steller sea lions from oil leaching out of the disposal site, the Coast Guard immediately determine whether any of the oiled material remained at Ushagat Island and, if so, consider whether any options were available for treating it so as to prevent or minimize any additional release of oil.
3 December	Commerce, commenting to the National Marine Fisheries Service on the Marine Entanglement Research Program Plan for Fiscal Year 1991 and recommending that task statements be thoroughly edited and reviewed, a proposed scope of work for preparing a manual on freeing entangled whales be revised and provided to the Commission, and funds be allocated among projects as proposed.
4 December	Commerce, commenting to the National Marine Fisheries Service on development of a conservation plan for northern fur seals; requesting that the Service advise the Commission as to its response to previous recommendations that the Service: (1) designate a fur seal recovery program overseer/coordinator; (2) establish and convene a fur seal conservation team to help guide the recovery program; and (3) update the Commission on the Plan's status; and further requesting that the Service advise the Commission as to what steps, if any, the Service was taking to propose listing the species on Appendix II or Appendix III to the Convention on International Trade in Endangered Species of Wild Fauna and Flora.
4 December	Commerce, commenting to the National Marine Fisheries Service on a three-year work plan for the Hawaiian monk seal recovery program; recommending that the Service ensure that projected funding needs are addressed in its budgets for the next three years; and further recommending that, before taking action on problems of male seals mobbing and killing or injuring female seals, the Service consult the Recovery Team and the Commission regarding the results of preliminary analyses, the plans for treating adult males, and the rationale for those plans.
5 December	Commerce, commenting to the National Marine Fisheries Service on the unusually high mortality of bottlenose dolphins off Galveston, Texas, during November 1990; urging that the Service consider this as a potential precursor to a larger die-off of bottlenose dolphins; and recommending that the Service immediately take steps to

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organize a strong response by, among other things: (1) designating a response team leader; (2) convening a meeting of the Gulf of Mexico Die-Off Review Team; (3) ensuring that all stranding teams along the Gulf coast are alerted and prepared to collect carcasses according to carefully described protocols; and (4) establishing a schedule for periodic review meetings and public reporting of the findings.

7 December	State, commenting to the Bureau of Oceans and International Environmental and Scientific Affairs on a draft U.S. position paper for monitoring and enforcing foreign high seas driftnet fisheries during 1991; noting that the Commission had not yet received results or assessments of the 1990 driftnet monitoring and enforcement program; and recommending that the Department of State and the National Marine Fisheries Service convene a group of experts to review and make recommendations on the proposed 1991 driftnet monitoring and assessment program in light of the results of the 1989 and 1990 programs.
7 December	Commerce, commenting to the National Marine Fisheries Service on a draft U.S position paper for monitoring and enforcing foreign high seas driftnet fisheries during 1991; noting that the Commission had not yet received results or assessments of the 1990 driftnet monitoring and enforcement program; and recommending that the Department of State and the National Marine Fisheries Service convene a group of experts to review and make recommendations on the proposed 1991 driftnet monitoring and assessment program in light of the results of the 1989 and 1990 programs.
11 December	Commerce, commenting to the National Marine Fisheries Service on its proposal to expand the regulatory definition of the term "take" to include feeding or attempting to feed a marine mammal in the wild in any manner and recommending that the Service adopt the proposed as a final rule as soon as possible.
14 December	State, commenting to the Bureau of Oceans and International Environmental and Scientific Affairs on issues related to high seas driftnet fishing and repeating its earlier recommendation that the State Department and the Commerce Department formally constitute an interagency working group to address the issue.
17 December	Commerce, scientific research permit application, Southwest Fisheries Science Center.
17 December	Interior, modification of scientific research permit, Alaska Office of Fish and Wildlife Research.
17 December	Commerce, modification of scientific research permit, LGL, Ltd., Environmental Research Associates.
18 December	Interior, modification of scientific research permit, Fish and Wildlife Service.
21 December	Commerce, commenting to the National Marine Fisheries Service on high seas driftnet fisheries and repeating its earlier recommendation that the Service and the Department of State convene an interagency group of experts to review the U.S. position on the proposed 1991 driftnet monitoring and assessment programs.
28 December	Interior, transmitting to the Fish and Wildlife Service the final report of the Workshop on Measures To Assess and Mitigate the Adverse Effects of Arctic Oil and Gas Activities on Polar Bears; recommending, among other things, that the Service implement the workshop recommendations and: (1) work with the Minerals Management Service and State agencies to identify the contents of and procedures for approving site-specific Polar Bear Interaction Plans that would be prepared by industry groups for offshore facilities; (2) encourage an appropriate industry group to seek an exemption under the Marine Mammal Protection Act to allow the incidental take of small numbers of polar bears; (3) with the Minerals Management Service and the Alaska Department of Fish and Game, support research and monitoring programs to evaluate the effectiveness of polar bear detection and deterrent systems; and (4) if it had not already done so, coordinate interagency efforts to ensure that oil spill contingency and response team plans address measures to assess and minimize the impact of oil spills on polar bears; and further recommending that the Service take the necessary steps to give effect to the provisions of the 1976 Agreement on the Conservation of Polar Bears.

APPENDIX B

REPORTS OF COMMISSION-SPONSORED ACTIVITIES AVAILABLE FROM THE NATIONAL TECHNICAL INFORMATION SERVICE (NTIS)

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., 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)

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 MM8AD055. 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 estimats 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 MM2079341-0. 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 MM1300702-9. 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)

Price codes for printed reports (including postage) are shown in parenthesis at the end of each citation. Microfiche copies of the reports are also available at the coded price. The key to the codes and ordering information can be found on the last page 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. NITS 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)

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 workshop 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 beachcast 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)

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)

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)

Marine Mammal Commission. 1975. Annual report of the Marine Mammal Commission, calendar year 1974. Report to Congress. NTIS PB-269 710. 27 pp. (A04)

Marine Mammal Commission. 1976. Annual report of the Marine Mammal Commission, calendar year 1975. Report to Congress. NTIS PB 269-711. 50 pp. (A04)

Marine Mammal Commission. 1977. Annual report of the Marine Mammal Commission, calendar year 1976. Report to Congress. NTIS PB-269 713. 71 pp. (A06)

Marine Mammal Commission. 1978. Annual report of the Marine Mammal Commission, calendar year 1977. Report to Congress. NTIS PB-281 564. 101 pp. (A06)

Marine Mammal Commission. 1979. Annual report of the Marine Mammal Commission, calendar year 1978. Report to Congress. NTIS PB-106 784. 108 pp. (A06)

Marine Mammal Commission. 1980. Humpback whales in Glacier Bay National Monument, Alaska. Final report for an interagency review meeting. NTIS PB80-141 559. 44 pp. (A03)

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)

Marine Mammal Commission. 1982. Report of a meeting to review on-going and planned research concerning humpback whales in Glacier Bay and surrounding waters in southeast Alaska. Final report of an interagency meeting. NTIS PB82-201 039. 20 pp. (A02)

Marine Mammal Commission. 1983. Annual report of the Marine Mammal Commission, calendar year 1982. Report to Congress. NTIS PB84-132 216. 106 pp. (A06)

Marine Mammal Commission. 1984. Annual report of the Marine Mammal Commission, calendar year 1983. Report to Congress. NTIS PB84-199 389. 118 pp. (A06)

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)

Marine Mammal Commission. 1989. Annual report of the Marine Mammal Commission, calendar year 1989. Report to Congress. NTIS PB90-196361. 239 pp. (A11)

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 MMC contract MM8AC003. NTIS PB80-175 144. 48 pp. (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)

Packard, J.M. 1982. Potential methods for influencing the movements and distribution of sea otters: assessment of research needs. Final report for MMC contract MM2079342-3. NTIS PB83-109 926. 51 pp. (A04)

Payne, R., O. Brazier, E. Dorsey, J. Perkins, V. Rowntree, and A. Titus. 1981. External features in southern right whales (*Eubalaena australis*) and their use in identifying individuals. Final report for MMC contract MM6AC017. NTIS PB81-161 093. 77 pp. (A05)

Pitcher, K.W. 1977. Population productivity and food habits of harbor seals in the Prince William Sound-Copper River delta area, Alaska. Final report for MMC contract MM5AC011. NTIS PB-266 935. 36 pp. (A03)

Pitcher, K.W. 1989. Harbor seal trend count surveys in southern Alaska, 1988. Final report for MMC contract MM4465853-1. NTIS PB90-208828. 19 pp. (A03)

Prescott, J.H., and P.M. Fiorelli. 1980. Review of the harbor porpoise (*Phocoena phocoena*) in the U.S. northwest Atlantic. Final report for MMC contract MM8AC016. NTIS PB80-176 928. 64 pp. (A04)

Prescott, J.H., P. Fiorelli, G. Early, and P.J. Boyle. 1990. Marine mammal strandings: the New England Aquarium Stranding Network. Final report for MMC contract MM6AC015. NTIS PB 90-259177. 128 pp. (A07)

Prescott, J.H., S.D. Kraus, and J.R. Gilbert. 1980. East Coast/Gulf Coast cetacean and pinniped workshop. Final report for MMC contract MM1533558-2. NTIS PB80-160 104. 142 pp. (A07)

Ray, G.C., R.V. Salm, and J.A. Dobbin. 1979. Systems analysis mapping: an approach towards identifying critical habitats of marine mammals. Final report for MMC contract MM6AC011. NTIS PB80-111 594. 27 pp. (A03)

Reeves, R.R. 1977. Exploitation of harp and hooded seals in the western North Atlantic. Final report for MMC contract MM6AD055. NTIS PB-270 186. 57 pp. (A04)

Reeves, R.R. 1977. The problem of gray whale (*Eschrichtius robustus*) harassment: at the breeding lagoons and during migration. Final report for MMC contract MM6AC021. NTIS PB-272 506 (Spanish translation PB-291 763). 60 pp. (A04)

Reynolds, J.E., III. 1986. Evaluation of the nature and magnitude of interactions between bottlenose dolphins, *Tursiops truncatus*, and fisheries and other human activities in the coastal areas of the southeastern United States. Final report for MMC contract MM2910892-5. NTIS PB86-162203. 38 pp. (A03)

Reynolds, J.E., III, and C.J. Gluckman. 1988. Protection of West Indian manatees (*Trichechus manatus*) in Florida. Final report for MMC contract MM4465868-3 and MM3309741-7. NTIS PB88-222922. 103 pp. (A06)

Ridgway, S.H., and K. Benirschke (eds). 1977. Breeding dolphins: present status, suggestions for the future. Final report for MMC contract MM6AC009. NTIS PB-273 673. 308 pp. (A14)

Ridgway, S.H., and W.F. Flanigan, Jr. 1981. An investigation of a potential method for the humane taking of certain whales and seals used for food. Final report for MMC contract MM6AC030. NTIS PB81-161 101. 12 pp. (A02)

Risebrough, R.W. 1978. Pollutants in marine mammals: a literature review and recommendations for research. Final report for MMC contract MM7AD035. NTIS PB-290 728. 64 pp. (A04)

Risebrough, R.W. 1989. Accumulation patterns of heavy metals and chlorinated hydrocarbons by sea otters, *Enhydra lutris*, in California. Final report for MMC contract MM2910790-0. NTIS PB89-230551. 51 pp. (A04)

Risebrough, R.W., D. Alcorn, S.G. Allen, V.C. Anderlini, L. Booren, R.L. DeLong, L.E. Fancher, R.E. Jones, S.M. McGinnis, and T.T. Schmidt. 1980. Population biology of harbor seals in San Francisco Bay, California. Final report for MMC contract MM6AC006. NTIS PB81-107 963. 67 pp. (A04)

Sawyer-Steffan, J.E., and V.L. Kirby. 1980. A study of serum steroid hormone levels in captive female bottlenose dolphins, their correlation with reproductive status, and their application to ovulation induction in captivity. Final report for MMC contract MM7AC016. NTIS PB80-177 199. 21 pp. (A03)

Schmidly, D.J., and S.H. Shane. 1978. A biological assessment of the cetacean fauna of the Texas coast. Final report for MMC contract MM4AC008. NTIS PB-281 763. 38 pp. (A03)

Scott, G.P., and H.E. Winn. 1980. Comparative evaluation of aerial and shipboard sampling techniques for estimating the abundance of humpback whales (*Megaptera novaeangliae*). Final report for MMC contract MM7AC029. NTIS PB81-109 852. 96 pp. (A06)

Shallenberger, E. 1981. The status of Hawaiian cetaceans. Final report for MMC contract MM7AC028. NTIS PB82-109 398. 79 pp. (A05)

Shane, S.H., and D.J. Schmidly. 1978. The population biology of the Atlantic bottlenose dolphin, *Tursiops truncatus*, in the Aransas Pass area of Texas. Final report for MMC contract MM6AC028. NTIS PB-283 393. 130 pp. (A07)

Silber, G.K., R.S. Wells, and K.S. Norris. 1990. A preliminary assessment of techniques for catching and radio-tagging harbor porpoises. Final report for MMC contract MM33098157. NTIS PB90-239609. 34 pp. (A03)

Smith, T.D., and T. Polacheck. 1979. Uncertainty in estimating historical abundance of porpoise populations. Final report for MMC contract MM7AC006. NTIS PB-296 476. 59 pp. (A04)

Stoker, S.W. 1977. Report on a subtidal commercial clam fishery proposed for the Bering Sea. Final report for MMC contract MM7AD076. NTIS PB-269 712. 33 pp. (A03)

Stuntz, W.E. 1980. Preliminary investigations of the possible relationship between passive behavior by spotted dolphins, *Stenella attenuata*, and capture stress. Final report for MMC contract MM7AC027. NTIS PB81-111 569. 13 pp. (A02)

Swartz, S.L. 1987. A review of the status of gray whales (*Eschrichtius robustus*) with a summary of research and management needs. Proceedings of a Marine Mammal Commission sponsored workshop held on 16-18 October 1985 in Monterey, California. Final report for MMC contract MM2911098-4. NTIS PB87-125035. 30 pp. (A03)

Swartz, S.L., and W.C. Cummings. 1978. Gray whales, *Eschrichtius robustus*, in Laguna San Ignacio, Baja California, Mexico. Final report for MMC contract MM7AC008. NTIS PB-276 319 (Spanish translation PB-288 636). 38 pp. (A03) (A04 Spanish)

Swartz, S.L., and M.L. Jones. 1978. The evaluation of human activities on gray whales, *Eschrichtius robustus*, in Laguna San Ignacio, Baja California, Mexico. Final report for MMC contract MM8AC005. NTIS PB-289 737 (Spanish translation PB-299 598). 34 pp. (A03)

Swartz, S.L., and M.L. Jones. 1980. Gray whales, *Eschrichtius robustus*, during the 1977-1978 and 1978-1979 winter seasons in Laguna San Ignacio, Baja California Sur, Mexico. Final report for MMC contract MM1533497-8. NTIS PB80-202 989. 35pp. (A03)

Swartz, S.L., and M.L. Jones. 1981. Demographic studies and habitat assessment of gray whales, *Eschrichtius robustus*, in Laguna San Ignacio, Baja California Sur, Mexico. Final report for MMC contract MM2079219-4. NTIS PB82-123 373. 56 pp. (A04)

Swartz, S.L., and M.L. Jones. 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)

Swartzman, G. 1984. Factors bearing on the present status and future of the eastern Bering Sea fur seal population with special emphasis on the effect of terminating the subadult male harvest on St. Paul Island. Final report for MMC contract MM2629737-6. NTIS PB84-172 329. 77 pp. (A05)

Swartzman, G., and R. Haar. 1980. Exploring interactions between fur seal populations and fisheries in the Bering Sea. Final report for MMC contract MM1800969-5. NTIS PB81-133688. 60 pp. (A04)

Taylor, L.R. and G. Naftel. 1978. Preliminary investigations of shark predation on the Hawaiian monk seal at Pearl and Hermes Reef and French Frigate Shoals. Final report for MMC contract MM7AC011. NTIS PB-285 626. 34 pp. (A03)

Tinney, R.T., Jr. 1983. Assessment of past, present, and future risks of oil spills in and near the present sea otter range in California. Final report for MMC contract MM2324944-0. NTIS PB83-216 069. 208 pp. (A10)

Tinney, R.T., Jr. 1984. Some factors affecting the oil spill risk to sea otters in California. Final report for MMC contract MM2910765-4. NTIS PB85-174035. 74 pp. (A04)

Tinney, R.T., Jr. 1988. Review of information bearing upon the conservation and protection of humpback whales in Hawaii. Final report for MMC contract MM3309689-0. NTIS PB88-195359. 65 pp. (A04)

Treacy, S.D. 1986. Ingestion of salmonids and gastrointestinal passage in captive harbor seals (*Phoca vitulina*). Final report for MMC contract MM2079357-5. NTIS PB86-200 235. 35 pp. (A03)

Waring, G.H. 1981. Survey of federally-funded marine mammal research and studies FY70-FY79. Final report for MMC contract MM1533588-3. NTIS PB81-174 336. 235 pp. (A11)

Waring, G.H. 1981. Survey of federally-funded marine mammal research and studies FY70-FY80. Final report for MMC contract MM1801196-8. NTIS PB81-242 059. 43 pp. (A03)

Waring, G.H. 1982. Survey of federally-funded marine mammal research and studies FY70-FY81. Final report for MMC contract MM2079243-6. NTIS PB82-227 570. 65 pp. (A04)

Waring, G.H. 1983. Survey of federally-funded marine mammal research and studies FY70-FY82. Final report for MMC contract MM2324754-9. NTIS PB83-262 998. 83 pp. (A05)

Waring, G.H. 1984. Survey of federally-funded marine mammal research and studies FY70-FY83. Final report for MMC contract MM2629857-9. NTIS PB84-215 086. 84 pp. (A05)

Waring, G.H. 1985. Survey of federally-funded marine mammal research and studies FY70-FY84. Final report for MMC contract MM2910918-6. NTIS PB85-225613. 106 pp. (A06)

Waring, G.H. 1986. Survey of federally-funded marine mammal research and studies FY70-FY85. Final report for MMC contract MM3309688-7. NTIS PB86-235 637. 108 pp. (A06)

Waring, G.H. 1987. Survey of federally-funded marine mammal research and studies FY70-FY86. Final report for MMC contract MM4465754-5. NTIS PB87-217386. 127 pp. (A07)

Waring, G.H. 1988. Survey of federally-funded marine mammal research and studies FY70-FY87. Final report for MMC contract MM4465836-6. NTIS PB88-212782. 140 pp. (A07)

Waring, G.H. 1989. Survey of federally-funded marine mammal research and studies, FY70-FY88. Final report for MMC contract MM6223905-5. NTIS PB90-104050. 152 pp. (A08)

Waring, G.H. 1990. Survey of federally-funded marine mammal research and studies FY 70-89. Final report for MMC contract T68108504. NTIS PB90-272097. 162 pp. (A08)

Wartzok, D., and G.C. Ray. 1980. The hauling-out behavior of the Pacific walrus. Final report for MMC contract MM5AC028. NTIS PB80-192 578. 46 pp. (A04)

Wells, R.S., B.G. Würsig, and K.S. Norris. 1981. A survey of the marine mammals of the upper Gulf of California, Mexico, with an assessment of the status of *Phocoena sinus*. Final report for MMC contract MM1300958-0. NTIS PB81-168 791. 51 pp. (A04)

Whitehead, H., K. Chu, P. Harcourt, and A. Alling. 1982. The humpback whales off west Greenland: summer 1981, with notes on other marine mammals and seabirds sighted. Final report MMC contract MM2079259-2. NTIS PB82-243 924. 25 pp. (A03)

Whitehead, H., and R. Payne. 1981. New techniques for measuring whales from the air. Final report for MMC contract MM6AC017. NTIS PB81-161 143. 36 pp. (A03)

Williams, T.D. 1978. Chemical immobilization, baseline hematological parameters and oil contamination in the sea otter. Final report for MMC contract MM7AD094. NTIS PB-283969. 27 pp. (A03)

Wilson, S.C. 1978. Social organization and behavior of harbor seals, *Phoca vitulina concolor*, in Maine. Final report for MMC contract MM6AC013. NTIS PB-280 188. 103 pp. (A06)

Winn, H.E. 1984. Development of a right whale sighting network in the southeastern U.S. Final report for MMC contract MM2324805-6. NTIS PB84-240 548. 12 pp. (A01)

Winn, H.E., E.A. Scott, and R.D. Kenney. 1985. Aerial surveys for right whales in the Great South Channel, spring 1984. Final report for MMC contract MM2910792-6. NTIS PB85-207 926. 18 pp. (A02)

Woodhouse, C.D., Jr., R.K. Cowen, and L.R. Wilcoxon. 1977. A summary of knowledge of the sea otter *Enhydra lutris*, L., in California and an appraisal of the completeness of the biological understanding of the species. Final report for MMC contract MM6AC008. NTIS PB-270 374. 71 pp. (A04)

Woods, C.A. 1987. An investigation of possible sightings of Caribbean monk seals, (*Monachus tropicalis*), along the north coast of Haiti. Final report for MMC contract MM3309519-2. NTIS PB87-164307. 14 pp. (A02)

Wray, P. 1978. The West Indian manatee (*Trichechus manatus*) in Florida: a summary and analysis of biological, ecological, and administrative problems affecting preservation and restoration of the population. Final report for MMC contract MM8AD054. NTIS PB-285 410. 89 pp. (A05)

Yellin, M.B., C.R. Agegian, and J.S. Pearse. 1977. Ecological benchmarks in the Santa Cruz County kelp forests before the re-establishment of sea otters. Final report for MMC contract MM6AC029. NTIS PB-272 813. 125 pp. (A07)

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APPENDIX C

SELECTED LITERATURE PUBLISHED ELSEWHERE RESULTING FROM COMMISSION-SPONSORED ACTIVITIES

Ainley, D.G., R.P. Henderson, H.R. Huber, R.J. Boekelheide, S.G. Allen, and T.L. McElroy. 1985. Dynamics of white shark/pinniped interactions in the Gulf of the Farallones 1970 to 1983. Memoirs, Southern California Academy of Sciences 9:109-122. (MMC contracts MM4AC002, MM5AC027, MM6AC007, MM7AC025, and MM1300888-2)

Ainley, D.G., H.R. Huber, and K.M. Bailey. 1982. Population fluctuations of California sea lions and the Pacific whiting off central California. Fishery Bulletin (NOAA) 80:253-258. (MMC contracts MM4AC002, MM5AC027, MM6AC007, MM7AC025, and MM1300888-2)

Ainley, D.G., C.S. Strong, H.R. Huber, T.J. Lewis, and S.H. Morrell. 1980. Shark predation of pinnipeds at the Farallon Islands, California. Fishery Bulletin (NOAA) 78(4):941-945. (MMC contracts MM4AC002, MM5AC027, MM6AC007, MM7AC025, and MM1300888-2)

Alexander, L.M., and L.C. Hanson (ed). 1985. Antarctic politics and marine resources: critical choices for the 1980s. Proceedings from the Eighth Annual Conference, 17-20 June 1984, Center for Ocean Management Studies, University of Rhode Island, Kingston, Rhode Island. 262 pp. (MMC contract MM2910791-3)

Allen, S.G., D.G. Ainley, G.W. Page, and C.A. Ribic. 1984. The effects of disturbance on harbor seal haul-out behavior patterns at Bolinas Lagoon, California. Fishery Bulletin (NOAA) 82(3):433-500. (MMC contract MM8AC012)

Allen, S.G., H.R. Huber, C.A. Ribic, and D.G. Ainley. 1989. Population dynamics of harbor seals in the Gulf of the Farallones, California. California Fish and Game 75(4):224-232. (MMC contracts MM7AD110 and MM8AD059)

Ashwell-Erickson, S., and R. Elsner. 1980. Pp. 869-899. *In* D.W. Hood and J.A. Calder (eds), The eastern Bering Sea shelf: oceanography and resources. U.S. Department of Commerce, Washington, D.C. (MMC contracts MM5AC012 and MM7AD011)

Bailey, K.M., and D.G. Ainley. 1982. Dynamics of California sea lion predation on Pacific hake. Fisheries Research 1:163-176. (MMC contracts MM4AC002, MM5AC027, MM6AC007, MM7AC025, and MM1300888-2)

Baker, C.S., and L.M. Herman. 1981. Migration and local movements of humpback whales (*Megaptera novaeangliae*) through Hawaiian waters. Canadian Journal of Zoology 59(3):460-469. (MMC contract MM7AC014)

Balcomb, K.C., III, and M.A. Bigg. 1986. Population biology of the three resident killer whale pods in Puget Sound and off southern Vancouver Island. *In* B.C. Kirkevoid and J.S. Lockard (eds). Behavioral biology of killer whales. Zoo biology monographs, Vol. 1. (MMC contract MM1300731-7)

Balcomb, K.C., III, J.R. Boran, and S.L. Heimlich. 1982. Killer whales in greater Puget Sound. Report of the International Whaling Commission 32:681-685. (MMC contract MM1300731-7)

Barham, E.G., J.C. Sweeney, S. Leatherwood, R.K. Beggs, and C.L. Barham. 1980. Aerial census of the bottlenose dolphin, *Tursiops truncatus*, in a region of the Texas coast. Fishery Bulletin (NOAA) 77(3):585-595. (MMC contract MM8AC011)

Beach, R.J., A.C. Geiger, S.J. Jeffries, S.D. Treacy, and B.L. Troutman. 1985. Marine mammals and their interactions with fisheries of the Columbia River and adjacent waters, 1980-1982. NOAA, NMFS, NWAFC processed report 85-04, 316 pp. (MMC contracts MM2079221-7 and MM2324788-2)

Bean, M.J. 1987. Legal strategies for reducing persistent plastics in the marine environment. Marine Pollution Bulletin 18:357-360. (MMC contract MM2629994-7)

Bengtson, J.L. 1985. Monitoring indicators of possible ecological changes in the Antarctic marine ecosystem. *In* Selected papers, 1982-1984 (Part II), Commission for the Conservation of Antarctic Marine Living Resources, Hobart, Australia. (MMC contract 2629914-1)

Bengtson, J.L. 1985. Review of Antarctic marine fauna. *In* Selected papers, 1982-1984 (Part I), Commission for the Conservation of Antarctic Marine Living Resources, Hobart, Australia. (MMC contract 2629914-1)

Blix, A.S., and L.K. Miller. 1979. Newborn fur seals (*Callorhinus ursinus* – do they suffer from the cold? American Journal of Physiology, 236:R322-327. (MMC contract MM5AC025)

Bockstoce, J. 1980. A preliminary estimate of the reduction of the western Arctic bowhead whale population by the pelagic whaling industry: 1848-1915. Marine Fisheries Review 42(9-10):20-27. (MMC contract MM7AD111)

Bockstoce, J.R. 1986. Whales, ice and men. The history of whaling in the western Arctic. University of Washington Press, Seattle. (MMC contract MM7AD111)

Breiwick, J.M. 1978. Reanalysis of Antarctic sei whale stocks. Report of the International Whaling Commission 28:345-368. (MMC contract MM7AC012)

Breiwick, J.M., E.D. Mitchell, and D.G. Chapman. 1980. Estimated initial population size of the Bering Sea stock of bowhead whale, *Balaena mysticetus*: an iterative method. Fishery Bulletin (NOAA) 78(4):843-853. (MMC contract MM8AC007)

Brown, R.F., and B.R. Mate. 1983. Abundance, movements and feeding habits of harbor seals, *Phoca vitulina*, at Netarts and Tillamook Bays, Oregon. Fishery Bulletin (NOAA) 91(2):291-301. (MMC contract MM8AC003)

Brownell, R.L., P.B. Best, and J.H. Prescott (eds). 1986. Right whales: past and present status. Proceedings of the workshop on the status of right whales, Boston, Massachusetts, 15-23 June 1983. Reports of the International Whaling Commission (Special Issue 10. 289 pp). (MMC contract MM2911051-5)

Brownell, R.L., Jr., L.T. Findley, O. Vidal, A. Robles, and S. Manzanilla N. 1987. External morphology and pigmentation of the vaquita, *Phocoena sinus, (Cetacea: Mammalia)*. Marine Mammal Science 3(1):22-30. (MMC contract MM3309558-7)

Burns, J.J., and F.H. Fay. 1974. New data on taxonomic relationships among North Pacific harbor seals, genus *Phoca (sensu stricto)*. Translation of the 1st International Theriological Congress (Moscow) 1:99. (MMC contract MM4AC005)

Burns, J.J., F.H. Fay, and G.A. Fedoseev. 1984. Craniological analysis of harbor and spotted seals of the North Pacific region. Pp. 5-16. *In* F.H. Fay and G.A. Fedoseev (eds). Soviet—American cooperative research on marine mammals. Vol. I-Pinnipeds. NOAA Tech. Report NMFS-12. (MMC contract MM4AC005)

Clapham, P.J., and C.A. Mayo. 1987. The attainment of sexual maturity in two female humpback whales. Marine Mammal Science 3(3):279-283. (MMC contract MM1800925-5)

Clark, W.G. 1981. Restricted least-squares estimates of age composition from length composition. Canadian Journal of Fisheries and Aquatic Science 38:297-307. (MMC contracts MM1533439-2 and MM1801114-6)

Clark, W.G. 1982. Early changes in the recruitment rates of Antarctic minke whales inferred from recent age distributions. Report of the International Whaling Commission 32:889-895. (MMC contracts MM1533439-2 and MM1801114-6)

Clark, W.G. 1982. Historical rates of recruitment to Southern Hemisphere fin whale stocks. Report of the International Whaling Commission 32:305-324. (MMC contracts MM1533439-2 and MM1801114-6)

Clark, W.G. 1983. Apparent inconsistencies among countries in measurements of fin whale lengths. Report of the International Whaling Commission 33:431-434. (MMC contracts MM1533439-2 and MM1801114-6)

Clark, W.G. 1984. Analysis of variance of photographic and visual estimates of dolphin school size. Southwest Fisheries Center Administration Report LJ-84-11C. Southwest Fisheries Center, National Marine Fisheries Service, La Jolla, California. 36 pp. (MMC contract MM2324792-1).

Clark, W.G. 1984. Recruitment rates of Antarctic fin whales, *Balaenoptera physalus*, inferred from cohort analysis. Reports of the International Whaling Commission (Special Issue 6):411-415. (MMC contract MM1533439-2)

Coe, J.M., and W.E. Stuntz. 1980. Passive behavior by the spotted dolphin, *Stenella attenuata*, in tuna purse seine nets. Fishery Bulletin (NOAA) 78(2):535-537. (MMC contract MM6AC022)

Costa, D.P. 1978. The sea otter: its interaction with man. Oceanus 21(2):24-30. (MMC contract MM6AA053)

Costa, D.P. 1982. Energy, nitrogen, and electrolyte flux and sea water drinking in the sea otter, *Enhydra lutris*. Physiological Zoology 55(1):35-44. (MMC contract MM6AA053)

Cowen, R.K., C.R. Agegian, and M.S. Foster. 1982. The maintenance of community structure in a central California giant kelp forest. Journal of Experimental Marine Biology and Ecology 64:189-201. (MMC contract MM7AC023)

Crone, M.J., and S.D. Kraus (eds). 1990. Right whales (*Eubalaena glacialis*), in the western North Atlantic: a catalog of identified individuals. New England Aquarium, Boston, Massachusetts. 243 pp. (MMC contract T6223913-6)

Dayton, P.K. 1984. Processes structuring some marine communities: are they general? Pp. 181-197. *In* D.R. Strong, *et al.* (eds). Ecological communities: conceptual issues and the evidence. Princeton University Press, Princeton, N.J. (MMC contract MM1300702-9)

Dayton, P.K., V. Currie, T. Gerrodette, B.D. Keller, R. Rosenthal, and D. Van Tresca. 1984. Patch dynamics and stability of some California kelp communities. Ecological Monographs 54(3):253-289. (MMC contract MM1300702-9)

Dayton, P.K., and M.J. Tegner. 1984. The importance of scale in community ecology: a kelp forest example with terrestrial analogs. Pp. 457-481. *In* P.W. Price, *et al.* (eds). A new ecology: novel approaches to interactive systems. John Wiley & Sons, Inc., New York. (MMC contract MM1300702-9)

Deiter, R.L. 1990. Recovery and necropsy of marine mammal carcasses in and near the Point Reyes National Seashore, May 1982 to March 1987. Pp. 123-141. *In* J.E. Reynolds, III, and D.K. Odell (eds). Proceedings of the second marine mammal stranding work shop, 3-5 December 1987, Miami, Florida. National Oceanic and Atmospheric Administration Technical Report No. 98, National Marine Fisheries Service. (MMC contract MM2911030-8)

DeMaster, D.P., and J.K. Drevenak. 1988. Survivorship patterns in three species of captive cetaceans. Marine Mammal Science (4):297-311.

Eberhardt, L.L., D.G. Chapman, and J.R. Gilbert. 1979. A review of marine mammal census methods. Wildlife Monographs, No. 63. 46 pp. (MMC contract MM4AC014)

Everitt, R.D., and R.J. Beach. 1982. Marine mammal-fisheries interactions in Oregon and Washington: an overview. Pp. 265-277. *In* Transactions of the 47th North American Wildlife and Natural Resources Conference. Wildlife Management Institute, Washington, D.C. (MMC contracts MM2079345-2 and MM2079357-5)

Fay, F.H. 1982. Ecology and biology of the Pacific walrus, *Odobenus rosmarus divergens* illigen. U.S. Fish and Wildlife Service. North American Fauna, No. 74. 279 pp. (Partial support under MMC contract MM1533576-0)

Fay, F.H. 1984. Walrus. Pp. 264-269. *In* D. Macdonald (ed). Encyclopedia of Mammals. Equinox Ltd., Oxford, England. (MMC contract MM1533576-0)

Fay, F.H. 1984. Foods of the Pacific walrus, winter and spring in the Bering Sea. Pp. 81-88. *In* F.H. Fay and G.A. Fedoseev (eds). Soviet-American cooperative research on marine mammals. Vol. I-Pinnipeds. NOAA Technical Report NMFS-12. (MMC contracts MM4AC005, MM4AC006, MM5AC024, MM8AC013, and MM1533576-0)

Fay, F.H. 1985. *Odobenus rosmarus*. Mammalian Species 238:1-7. (MMC contract MM1533576-0)

Fay, F.H., B.P. Kelly, and J.L. Sease. 1989. Managing the exploitation of Pacific walruses: a tragedy of delayed response and poor communication. Marine Mammal Science 5(1):1-16. (MMC contracts MM4AC005, MM4AC006, MM5AC024, MM8AC013, and MM1533576-0)

Foster, M. 1982. The regulation of macroalgal associations in kelp forests. Pp. 185-205. *In* L. Srivastava (ed). Synthetic and degradative processes in marine macrophytes. W. de Gruyter & Company, Berlin. (MMC contract MM7AC023)

Fowler, C.W. 1980. A rationale for modifying effort by catch, using the sperm whale of the North Pacific as an example. Reports of the International Whaling Commission (Special Issue 2):99-102. (MMC contract MM8AC009)

Fowler, C.W. 1981. Comparative population dynamics in large mammals. Pp. 437-455. *In* C.W. Fowler and T.D. Smith (eds). Dynamics of large mammal populations. John Wiley & Sons, Inc., New York. (MMC contract MM1300730-4)

Fowler, C.W. 1981. Density dependence as related to life history strategy. Ecology 62:602-610. (MMC contract MM7AC013)

Fowler, C.W. 1987. A review of density dependence in populations of large mammals. Pp. 401-441. *In* H.H. Genoways (ed). Current Mammalogy, Vol. I. (MMC contract MM7AC013)

Gaines, S.E., and D. Schmidt. 1976. Wildlife management under the Marine Mammal Protection Act of 1972. Pp. 50096-50114. *In* Environmental Law Reporter, Vol. 6. (MMC contract MM5AC029)

Gentry, R.L., and G.L. Kooyman. 1986. Fur seals: maternal strategies on land and at sea. Princeton University Press, Princeton, New Jersey. 291 pp. (MMC contract MM6A019)

Georgia Conservancy, The. 1986. Report of the southeastern U.S. right whale workshop, 18-20 February 1986, Jekyll Island, Georgia. 41 pp. ((MMC contract MM633095950)

Geraci, J.R. 1978. The enigma of marine mammal strandings. Oceanus 21(2):1-10. (MMC contracts MM5AC008, MM6AD007, MM7AD-69, and MM7AC020)

Geraci, J.R. 1989. Clinical investigations of the 1987-88 mass mortality of bottlenose dolphins along the U.S. central and south Atlantic coast. Final report to the U.S. National Marine Fisheries Service, Office of Naval Research, and the Marine Mammal Commission, Washington, D.C. 63 pp. (MMC contracts MM4465826-9, T5360275-6, T5360277-2, and T5360286-6)

Geraci, J.R., D.M. Anderson, R.J. Timperi, D.J. St. Aubin, G.A. Early, J.H. Prescott, and C.A. Mayo. 1989. Humpback whales (*Megaptera novaeangliae*) fatally poisoned by dinoflagellate toxin. Canadian Journal of Fisheries and Aquatic Science 46(11):1895-1898. (MMC contract T5306271-4)

Geraci, J.R., M.D. Daily, and D.J. St. Aubin. 1978. Parasitic mastitis in the Atlantic white-sided dolphin, *Lagenorhynchus acutus*, as a probable factor in herd productivity. Journal of the Fisheries Research Board of Canada 35(10):1350-1355. (MMC contract MM5AC008)

Geraci, J.R., and D.J. St. Aubin. 1980. Offshore petroleum resource development and marine mammals: a review and research recommendations. Marine Fisheries Review 42(11):1-12. (Requested by the Marine Mammal Commission)

Glockner-Ferrari, D.A., and M.J. Ferrari. 1987. Identification, reproduction, and distribution of humpback whales in Hawaiian waters, 1984 and 1985. Report to National Marine Fisheries Service, National Marine Mammal Laboratory, Seattle. 33 pp. (MMC contract MM2629752-5)

Goodman, D. 1980. Demographic intervention for closely managed populations. *In* M.E. Soule and B.A. Wilcox (eds). Conservation biology: an evolutionary perspective. Sinaves. (MMC contract MM8AD-008)

Goodman, D. 1981. Life history analysis of large mammals. *In* C.W. Fowler and T.D. Smith (eds). Dynamics of large mammal populations. John Wiley & Sons, Inc., New York. (MMC contract MM8AD-008)

Haenel, N.J. 1986. General notes on the behavioral ontogeny of Puget Sound killer whales and the occurrence of allomaternal behavior. *In* B.C. Kirkevoid and J.S. Lockard (eds). Behavioral biology of killer whales. Zoo Biology Monographs, Vol. 1. (MMC contract MM1300731-7)

Hain, J.H.W., G.R. Carter, S.D. Kraus, C.A. Mayo, and H.E. Winn. 1982. Feeding behavior of the humpback whale, *Megaptera novaeangliae*, in the western North Atlantic. Fishery Bulletin (NOAA) 80(2):259-268. (MMC contract MM1800925-5)

Hall, J.D. 1977. A non-lethal lavage device for sampling stomach contents of small marine mammals. Fishery Bulletin (NOAA) 75(3):653-656. (MMC contract MM4AC013)

Harvey, J.T., and B.R. Mate. 1984. Dive characteristics and movements of radio-tagged gray whales in San Ignacio Lagoon, Baja California Sur, Mexico. Pp. 561-575. *In* M.L. Jones, S. Swartz, and S. Leatherwood (eds). The Gray whale. Academic Press, Orlando, Florida. (MMC contract MM1533416-9)

Heimlich-Boran, J.R. 1986. Photogrammetric analysis of growth in Puget Sound *Orcinus orca*. *In* B.C. Kirkevoid and J.S. Lockard (eds). Behavioral biology of killer whales. Zoo Biology Monographs. Vol. 1. (MMC contract MM1300731-7)

Heimlich-Boran, J.R. 1986. Fishery correlations with the occurrence of killer whales in greater Puget Sound. *In* B.C. Kirkevoid and J.S. Lockard (eds). Behavioral biology of killer whales. Zoo Biology Monographs. Vol. 1. (MMC contract MM1300731-7)

Heimlich-Boran, S.L. 1986. Cohesive relationships among Puget Sound killer whales. *In* B.C. Kirkevoid and J.S. Lockard (eds). Behavioral biology of killer whales. Zoo Biology Monographs. Vol. 1. (MMC contract MM1300731-7)

Herman, L.M. 1979. Humpback whales in Hawaiian waters: a study in historical ecology. Pacific Science 33(1):1-16. (MMC contract MM7AC014)

Herman, L.M., and R.C. Antinoja. 1977. Humpback whales in the Hawaiian breeding waters: population and pod characteristics. Scientific Report of the Whales Research Institute, No. 29:59-85. (MMC contract MM7AC014)

Hoelzel, A.R., and R.W. Osborne. 41986. Killer whale call characteristics: implications for cooperative foraging strategies. *In* B.C. Kirkevoid and J.S. Lockard (eds). Behavioral biology of killer whales. Zoo Biology Monographs. Vol. 1. (MMC contract MM1300731-7)

Hofman, R.J. 1985. The Convention on the Conservation of Antarctic Marine Living Resources. Pp. 113-122. *In* L.M. Alexander and L.C. Hanson (eds). Antarctic politics and marine resources: critical choices for the 1980s. Center for Ocean Management Studies, University of Rhode Island, Kingston, Rhode Island.

Hofman, R.J., and W.N. Bonner. 1985. Conservation and protection of marine mammals: past, present and future. Marine Mammal Science 1(2):109.

Huber, H.R. 1987. Natality and weaning success in relation to age of first reproduction in northern elephant seals. Canadian Journal of Zoology 65(6):1311-1316. (MMC contracts MM4AC002, MM5AC027, MM6AC007, MMAC025, MM130088-3, MM1535599-3)

Huber, H.R., D.G. Ainley, and S.H. Morrell. 1982. Sightings of cetaceans in the Gulf of the Farallones, California, 1971-1979. California Fish and Game 68(3):183-189. (MMC contract MM1300888-2)

Hui, C.A. 1980. Variability of dentin deposits in *Tursiops truncatus*. Canadian Journal of Fisheries and Aquatic Science 37(4):712-716. (MMC contract MM7AC021)

Irvine, A.B., M.D. Scott, R.S. Wells, and J.H. Kaufman. 1981. Movements and activities of the Atlantic bottlenose dolphin, *Tursiops truncatus*, near Sarasota, Florida. Fishery Bulletin (NOAA) 79(4):671-688. (MMC contracts MM4AC004 and MM5AC018)

Irvine, A.B., R.S. Wells, and M.D. Scott. 1982. An evaluation of techniques for tagging small odontocete cetaceans. Fishery Bulletin (NOAA) 80(1):135-143. (MMC contracts MM4AC004 and MM5AC018)

Johnson, P.A., B.W. Johnson, and L.R. Taylor. 1981. Interisland movement of a young Hawaiian monk seal between Laysan Island and Maro Reef. 'Elepaio, 41(11):113-114. (MMC contracts MM7AC009 and MM8AC008)

Jones, M.L. 1985. Evaluation of the potential impact of whale-watching activities on gray whales in Laguna San Ignacio, Baja California Sur, Mexico, 1978 to 1982. Masters thesis, Moss Landing Marine Laboratory, San Jose State University, San Jose, California. 73 pp. (MMC contracts MM7AC008, MM8AC005, MM1533497-8, MM2079219-4, MM2324713-8, and MM2911098-4)

Jones, M.L. 1990. The reproductive cycle in gray whales based on photographic resightings of females on the breeding grounds from 1977-82. Reports of the International Whaling Commission (Special Issue 12):177-182. (MMC contracts MM7AC008, MM8AC005, MM1533497-8, MM2079219-4, MM2324713-8, and MM2911098-4)

Jones, M.L., and S.L. Swartz. 1984. Demography and phenology of breeding gray whales in Laguna San Ignacio, Baja California Sur, Mexico: 1978-1982. Pp. 309-374. *In* M.L. Jones, S.L. Swartz, and J.S. Leatherwood (eds). The gray whale. Academic Press, Inc., Orlando, Florida. 602 pp. (MMC contracts MM7AC008, MM8AC005, MM1533497-8, MM2079219-4, MM2324713-8, and MM2911098-4)

Jones, M.L., S.L. Swartz, and J.S. Leatherwood (eds). 1984. The gray whale. Academic Press, Inc., Orlando, Florida. 602 pp. (MMC contracts MM7AC008, MM8AC005, MM1533497-8, MM2079219-4, MM2324713-8, MM2911098-4)

Kirby, V. 1983. Progesterone and estrogens in pregnant and nonpregnant dolphins (*Tursiops truncatus*) and the effects of induced ovulation. Biology of Reproduction 28:897-901. (MMC contract MM7AC016)

Kooyman, G.L., J.O. Billups, and W.D. Farwell. 1983. Two recently developed recorders for monitoring diving activity of marine birds and mammals. Pp. 197-214. *In* A.G. MacDonald and I.G. Priede (eds). Experimental biology at sea. Academic Press, New York. (MMC contract MM6AC019)

Kooyman, G.L., and L.H. Cornell. 1981. Flow properties of expiration and inspiration in a trained bottlenosed porpoise. Physiological Zoology 54(1):55-61. (MMC contract MM4AC012)

Kooyman, G.L., R.L. Gentry, and D.L. Urquhart. 1976. Northern fur seal diving behavior: a new approach to its study. Science 193:411-412. (MMC contract MM6AC019)

Kooyman, G.L., K.S. Norris, and R.L. Gentry. 1975. Spout of the gray whale: its physical characteristics. Science 190:908-910. (MMC contract MM4AC012)

Kooyman, G.L., and E.E. Sinnett. 1979. Mechanical properties of the harbor porpoise lung. Respiratory Physiology, 36:287-300. (MMC contract MM4AC012)

Kraus, S.D. 1990. Rates and potential causes of mortality in North Atlantic right whales (*Eubalaena glacialis*). Marine Mammal Science, 6(4):278-291. (MMC contract MM3309800-5)

Kraus, S.D., J.R. Gilbert, and J.H. Prescott. 1983. A comparison of aerial, shipboard and land-based survey methodology for the harbor porpoise, *Phocoena phocoena*. Fishery Bulletin (NOAA) 81:910-912, (MMC contract MM1801023-1)

Kraus, S.D., K.E. Moore, C.A. Price, M.J. Crone, W.A. Watkins, H.E. Winn, and J.H. Prescott. 1986. The use of photographs to identify individual North Atlantic right whales (*Eubalaena glacialis*). Reports of the International Whaling Commission (Special Issue 10):139-144. (MMC contracts MM2079355-9 and MM3309800-5)

Kraus, S.D., J.H. Prescott, and A.R. Knowlton. 1988. Wintering right whales along the Southeastern United States: a primary calving ground. Proceedings of the third southeastern non-game and endangered wildlife symposium. Georgia Department of Natural Resources, pp. 148-157. (MMC contract MM3309800-5)

Kraus, S.D., J.H. Prescott, A.R. Knowlton, and G.S. Stone. 1986. Migration and calving of right whales (*Eubalaena glacialis*) in the western North Atlantic. Reports of the International Whaling Commission (Special Issue 10):145-151. (MMC contracts MM2079355-9 and MM3309800-5)

Laist, D.W. 1987. An overview of the biological effects of lost and discarded plastic debris in the marine environment. Marine Pollution Bulletin 18:319-326.

Leatherwood, S. 1975. Some observations of feeding behavior of bottlenosed dolphins (*Tursiops truncatus*) in the northern Gulf of Mexico and (*Tursiops* cf. *T. gilli*) off Southern California, Baja California, and Nayarit, Mexico. Marine Fisheries Review 37(9):10-16. (MMC contract MM6AC001)

Leatherwood, S., J.R. Gilbert, and D.G. Chapman. 1978. An evaluation of some techniques for aerial censuses of bottlenosed dolphins. Journal of Wildlife Management 42(2):239-250. (MMC contract MM6AC001)

Leatherwood, J.S., R.A. Johnson, D.K. Ljungblad, and W.E. Evans. 1977. Broadband measurements of underwater acoustic target strengths of panels of tuna nets. Technical Report 126. Naval Ocean Systems Center, San Diego, California. 19 pp. (MMC contract MM6AC020)

Loughlin, T.R. 1979. Radio telemetric determination of the 24-hour feeding activities of sea otters, *Enhydra lutris*. Pp. 717-724. *In* C.J. Amlaner, Jr., and D.W. McDonald (eds). A handbook on biotelemetry and radiotracking. Pergamon Press, Oxford and New York. (MMC contracts MM6-AC004 and MM6AC024)

Loughlin, T.R. 1980. Home range and territoriality of sea otters near Monterey, California. Journal of Wildlife Management 44(3):576-582. (MMC contracts MM6AC004 and MM6AC024)

Lowry, L.F. 1982. Documentation and assessment of marine mammal-fishery interactions in the Bering Sea. Pp. 300-311. *In* Transactions of the 47th North American wildlife and natural resources conference wildlife management institute. Washington, D.C. (MMC contract MM1533596-4)

Lowry, L.F., and F.H. Fay. 1984. Seal eating by walruses in the Bering and Chukchi Seas. Polar Biology 3:11-18. (MMC contracts MM5AC006 and MMC5AC024)

Mate, B.R., and J.T. Harvey. 1984. Ocean movements of radio-tagged gray whales. *In* M.L. Jones and S.L. Swartz (eds). The gray whale, *Eschrichtius robustus*. Academic Press, New York. (MMC contract 1533416-0)

Mate, B.R., J. Harvey, R. Maiefski, and L. Hobbs. 1983. A New radio tag for large whales. Journal of Wildlife Management 47(3):869-872. (MMC contract MM1533416-9)

Mayo, C.A., C.A. Carlson, P.J. Clapham, and D.K. Mattila. 1985. Humpback whales of the southern Gulf of Maine. Shankpainter Press, Provincetown, Massachusetts. (MMC contract MM1800925-5)

Mead, J.G. 1977. Records of sei and bryde's whales from the Atlantic Coast of the United States, the Gulf of Mexico and the Caribbean. Reports of the International Whaling Commission (Special Issue l):113-116. (MMC contract MM7AC007)

Melteff, B.R., and D.H. Rosenberg (eds). 1984. Proceedings of the workshop on biological interactions among marine mammals and commercial fisheries in the southeastern Bering Sea, October 18-21, 1983, Anchorage, Alaska. Alaska Sea Grant College Program, University of Alaska, Fairbanks, Alaska. 300 pp. (MMC contract MM2324802-7)

Merrell, T.R. 1985. Fish nets and other plastic litter on Alaska beaches. *In* R.S. Shomura and H.O. Yoshida (eds). Proceedings of the workshop on the fate and impact of marine debris, 26-29 November 1984, Honolulu, Hawaii. U.S. Dept. Commerce, NOAA Tech. Memo. (MMC contract MM2910786-1)

Miller, L.K. 1977. Energetics of the northern fur seal in relation to climate and food resources of the Bering Sea. Procedures 2nd Conference Biology Marine Mammals, San Diego, California. (MMC contract MM5AC025)

Mizroch, S.A., D.W. Rice, J.L. Bengtson, and S.W. Larson. 1985. Preliminary atlas of *Balaenopterid* whale distribution in the southern ocean based on pelagic catch data. SC-CAMLR-IV/BG/21. Pp. 113-193. *In* Selected papers presented to the scientific committee of CCAMLR, 1985. (MMC contract MM3309521-5)

Nafziger, J.A.R. 1978. The management of marine mammals after the fishery conservation and management act. Willamette Law Journal 14:153-215. (MMC contract MM7AC001)

National Research Council. 1981. An evaluation of antarctic marine ecosystem research. Committee To Evaluate Antarctic Marine Ecosystem Research, Polar Research Board. National Academy Press, Washington, D.C. 99 pp. (MMC contract MM1800913-2)

National Research Council. 1988. Priorities in arctic marine science. 73 pp. (MMC contracts MM2911050-6, MM3309999821-2)

Norris, K.S., R. Goodman, B. Villa-Ramirez, and L. Hobbs. 1977. Behavior of California gray whales (*Eschrichtius robustus*) in Southern Baja California, Mexico. Fishery Bulletin (NOAA) 75(1):159-172. (MMC contract MM5AC007)

Odell, D.K. 1975. Status and aspects of the life history of the bottlenose dolphin, *Tursiops truncatus*, in Florida. Journal of the Fisheries Research Board of Canada 32(7):1055-1058. (MMC contract MM4AC003)

Odell, D.K. 1976. Distribution and abundance of marine mammals in south Florida: Preliminary Results. *In* A. Thorhaug (ed). 1976. Biscayne Bay: Past/Present/Future. Biscayne Bay Symposium I, 2-3 April 1976. University of Miami Sea Grant Special Report No. 5. 315 pp. (MMC contract MM4AC003)

Odell, D.K. 1979. Distribution and abundance of marine mammals in the waters of the Everglades National Park. Proceedings of the first conference on research in national parks. USDI, NPS, Transactions proceedings series No. 5:673-678. (MMC contract MM4AC003)

Packard, J.M. 1981. Abundance, distribution, and feeding habits of manatees *(Trichechus manatus)* wintering between St. Lucie and Palm Beach Inlets, Florida. U.S. Fish and Wildlife Contract Report No. 14-16-004-80-105. 139 pp. (MMC contract MM1801025-7).

Packard, J.M. 1984. Impact of manatees, *Trichechus manatus*, on seagrass communities in eastern Florida. *In* Acta Zoological ca. 172:21-22. (MMC contract MM1801025-7)

Packard, J.M. 1984. Proposed research/management plan for Crystal River manatees. Vols. 1-3. Tech. Report 7. Florida Cooperative Fish and Wildlife Research Unit, University of Florida, Gainesville, Florida. Prepared for Fish and Wildlife Service, U.S. Department of the Interior, Washington, D.C. 31 pp. 235 pp. 346 pp. (MMC contract MM1801024-4)

Packard, J.M., R.K. Frohlich, J.E. Reynolds, III, and J.R. Wilcox. 1985. Manatee response to interrupted operation of the Fort Myers power plant, winter 1984/85. Manatee population research report No. 8. Technical Report No. 8-8. Florida Cooperative Fish and Wildlife Research Unit. University of Florida, Gainesville, Florida. 20 pp. (MMC contract MM3309522-8)

Packard, J.M., and O.F. Wetterquist. 1985. Evaluation of manatee habitat on the northwestern coast of Florida. Coastal Zone Management Journal 14(4):279-310. (MMC contract MM1801025-7)

Payne, R., O. Brazier, E.M. Dorsey, J.S. Perkins, V.J. Rowntree, and A. Titus. 1983. External features in southern right whales *(Eubalaena australis)* and their use in identifying individuals. Pp. 371-445. *In* R. Payne (ed). Communication and behavior of whales. AAAS Selected Symposium 76. Westview Press, Inc. Boulder, Colorado. (MMC contract MM6AC017)

Pearse, J.S., D.P. Costa, M.B. Yellin, and C.R. Agegian. 1977. Localized mass mortality of red sea urchin, *Strongylocentrotus franciscanus*, near Santa Cruz, California. Fishery Bulletin (NOAA) 75(3):645-648. (MMC contract MM6AC029)

Perrin, W.F., R.L. Brownell, Jr., and D.P. DeMaster (eds). 1984. Reproduction in whales, dolphins, and porpoises. Reports of the International Whaling Commission (Special Issue 6. 490 pp.) (MMC contract MM2079356-2)

Perrin, W.F., R.L. Brownell, Jr., Zhou Kaiya, and Liu Jiankang (eds) 1989. Biology and conservation of the river dolphins. IUCN Species Survival Commission Occasional Paper No. 3. (MMC contract MM3309828-3)

Perrin, W.F., and A.C. Myrick, Jr. (eds). 1980. Age determination of toothed whales and sirenians. Reports of the International Whaling Commission (Special Issue 3. 229 pp.) (MMC contract MM8AC004)

Pierotti, R.J., D.G. Ainley, T.S. Lewis, and M.C. Coulter. 1977. Birth of a California sea Lion on Southeast Farallon Island. California Fish and Game 63(1):64-65. (MMC contract MM4AC002)

Pitcher, K.W. 1980. Food of the harbor seal, *Phoca vitulina*, in the Gulf of Alaska. Fishery Bulletin (NOAA) 78(2):544-549. (MMC contract MM5AC011).

Pitcher, K.W. 1980. Stomach contents and feces as indicators of harbor seal, *Phoca vitulina*, foods in the Gulf of Alaska. Fishery Bulletin (NOAA) 78(3):797-798. (MMC contract MM5AC011)

Pitcher, K.W. 1986. Variation in blubber thickness of harbor seals in Southern Alaska. Journal of Wildlife Management 50(3):463-466. (MMC contract MM5AC011)

Pitcher, K.W. 1990. Major decline in the number of harbor seals, *Phoca vitulina*, on Tugidak Island, Gulf of Alaska. Marine Mammal Science, 6(2):121-134. (MMC contract T75133261)

Ralls, K. 1989. A semi-captive breeding program for the Baiji, *Lipotes vexillifer*: genetic and demographic considerations. Pp. 150-156 *In* W.F. Perrin, R.L. Brownell, Jr., Zhou Kaiya, and Liu Jiankang (eds), Biology and conservation of the river dolphins. IUCN Species Survival Commission Occasional Paper No. 3. (MMC contract MM3309828-3)

Ralls, K., and J. Ballou (eds). 1986. Proceedings of the workshop on the genetic management of captive populations. Zoo Biology 5(2):81-238. (MMC contract MM2910864-0)

Ralls, K., and J. Ballou. 1986. Captive breeding programs for populations with a small number of founders. Trends Ecology and Evolution, 1:19-22. (MMC contract MM2910864-0)

Ralston, F. (ed). 1977. A workshop to assess research related to the porpoise/tuna problem, February 28, March 1-2. Southwest Fisheries Center Admin. Report LJ-77-15. Southwest Fisheries Service, National Marine Fisheries Service, La Jolla, California. 119 pp. 6 appendices. (MMC contract MM7AC022).

Ray, G.C., J.A. Dobbin, and R.V. Salm. 1978. Strategies for protecting marine mammal habitats. Oceanus 21(2):55-67. (MMC contract MM6AC011)

Reeves, R.R., D. Tuboku-Metzger, and R.A. Kapindi. 1988. Distribution and exploitation of manatees in Sierra Leone. Oryz 22(2):75-84. (MMC contract MM241103a-9)

Reynolds, III., J.E., and R.D. Madded (eds). 1990. Report of the workshop on geographic information system as an aid to managing habitat for West Indian manatees in Florida and Georgia. Rep. No. 49. Florida Marine Research, Florida Department of Natural Resources, St. Petersburg, Florida. 57 pp. (MMC contract T6223916-5)

Roffe, T.J., and B.R. Mate. 1984. Abundances and feeding habits of pinnipeds in the Rogue River, Oregon. Journal of Wildlife Management 48(4):1262-1274. (MMC contract MM8AC003)

Scott, G.P., and H.E. Winn. 1978. Assessment of humpback whale (*Megaptera novaeangliae*) stocks using vertical photographs. Proceedings PECORA IV symposium, National Wildlife Science and technology series 3:235-243. (MMC contract MM7AC029)

Sergeant, D.E., D.J. St. Aubin, and J.R. Geraci. 1980. Life history and Northwest Atlantic status of the white-sided dolphin, *Lagenorhynchus acutus*. Cetology 37:1-12. (MMC contract MM5AC008)

Shallenberger, E.W. 1977. Humpback whales in Hawaii: population and distribution. Oceans '77, marine technology society, institute of electrical and electronics engineers, p. Hawaii C1-7. (MMC contract MM7AC014)

Shane, S. 1978. Suckerfish attached to a bottlenose dolphin. Journal of Mammalogy, 59(2):4399-440. (MMC contract MM6AC028)

Shane, S.H. 1980. Occurrence, movements, and distribution of bottlenose dolphin, *Tursiops truncatus*, in southern Texas. Fishery Bulletin (NOAA) 78(3):593-601. (MMC contract MM6AC028)

Shane, S.H. 1990. Comparison of bottlenose dolphin behavior in Texas and Florida, with a critique of methods for studying dolphin behavior. Pp. 541-558 *In* J.S. Leatherwood and R. Reeves (eds), The bottlenose dolphin. Academic Press, Orlando, Florida. 653 pp. (MMC contract MM6AC028)

Shane, S.H., and D. McSweeney. 1990. Using photo-identification to study pilot whale social organization. Reports of the International Whaling Commission (Special Issue 12):259-263. (MMC contracts MM2629899-3 and MM2910859-8)

Shane, D., and D.J. Schmidly. 1976. Bryde's whale (*Balaenoptera edeni)* from the Louisiana coast. Southwest Naturalist, 21(3):409-4120. (MMC contract MM4AC008).

Shaughnessy, P.D., and F.H. Fay. 1977. A review of the taxonomy and nomenclature of North Pacific harbour seals. Journal of Zoology, London, 182:385-419. (MMC contract MM4AC005)

Sherman, K., and L.M. Alexander (eds). 1984. Variability and management of large marine ecosystems. AAAS Selected Symposium 99. Westview Press, Boulder, Colorado. 319 pp. (MM1300736-2)

Sherman, K., and L.M. Alexander (eds). 1989. Biomass yields and geography of large marine ecosystems. AAAS Selected Symposium 111. Westview Press, Boulder, Colorado. 493 pp. (MMC contracts MM4465739-6 and T-68108614)

Shomura, R.S., and H.O. Yoshida (eds). 1985. Proceedings of the workshop on the fate and impact of marine debris, 27-29 November 1984, Honolulu, Hawaii. NOAA-TM-NMFS-SWFC-54. 580 pp. (MMC contract MM2629949-7)

Silber, G.K. 1990. Occurrence and distribution of the vaquita (*Phocoena sinus*) in the northern Gulf of California. Fishery Bulletin U.S., 88(2):339-346. (MMC contract T62240221-9)

Siniff, D.B., T.D. Williams, A.M. Johnson, and D.L. Garshelis. 1982. Experiments on the response of sea otters (*Enhydra lutris*) to oil contamination. Biological Conservation 23(4):261-272. (MMC contract MM7AD-094)

Smith, T.D. 1981. The adequacy of the scientific basis for the management of sperm whales. Pp. 333-343. *In* Mammals in the Seas. FAO Fisheries Series No. 5, Vol. III. 504 pp. (MMC contract MM6AD047)

Smith, T., and T. Polacheck. 1979. Analysis of a simple model for estimating historical population sizes. Fishery Bulletin (NOAA) 76(4):771-779. (MMC contract MM7AC006)

Southern, S.O., P.J. Southern, and A.E. Dizon. 1988. Molecular characterization of a cloned dolphin mitochondrial genome. Journal of Molecular Evolution 28:32-42. (MMC contract MM29100998-2)

Stone, G.S., S.D. Kraus, J.H. Prescott, and K.W. Hazard. 1988. Significant aggregations of the endangered right whale, *Eubalaena glacialis*, on the continental shelf of Nova Scotia. The Canadian Field-Naturalist 102(3):471-474. (MMC contract T6223913-6)

Swartz, S.L. 1981. Cleaning symbiosis between topsmelt, *Atherinops affinis*, and gray whales, *Eschrichtius robustus*, in Laguna San Ignacio, Baja California Sur, Mexico. Fishery Bulletin (NOAA) 79(2):360. (MMC contracts MM8AC005 and MM1533497-8)

Swartz, S.L. 1986. Gray whale migratory, social and breeding behavior. Reports of the International Whaling Commission (Special Issue 8):207-229. (MMC contracts MM7AC008, MM8AC005, MM1533497-8, MM2079219-4 and MM2324713-8).

Swartz, S.L. 1986. Demography, migration, and behavior of gray whales *Eschrichtius robustus* (Lilljeborg, 1861) in San Ignacio Lagoon, Baja California Sur, Mexico and in their winter range. Ph.D. Dissertation. University of California, Santa Cruz, California. 85 pp. (MMC contracts MM7AC008, MM8AC005, MM1533497-8, MM2079219-4, MM2324713-8, MM2911098-4)

Swartz, S.L., and M.K. Bursk. 1979. The gray whales of Laguna San Ignacio after two years. Whalewatcher 13(1):709. (MMC contracts MM7AC008 and MM8AC005)

Swartz, S.L., and M.L. Jones. 1983. Gray whale (*Eschrichtius robustus*) calf production and mortality in the winter range. Report of the International Whaling Commission 33:503-508. (MMC contracts MM7AC009, MM1533497-8 and MM2079219-4)

Swartz, S.L., and M.L. Jones. 1984. Gray whale mothers and their calves. Oceans 17(2):47-55. (MMC contracts MM7AC009, MM1533497-8 and MM2079219-4)

Swartz, S.L., and M.L. Jones. 1987. Gray whales at play in San Ignacio Lagoon. National Geographic Magazine (76):755-771. (MMC contract MM7AC008, MM8AC005, MM1533497-8, MM2079219-4 and MM2324713-8)

Swartzman, G.L. 1984. Present and future potential models for examining the effect of fisheries on marine mammal populations in the Eastern Bering Sea. *In* B. Melteff (ed). Proceedings of the workshop on biological interactions among marine mammals and commercial fisheries in the Southeastern Bering Sea. Alaska Sea Grant Report 84-1. (MMC contract MM1800969-5).

Swartzman, G.L., and R.T. Haar. 1983. Interactions between fur seal populations and fisheries in the Bering Sea. Fishery Bulletin (NOAA) 8(1):121-132. (MMC contracts MM1800969-5 and MM2629737-6)

Swartzman, G.L., and R.T. Haar. 1985. Interactions between fur seal populations and fisheries in the Bering Sea. Pp. 62-93. *In* J.R. Beddington, R. Beverton, and D.M. Lavigne (eds). Marine Mammals and Fisheries. George Allen and Unwin. London. 354 pp. (MMC contracts MM1800969-5 and MM2629737-6)

Tillman, M.F., and G.P. Donovan (eds). 1983. Special issue on historical whaling records. Reports of the International Whaling Commission (Special Issue 5. 490 pp). (MMC contract MM7AC017)

Tricas, T.C., L.R. Taylor, and G. Naftel. 1981. Diel behavior of the tiger shark, *Galeocerdo cuvier*, at French Frigate Shoals, Hawaiian Islands. Copeia 1981:904-908. (MMC contract MM7AC011)

Van Wagenen, R.F., M.S. Foster, and F. Burns. 1981. Sea otter predation on birds near Monterey, California. Journal of Mammalogy, 62(2):433-434. (MMC contract MM7AC023)

Villa-R., B. 1976. Report on the status of *Phocoena sinus*, Norris and McFarland 1958, in the Gulf of California. Universidad Nacional Instituto De Biologia Anales: Serie Zoologia 47(2):203-208. (MMC contract MM6AD052)

Wells, R.S., A.B. Irvine, and M.D. Scott. 1980. The social ecology of inshore odontocetes. *In* L.M. Herman (ed). Cetacean behavior: mechanisms and processes. John Wiley & Sons, Inc., New York. (MMC contracts MM4AC004 and MM5AC0018)

Whitehead, H., K. Chu, J. Perkins, P. Bryant, and G. Nichols. 1983. Population size, stock identity, and distribution of the humpback whales off West Greenland—summer 1981. Report of the International Whaling Commission 33:497-501. (MMC contract MM2079259-2).

Williams, T.D., and F.H. Kocher. 1978. Comparison of anaesthetic agents in the sea otter. Journal of American Veterinary Medical Association 173:1127-1130. (MMC contract MM7AD-094)

Williams, T.D., and L.T. Pulley. 1983. Blood collection, hematology and blood chemistry in the sea otter. Journal of Wildlife Diseases 19(1):44-47. (MMC contract MM7AD-094)

Williams, T.D., and D.B. Siniff. 1983. Surgery implantation of radiotelemetry devices in the sea otter. Journal of the American Veterinary Medical Association 193(11). (MMC contract MM7AD-094)

Williams, T.D., A.L. Williams, and D.B. Siniff. 1981. Fentanyl and azaperone produced neuroleptanalgesia in the sea otter. Journal of Wildlife Diseases 17(3) July 1981. (MMC contract MM7AD-094)

Würsig, B., and B. Tershy. 1989. The baiji: perhaps the most endangered of them all. Whalewatcher 23:3-5. (MMC contract T6223922-0)