

# MARINE MAMMAL COMMISSION

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**Annual Report to Congress**

**1996**

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**Marine Mammal Commission  
4340 East-West Highway, Room 905  
Bethesda, Maryland 20814**

**31 January 1997**

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# EXECUTIVE SUMMARY

This is the 24th Annual Report of the Marine Mammal Commission and its Committee of Scientific Advisors on Marine Mammals. The Commission was established under Title II of the Marine Mammal Protection Act of 1972 to provide an independent source of policy and program guidance to Congress, the Executive Branch, and Federal agencies on domestic and international activities affecting marine mammal conservation.

The purpose of this report is to provide timely information on management-related issues and events to Congress, Federal and state agencies, public interest groups, the academic community, private citizens, and the international community. When combined with previous annual reports, it provides an historical record of the nation's progress in developing policies and programs to conserve marine mammals and their habitats. To ensure factual accuracy, a draft report was provided to Federal and state agency officials and other involved persons for comment. The contents of the report are briefly described below.

## Introduction (Chapter I)

The members of the Commission, its Committee of Scientific Advisors on Marine Mammals, and staff during 1996 are listed in this chapter, along with a brief summary of the Commission's recent funding levels. The Commission's fiscal year 1997 appropriation was \$1,189,000 and its request level for fiscal year 1998 is \$1,240,000.

## Species of Special Concern (Chapter II)

The Marine Mammal Commission devotes particular attention to marine mammal species and populations facing special conservation needs. In 1996 these included the Florida manatee, the Hawaiian monk seal, and the northern right whale. Work on these and other species is discussed in this chapter.

**Florida Manatees** — The largest known population of endangered West Indian manatees is the Florida manatee, which occurs only in the southeastern United States. Concerns about its recovery derive from the large number of dead manatees found every year and habitat degradation. In past years about one-third of observed manatee mortality has been due to collisions with watercraft and entrapment in water control structures. The Commission worked closely with the Fish and Wildlife Service, the lead Federal agency responsible for manatee recovery, to develop a recovery plan for the species in 1980, and in 1996 the Service adopted an updated recovery plan which the Commission also helped prepare.

In February 1996 encouraging findings were reported from a statewide survey in which 2,639 manatees were counted. The high count, due in part to excellent survey conditions, was significantly greater than the previous high count of 1,865 animals, and suggests a population

increase. In March and April, however, more than 150 manatees died due to a red tide in southwestern Florida, and by year's end the manatee death toll from all causes had reached 415, nearly twice the previous annual mortality high of 214 in 1990. Manatee deaths in 1996 included a record number of vessel-related deaths.

The Commission helped mount a response to the die-off by enlisting the help of the Working Group on Unusual Marine Mammal Mortality Events, and continued to work with state and Federal agencies during the die-off. In light of the possibility of another such event, in November the Commission organized a review of the effectiveness of the response to the manatee die-off. Reviewers stressed the need to complete a die-off contingency plan for Florida manatees and provided advice on its contents. The Commission also reviewed the overall Florida manatee recovery program. Significant progress continues to be made on developing boat speed zones in key manatee habitat, designing and testing gate-reversing mechanisms to reduce manatee deaths from entrapment in water control structures, and on releasing rescued, rehabilitated manatees back to the wild. An important need is to strengthen Federal support for essential manatee research, but such support is uncertain.

**Hawaiian Monk Seal** — The Hawaiian monk seal, the most endangered seal in U.S. waters, breeds almost exclusively on six remote atolls in the Northwestern Hawaiian Islands. The species declined significantly in the 1960s due at least in part to human disturbance at breeding beaches. After a brief increase early in the 1980s, the number of monk seals again began decreasing late in the 1980s due to a sharp decline in juvenile survival at the largest breeding colony. Reduced prey availability possibly related to climate change and/or commercial lobster fishing appears to be the cause. Other factors that may be impeding recovery are disturbance by people, entanglement in derelict fishing gear, and mortality of adult females and juveniles due to mobbing behavior of adult male seals. The National Marine Fisheries Service has lead responsibility for the recovery of Hawaiian monk seals.

Prospects for significantly reducing human disturbance have improved in recent years, with closures of a Coast Guard LORAN station on Kure Atoll and the Midway Islands Naval Air Station. Because of these actions and the species' decline, the Commission, in cooperation with the Service, re-examined the monk seal recovery program in 1995. Many of the resulting recommendations were acted upon by the Service and other agencies in 1996. The Service increased program funding and monitored all monk seal breeding colonies providing the most thorough population assessment to date. Juvenile survival rates remained very low at the largest breeding colony in 1996, and there were signs that survival rates may be decreasing at other sites. Rehabilitating and releasing underweight monk seals was suspended in 1996 for the first time since the program started in the early 1980s because an eye ailment, which has resisted diagnosis, developed in most of the seals rescued in 1995. They have not been released to prevent the possibility of infecting wild colonies.

In 1996 field teams found the highest number of entangled seals recorded to date, including 21 percent of the pups born at one major breeding colony. Most were entangled in derelict fishing nets drifting in from the North Pacific and were freed by field crews. The

Commission remains concerned about possible effects of commercial fishing on the availability of monk seal prey and notes that its relevant management recommendations to the National Marine Fisheries Service have not been adopted.

The Navy continued its outstanding efforts to clean up Midway Atoll, and in 1996 completed arrangements to transfer ownership of the atoll in 1997 to the Fish and Wildlife Service for a new national wildlife refuge. Monk seals, which virtually disappeared from Midway in the 1960s, have increased in number at the atoll in recent years.

**Northern Right Whales** — The most endangered marine mammal in U.S. waters is the northern right whale. The western North Atlantic population, which numbers about 300 animals and occurs off the eastern United States and Canada, is the species' largest known population. More than 50 percent of observed right whale deaths are due to ship collisions and entanglement in fishing gear. Six confirmed right whale deaths in the first three months of 1996, including five on the population's calving grounds off Florida and Georgia, prompted intensified conservation efforts. An average of only 11 calves per year were documented over the past four years, including 22 births in 1996. Given the low birth rate, it seems likely that mortality has exceeded recruitment in some recent years and that survival of the population will depend on reducing human sources of mortality in the next 10 to 20 years. The National Marine Fisheries Service is the lead Federal agency for right whale recovery; however, many other Federal, state, and private groups have important related responsibilities.

To reduce right whale entanglement in fishing gear, the Commission again recommended in 1996 that the Service seasonally restrict gillnets and lobster traps in two critical habitat areas and undertake research on possible gear modifications to reduce entanglement risks. Although the Service has not yet acted on the recommendations, it reinitiated consultations under the Endangered Species Act in 1996 on all fisheries whose gear might entangle right whales and it convened a large whale take reduction team, including a Commission representative, to develop a take reduction plan. To reduce ship strikes, the Service consulted with the Coast Guard and the Navy to ensure that their vessel operations and programs pose the least threat possible to right whales. It also continued to support periodic meetings of regional recovery plan implementation teams, in which the Commission participates, to oversee interagency recovery work off New England and the southeastern United States.

The Navy operates several facilities adjacent to the right whale calving grounds off Florida and Georgia and, in consultation with the Commission and the National Marine Fisheries Service, it took steps to manage its vessel traffic and activities to reduce the potential for harm to right whales during the winter calving season. Similarly, the Coast Guard completed an Atlantic Coast endangered species initiative, which identified further steps to reduce the risk of ship collisions. Both agencies continued to help fund an early-warning system to alert ships of the location of whales on the population's calving grounds.

In November the Commission reviewed the cooperative recovery efforts of involved agencies and groups. Based on its review the Commission recommended further actions by the

National Marine Fisheries Service, including steps to secure a long-term funding base for recovery work using innovative funding mechanisms, such as establishment of a Right Whale Trust Fund.

### **Marine Mammal-Fisheries Interactions (Chapter III)**

Marine mammals may be caught and killed or seriously injured incidental to commercial fishing operations. They also may damage fishing gear and caught fish, and compete with fishermen for fish and shellfish. Management of these interactions is guided primarily by provisions of the Marine Mammal Protection Act, but also by the Magnuson-Stevens Fishery Conservation and Management Act under which fishery resources of the United States are managed.

Amendments to the former statute in 1994 established a new regime to govern the incidental take of marine mammals in fisheries. In part, the amendments require the National Marine Fisheries Service and the Fish and Wildlife Service to prepare stock assessments for each marine mammal stock in U.S. waters to provide a basis for management decisions. The initial assessments, completed in 1995, identified “strategic stocks” for which take reduction plans are needed. In 1996 the National Marine Fisheries Service established four take reduction teams to develop recommended take reduction plans. Commission representatives participated on two of these teams. In 1996 Congress also amended and reauthorized the Magnuson-Stevens Fishery Conservation and Management Act. Key provisions of recent amendments to both the Magnuson-Stevens Act and the Marine Mammal Protection Act relative to the management of marine mammal-fishery interactions are discussed.

The catch of dolphins in the eastern tropical Pacific purse seine fishery for yellowfin tuna is addressed under a separate section of the Marine Mammal Protection Act. The mortality of dolphins in this fishery once exceeded 500,000 dolphins per year, but as a result of the Act’s provisions and the International Dolphin Conservation Program implemented under the multilateral La Jolla Agreement, it has been greatly reduced. In 1996 dolphin mortality was less than 3,000 animals. During 1996 Congress considered but did not pass legislation to lift embargoes imposed against most tuna caught in the eastern tropical Pacific and to amend the definition of “dolphin-safe” tuna to include tuna caught in sets on dolphins in which no dolphin deaths occur. The amendments would have been contingent on adoption of an international agreement formalizing and strengthening the La Jolla Agreement. Failure to enact this legislation prompted Mexico, the largest participant in the fishery, to suspend its participation in the International Dolphin Conservation Program.

In certain areas, predation by seals and sea lions has affected recovery of depleted salmon stocks or interfered with aquaculture operations. Under the 1994 amendments to the Marine Mammal Protection Act, the killing of individual animals contributing to such problems may be authorized when other solutions prove ineffective. The State of Washington was authorized in 1995 to use lethal means to remove California sea lions eating steelhead trout from a depleted run that passes through the Ballard Locks in Seattle, Washington, and in 1996 the authorization

was reconsidered and modified. This and other actions taken to address pinniped-fishery interactions are discussed in Chapter III. Also discussed are actions taken or contemplated with respect to expansion of aquaculture operations. The Commission believes that safeguards are needed to ensure that aquaculture operations do not have significant adverse effects on marine mammals or other components of marine ecosystems.

## **International Aspects of Marine Mammal Protection and Conservation (Chapter IV)**

The Marine Mammal Protection Act directs the Commission, in consultation with its Committee of Scientific Advisors, to advise the Secretary of State and other Federal officials on measures necessary to protect and conserve marine mammals internationally, as well as domestically. In response to this directive, the Commission in 1996 participated in cooperative interagency efforts to develop U.S. positions on international management programs concerning aboriginal and commercial whaling, conservation of the Antarctic marine ecosystem, and the international trade of endangered species of wild fauna and flora. The Commission also completed the three-year update of its *Compendium of International Treaties and Agreements* and, as discussed in Chapter V, invested considerable effort in international conservation issues related to the Arctic.

**Compendium of International Treaties and Agreements** — To protect and conserve marine mammals worldwide requires knowledge of the full range of potentially applicable international treaties and agreements. Recognizing that there was no easily accessible source of such agreements, the Commission compiled and in 1994 published a three-volume, 3,500 page *Compendium of Selected Treaties, International Agreements, and Other Relevant Documents on Marine Resources, Wildlife, and the Environment*. In 1996 the Commission completed the compilation of documents to update the Compendium from 1 January 1993 through 31 December 1995. The update will be published in mid-1997 and negotiations are underway to put all four volumes on CD-ROM.

**The International Whaling Commission (IWC)** — Issues considered during the 1996 meetings of the IWC and its Scientific Committee included establishment of an observation and inspection system to ensure compliance with regulatory measures when and if the IWC authorizes the resumption of commercial whaling; commercial whaling by Norway under an objection to the moratorium that entered into effect in 1986; a request by Japan to allow residents of small coastal communities to take 50 minke whales for local sale and use; permits issued by Japan authorizing the killing of minke whales in the Antarctic and the North Pacific for purposes of scientific research; and the development of a new regime to govern aboriginal subsistence whaling. Little progress was made on developing an agreed system of international observation and inspection for commercial whaling. Japan's request for a catch limit 50 minke whales was rejected. Resolutions were adopted condemning Norway's resumption of commercial whaling and Japan's continuation of "scientific" whaling. Efforts to develop a new system for determining aboriginal whaling needs and appropriate catch limits were continued with a view to adopting a revised scheme in 1997.

**Conservation of Marine Mammals and their Habitat in the Southern Ocean** — This section describes key provisions and the background of the Antarctic Treaty, the Treaty Protocol on Environmental Protection, the Convention for the Conservation of Antarctic Seals, and the Convention on the Conservation of Antarctic Marine Living Resources. It also provides brief summaries of the results of the 1996 Antarctic Treaty Consultative Meeting and the 1996 meetings of the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources. The principal results of the National Marine Fisheries Service's Antarctic Marine Living Resources Research Program also are described.

**The Convention on International Trade in Endangered Species of Wild Fauna and Flora** — The next meeting of parties to this Convention will be in June 1997 in Zimbabwe. This section of the report describes a proposal by Norway and a possible proposal by Japan to transfer certain stocks of whales thought to be at or near historic levels from Appendix I to Appendix II of the Convention. The stocks addressed in these proposals are ones that could be subjected to commercial whaling when and if the IWC's moratorium on commercial whaling is lifted. This section also describes efforts to detect and stop illegal trade in whale meat.

## **Activities Related to Marine Mammals in the Arctic (Chapter V)**

Marine mammals are important components of Arctic marine ecosystems. Marine mammals also play an important role in the cultures and subsistence economies of indigenous people in coastal Alaska and elsewhere around the Arctic rim. In June 1991 the United States and the seven other Arctic countries adopted and began implementing a strategy — the Arctic Environmental Protection Strategy — to preserve the environmental quality and natural resources of the Arctic. This chapter provides background information and describes actions taken by the Commission and others in 1996 to refine and implement the strategy.

Several Arctic countries believed that a more formal intergovernmental organization was necessary to effectively implement the Arctic Environmental Protection Strategy and to address other matters of regional interest and concern. In March 1995 Canada proposed establishment of an intergovernmental Arctic council to overview and promote cooperative responses to issues of mutual interest and concern to the eight Arctic countries. A declaration establishing the Council was signed in September 1996. The end product, and difficulties encountered in the course of the negotiations, are described in this chapter.

The 1994 amendments to the Marine Mammal Protection Act encourage the National Marine Fisheries Service and the Fish and Wildlife Service to develop agreements with Alaska Native organizations to cooperatively conserve marine mammal populations important to the cultural heritage and subsistence economies of coastal Alaska Natives. The 1994 amendments to the Act also direct the Fish and Wildlife Service to explore with its counterparts in Russia the development of cooperative programs to conserve the polar bear population shared by the two countries. A bilateral agreement to conserve the shared walrus population is also being pursued. Further, the 1994 Marine Mammal Protection Act amendments authorize the Secretary of the Interior to issue permits to import sport-hunted polar bear trophies from Canada. Background

information and actions taken in 1996 by the Fish and Wildlife Service, in consultation with the Commission and others, to implement these statutory provisions are described in this chapter.

Also described in this chapter are steps that have been taken by the Commission and others, beginning in 1990, to determine the cause or causes of and what might be done to stop and reverse the alarming declines in populations of Steller sea lions, harbor seals, and other marine species that have occurred in parts of the Bering Sea and the Gulf of Alaska since the mid-1970s.

## **Marine Mammal Strandings and Die-Offs (Chapter VI)**

The incidence of unusual marine mammal mortality events has increased throughout the world since the late 1970s. In 1996 there were three such events in U.S. waters. The first involved the deaths of more than 150 endangered Florida manatees and the second involved five northern right whales off northeastern Florida and Georgia (both described in Chapter II). The third event involved the deaths of at least 25 bottlenose dolphins along the coast between the Florida panhandle and Louisiana in October and November. To respond to such events, a new title, (Title IV) *Marine Mammal Health and Stranding Response*, was added to the Marine Mammal Protection Act in 1992. The new title directs the Secretary of Commerce to establish an expert working group to (1) provide advice on detecting and responding to unusual mortality events, (2) develop a national contingency plan for guiding response efforts, and (3) establish criteria for releasing rescued animals back into the wild in a way that will improve chances the released animal will survive, but will not transmit diseases to wild populations. Efforts by the Commission and others to address these requirements in 1996 are discussed in this Chapter.

## **Effects of Pollution on Marine Mammals (Chapter VII)**

Marine mammals can be affected directly and indirectly by a variety of environmental contaminants, the sources and effects of which often are not known. Direct effects include such things as mortality from toxic chemical spills and entanglement and drowning in lost and discarded fishing gear. Indirect or second-order effects include such things as decreased growth, survival, and productivity rates due to contaminant-caused decreases in important prey species. This chapter provides background information and describes efforts by the Commission and others to identify and determine how best to minimize threats to marine mammals posed by marine debris, chemical pollutants, and noise from various sources.

**Marine Debris** — Many species of marine mammals, seabirds, sea turtles, and fish are killed or injured by entanglement in lost and discarded fishing gear and other types of marine debris and by ingesting debris, particularly plastics, lost or discarded into the sea. As noted in past reports, the Commission has played a lead role in calling attention to the problem since the early 1980s. In 1996 the Commission urged the National Oceanic and Atmospheric Administration to provide at least some support for the Marine Entanglement Research Program, but the program was eliminated in 1996. The Commission also participated in an interagency meeting convened by the Environmental Protection Agency to coordinate Federal activities to

reduce marine debris pollution and worked with the Navy to develop a long-term strategy for bringing its vessels into compliance with international standards on the discharge of ship-generated garbage at sea.

**Chemical Contaminants** — There has been an increase in the past 15-20 years in unusual marine mammal mortality events, unexplained marine mammal population declines, and strandings of marine mammals in some areas. High levels of anthropogenic contaminants have been found in some of the animals that died, suggesting that increasing pollution of the world's oceans may be involved. To help assess this possibility, the Marine Mammal Commission compiled a bibliography in 1996 of publications on anthropogenic contaminants in the marine environment and their effects on marine mammals. It also began planning workshops to identify and determine how best to resolve critical uncertainties concerning environmental contaminants that may be adversely affecting marine mammals.

**Effects of Noise** — Many marine mammal species use sound to communicate, navigate, and capture prey. Both natural and anthropogenic sounds may interfere with these and other vital functions. This section describes actions taken by the Commission and others in 1996 to assess the possible effects on marine mammals of sounds produced as part of the Acoustic Thermometry of Ocean Climate Program; assess the effectiveness and possible adverse side effects of acoustic devices that have been or might be used to prevent marine mammal-fishery interactions; determine measures that should be taken to assess and ensure that shock testing the SEAWOLF submarine and deployment of the Navy's Low-Frequency Active Sonar have negligible effects on marine mammals; and seek expert advice on how best to resolve uncertainties concerning the possible effects of underwater explosions and anthropogenic sounds on marine mammals.

## **Outer Continental Shelf Oil and Gas Exploration and Development (Chapter VIII)**

Marine mammals may be adversely affected by oil spills, noise, vessel traffic, and other environmental perturbations associated with offshore oil and gas exploration and development. The Minerals Management Service has lead responsibility for ensuring that such activities do not adversely affect marine mammals, their habitats, or their availability for subsistence use by Alaska Natives. In 1996 the Commission commented on draft environmental impact statements prepared by the Minerals Management Service for two proposed Outer Continental Shelf lease sales in the Gulf of Mexico and one proposed lease sale in Alaska. The Commission also provided information and comments to the U.S. Army Corps of Engineers District for Alaska on the possible effects of proposed development of oil and gas resources in the Alaskan Beaufort Sea. In addition, the Commission commented to the National Marine Fisheries Service on actions under section 101(a)(5) of the Marine Mammal Protection Act to authorize the taking of certain marine mammals in Alaska and the Gulf of Mexico incidental to oil- and gas-related activities.

## **Research and Studies Program (Chapter IX)**

The Marine Mammal Protection Act directs the Commission to carry out a continuing review of research programs conducted and planned under the authority of the Act, and to undertake or precipitate such other studies as it deems necessary to further the purposes of the Act. To help meet these responsibilities, the Commission conducts an annual survey of Federally-funded marine mammal research; it also contracts for studies, as its budget allows, to help identify and determine how best to resolve critical marine mammal conservation problems, and it makes recommendations to other agencies on research which it believes they should undertake. Further, the Commission holds program reviews, workshops, and planning meetings, and participates in similar activities chaired by other agencies, to ensure that information needs are identified and met as cost-effectively as possible. Commission actions in this regard during 1996 are described in this chapter.

## **Permits and Authorizations To Take Marine Mammals (Chapter X)**

The Marine Mammal Protection Act authorizes the National Marine Fisheries Service and the Fish and Wildlife Service, in consultation with the Marine Mammal Commission, to issue permits to take marine mammals for scientific research, public display, enhancing the survival or recovery of marine mammal populations, educational purposes, or commercial photography. In 1996 the Commission reviewed and commented on 25 permit applications and 50 requests for permit amendments. The Commission also reviewed requests under a streamlined procedure to authorize scientific research involving only non-injurious disturbance of marine mammals.

The Marine Mammal Protection Act also authorizes the two Services to issue rules authorizing the take of small numbers of marine mammals incidental to activities other than commercial fishing if the taking would have a negligible impact on marine mammal stocks. Amendments enacted in 1994 streamlined the authorization process when the taking is by harassment only. In 1996 the Commission commented on small-take authorization requests for rocket launches at Vandenberg Air Force Base in California, a physical oceanography experiment using sound to study flow fields and mixing of waters in Puget Sound, Washington, and shock testing of the SEAWOLF submarine by the Navy. As discussed in Chapter VIII, small-take authorizations were also issued for oil- and gas-related activities in the Gulf of Mexico and in waters off Alaska. This chapter also discusses Commission recommendations regarding the growing number of private enterprises offering programs to swim with or feed wild marine mammals and the need to strengthen enforcement of the Marine Mammal Protection Act as it pertains to such activities.

## **Marine Mammals in Captivity (Chapter XI)**

The handling, care, treatment, and transportation of captive marine mammals is regulated by the Animal and Plant Health Inspection Service under the Animal Welfare Act. Amendments to the Marine Mammal Protection Act enacted in 1994 diminished the role of other agencies with respect to captive marine mammals, and increased the Service's responsibility for matters, such

as swim-with-the-dolphin programs, which previously had been regulated by the National Marine Fisheries Service. During 1996 the Animal and Plant Health Inspection Service held two three-day meetings of a negotiated rulemaking committee to consider revisions to its standards for the care and maintenance of captive marine mammals. The Commission participated as an observer. Although the committee reached consensus on revisions to several sections of the standards, the most contentious issues were not resolved. The Animal and Plant Health Inspection Service now intends to publish proposed rules based in part on consensus language and in part on its own proposal.

The export of marine mammals to foreign countries has been controversial because standards for foreign facilities are often lower than those for U.S. facilities. As a result, animals may be subjected to inhumane conditions. The 1994 amendments to the Marine Mammal Protection Act addressed this issue by requiring that exports of live marine mammals be allowed only if the foreign facility meets standards comparable to U.S. requirements. In 1996 the Commission again wrote the National Marine Fisheries Service and the Animal and Plant Health Inspection Service providing advice on how best to implement this requirement. In part, it recommended that comparability determinations be based on a physical inspection of the foreign facility.

The Commission also provided recommendations to the responsible agencies on releasing captive marine mammals to the wild. In light of unauthorized releases at one facility, the Commission recommended that the agencies make it clear that releasing captive marine mammals without proper authorization constitutes an illegal taking under the Marine Mammal Protection Act and is contrary to the care and maintenance standards for captive marine mammals.

## **Appendices**

Appendix A lists recommendations made by the Marine Mammal Commission in 1996. Appendix B lists Commission-sponsored reports published by the National Technical Information Service. Appendix C lists citations for other papers and reports, which also result from Commission-sponsored work, that have been published elsewhere.

# Chapter I

## INTRODUCTION

This is the 24th Annual Report of the Marine Mammal Commission, covering the period 1 January through 31 December 1996. It is being submitted to Congress pursuant to section 204 of the Marine Mammal Protection Act of 1972.

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

### Personnel

The Commission consists of three part-time Commissioners appointed by the President. The Marine Mammal Protection Act requires that Commissioners be knowledgeable in marine ecology and resource management. At the end of 1996 the Commissioners were John E. Reynolds, III, Ph.D., (Chairman), Eckerd College, St. Petersburg, Florida; Paul K. Dayton, Ph.D., Scripps Institution of Oceanography, La Jolla, California; and Vera Alexander, Ph.D., University of Alaska, Fairbanks.

The Commission's full-time staff members are John R. Twiss, Jr., Executive Director; Robert J. Hofman, Ph.D., Scientific Program Director; David W. Laist, Policy and Program Analyst; Michael L. Gosliner, General Counsel; Gregory K. Silber, Ph.D., Deputy Scientific Program Director; Alison G. Kirk, Permit Officer; Nancy L. Shaw, Administrative Officer; Lisa R. Jackson, Staff Assistant in charge of publications; and Darel E. Jordan and Susan E. Holcombe, Staff Assistants.

The Commission Chairman, with the concurrence of other Commissioners, appoints persons to the nine-member Committee of Scientific Advisors on Marine Mammals. The Marine Mammal Protection Act requires that committee members be scientists who are knowledgeable in marine ecology and marine mammal affairs. At the end of 1996 its members were Robert L. Brownell, Jr., Ph.D., (Chairman), National Marine Fisheries Service, La Jolla, California; Daryl J. Boness, Ph.D., Smithsonian Institution, Washington, D.C.; Daryl P. Domning, Ph.D., Howard University, Washington, D.C.; Joseph R. Geraci, V.M.D., Ph.D., National Aquarium, Baltimore, Maryland; Steven K. Katona, Ph.D., College of the Atlantic, Bar Harbor, Maine; Lloyd F. Lowry, Alaska Department of Fish and Game, Fairbanks; Bruce R. Mate, Ph.D., Oregon State University, Newport; Jeanette A. Thomas, Ph.D., Western Illinois University, Moline; and Judith E. Zeh, Ph.D., University of Washington, Seattle.

During 1996 Mr. Caleb Pungowiyi, Executive Director of the Eskimo Walrus Commission, former president of the Inuit Circumpolar Conference, and resident of Nome and Kotzebue, Alaska, served as Special Advisor to the Marine Mammal Commission on Native Affairs.

### Funding

Appropriations to the Marine Mammal Commission's in the past five fiscal years have been: FY 1992, \$1,250,000; FY 1993, \$1,260,000; FY 1994, \$1,290,000; FY 1995, \$1,384,000; and FY 1996, \$1,190,000. The Commission's appropriation for the current fiscal year, FY 1997, is \$1,189,000.



## Chapter II

### SPECIES OF SPECIAL CONCERN

Section 202 of the Marine Mammal Protection Act directs the Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, to make recommendations to the Department of Commerce, the Department of the Interior, and other agencies on actions needed to conserve marine mammals. To help meet this charge, the Commission devotes special attention to individual species and populations that are vulnerable or exposed to various types of human impacts. Such species may include marine mammals listed as endangered or threatened under the Endangered Species Act or depleted under the Marine Mammal Protection Act (Table 1), as well as other species or populations facing special conservation challenges.

During 1996 special attention was directed to a number of endangered, threatened, or depleted species or populations. These included the Florida manatee, Hawaiian monk seal, Steller sea lion, northern fur seal, sea otter, northern right whale, bowhead whale, and vaquita. Other species not so listed, but which received special attention included harbor seals in Alaska, Pacific walruses, gray whales in the eastern North Pacific Ocean, harbor porpoises in the Gulf of Maine, and polar bears.

#### **Florida Manatee** *(Trichechus manatus latirostris)*

The Florida manatee is a subspecies of the West Indian manatee and occurs only in coastal waters and rivers of the southeastern United States. As manatees are unable to survive long periods in waters colder than 68°F, their winter habitat is restricted to the southern tip of Florida or more northerly areas near warm-water springs and thermal power plants and industrial outfalls. In summer the population disperses throughout Florida with a few animals migrating northward along the East Coast and westward along the Gulf of Mexico coast. Individual animals have

been documented as far north as Rhode Island and as far west as Texas. The only other subspecies of West Indian manatee, the Antillean manatee, occurs in the Greater Antilles in the Caribbean, on the east coast of Central America, and the northeast coast of South America. West Indian manatees are listed as endangered throughout their range.

The Florida manatee population consists of two relatively discrete groups of animals, one on the east coast and one on the west coast of the Florida Peninsula. Although there is some overlap between the groups' ranges at the southern tip of Florida, there is very little evidence of animals moving from one side of the state to the other. Together, the two groups comprise the largest known population of West Indian manatees anywhere in the species' range.

In recent years, the Florida Department of Environmental Protection has organized statewide winter surveys timed to correspond with cold periods when most manatees aggregate at warm-water refuges. In 1996 the state mounted two such surveys, one in January and one in February. The January survey produced a count of 2,274 manatees, and the February survey produced a count of 2,639 manatees. The latter count, the highest recorded to date, included 1,457 manatees on the east coast of Florida and 1,182 manatees on the west coast. The high count supports the belief of many manatee scientists that the population has increased in size.

Due principally to uncertainties and variability in the number of animals not present at the refuges at the time of a survey, it has not been possible to use the statewide counts to estimate total population size or to detect population trends. However, the counts confirmed a minimum population size more than double the 1,200-animal estimate developed before the surveys were begun in 1991. The highest previous statewide count was 1,856 animals in 1992.

**Table 1. Marine mammal species and populations listed as endangered (E) or threatened (T) under the Endangered Species Act and depleted (D) under the Marine Mammal Protection Act, as of 31 December 1996<sup>1</sup>**

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>	<u>Range</u>
<b>Manatees and Dugongs</b>			
West Indian manatee	<i>Trichechus manatus</i>	E/D	Eastern North, Central, and South America coasts and rivers from southeast United States to Brazil; Puerto Rico and other Greater Antilles Islands
Amazonian manatee	<i>Trichechus inunguis</i>	E/D	Amazon River basin of South America
West African manatee	<i>Trichechus senegalensis</i>	T/D	West Africa coasts and rivers; Senegal to Angola
Dugong	<i>Dugong dugon</i>	E/D	Northern Indian Ocean from Madagascar to Indonesia; Philippines; Australia; southern China; Palau
<b>Otters</b>			
Marine otter	<i>Lutra felina</i>	E/D	Western South America; Peru to southern Chile
Southern sea otter	<i>Enhydra lutris nereis</i>	T/D	Central California coast
<b>Seals and Sea Lions</b>			
Hawaiian monk seal	<i>Monachus schauinslandi</i>	E/D	Hawaiian Archipelago
Caribbean monk seal	<i>Monachus tropicalis</i>	E/D	Caribbean Sea and Bahamas (probably extinct)
Mediterranean monk seal	<i>Monachus monachus</i>	E/D	Mediterranean Sea; Atlantic coast of northwest Africa
Guadalupe fur seal	<i>Arctocephalus townsendi</i>	T/D	West coast of Baja California, Mexico, to southern California
Northern fur seal	<i>Callorhinus ursinus</i>	D	North Pacific Rim from California to Japan
Steller sea lion	<i>Eumetopias jubatus</i>	T/D	North Pacific Rim from Japan to California
Saimaa seal	<i>Phoca hispida saimensis</i>	E/D	Lake Saimaa, Finland
<b>Whales, Porpoises, and Dolphins</b>			
Baiji	<i>Lipotes vexillifer</i>	E/D	Changjiang (Yangtze) River, China
Indus river dolphin	<i>Platanista minor</i>	E/D	Indus River and tributaries, Pakistan
Vaquita	<i>Phocoena sinus</i>	E/D	Northern Gulf of California, Mexico
Northeastern offshore spotted dolphin	<i>Stenella attenuata</i>	D	Eastern tropical Pacific Ocean
Eastern spinner dolphin	<i>Stenella longirostris orientalis</i>	D	Eastern tropical Pacific Ocean
Mid-Atlantic coastal bottlenose dolphin	<i>Tursiops truncatus</i>	D	Atlantic coastal waters from New York to Florida
Northern right whale	<i>Eubalaena glacialis</i>	E/D	North Atlantic, North Pacific Oceans; Bering Sea
Southern right whale	<i>Eubalaena australis</i>	E/D	South Atlantic, South Pacific, Indian, and Southern Oceans
Bowhead whale	<i>Balaena mysticetus</i>	E/D	Arctic Ocean and adjacent seas
Humpback whale	<i>Megaptera novaeangliae</i>	E/D	Oceanic, all oceans
Blue whale	<i>Balaenoptera musculus</i>	E/D	Oceanic, all oceans
Finback or fin whale	<i>Balaenoptera physalus</i>	E/D	Oceanic, all oceans
Western North Pacific gray whale	<i>Eschrichtius robustus</i>	E/D	Western North Pacific Ocean
Sei whale	<i>Balaenoptera borealis</i>	E/D	Oceanic, all oceans
Sperm whale	<i>Physeter macrocephalus</i>	E/D	Oceanic, all oceans

<sup>1</sup> From Fish and Wildlife Service Regulations at 50 C.F.R. §17.11 and National Marine Fisheries Service Regulations at 50 C.F.R. §216.15.

**Table 2. Known manatee mortality in the southeastern United States (excluding Puerto Rico) reported through the manatee salvage and necropsy program, 1978-1996**

<u>Year</u>	<u>Vessel-Related Deaths</u> <u>No. (%)</u>	<u>Flood Gate and Lock Deaths</u> <u>No. (%)</u>	<u>Other Human-Related Deaths<sup>1</sup></u> <u>No. (%)</u>	<u>Perinatal Deaths</u> <u>No. (%)</u>	<u>Other Deaths<sup>2</sup></u> <u>No. (%)</u>	<u>Total Deaths in S.E. U.S.</u>
1978	21 (25)	9 (11)	1 (1)	10 (12)	43 (51)	84
1979	24 (31)	8 (10)	9 (12)	9 (12)	28 (36)	78
1980	16 (25)	8 (12)	2 (3)	13 (20)	26 (40)	65
1981	24 (21)	2 (2)	4 (3)	13 (11)	74 (63)	117
1982	20 (17)	3 (3)	2 (2)	14 (12)	78 (67) <sup>3</sup>	117
1983	15 (19)	7 (9)	5 (6)	18 (22)	36 (44)	81
1984	34 (26)	3 (2)	1 (1)	26 (20)	66 (51)	130
1985	35 (28)	3 (2)	3 (2)	23 (19)	59 (48)	123
1986	33 (26)	3 (2)	1 (1)	27 (22)	61 (49)	125
1987	39 (33)	5 (4)	4 (3)	30 (26)	39 (33)	117
1988	43 (32)	7 (5)	4 (3)	30 (22)	50 (37)	134
1989	51 (29)	3 (2)	5 (3)	39 (22)	78 (44)	176
1990	49 (23)	3 (1)	4 (2)	45 (21)	113 (53)	214
1991	53 (30)	9 (5)	6 (3)	53 (30)	54 (30)	175
1992	38 (23)	5 (3)	6 (4)	48 (29)	70 (42)	167
1993	35 (24)	5 (3)	7 (5)	39 (27)	61 (41)	147
1994	51 (26)	16(8)	5 (3)	46 (24)	76 (39)	194
1995	43 (21)	8 (4)	5 (2)	56 (28)	91 (45)	203
1996	60 (14)	10 (2)	0 (0)	55 (13)	290 (70) <sup>4</sup>	415

1 Includes deaths due to entanglement and ingestion of marine debris, drowning in shrimp nets, poaching, vandalism, *etc.*

2 Includes deaths due to cold stress, other natural causes, and undetermined causes.

3 Includes 38 deaths attributed to a spring red-tide event in southwestern Florida.

4 Includes 151 deaths attributed to a spring red-tide event in southwestern Florida.

Source: Florida Department of Environmental Protection

High levels of documented mortality, including a large proportion of human-related deaths, and habitat loss have caused serious concern about the status of Florida manatees. Over the past 15 years, human-related manatee deaths have ranged from about 25 to 40 percent of annual mortality. Most human-related deaths are caused by collisions with boats and entrapment in flood gates and navigation locks. A few animals also have died as a result of entanglement in fishing gear and debris, drowning in shrimp trawls, and vandalism. Degradation and loss of habitat due

to coastal development is also a serious threat. No other marine mammal lives in such close association with human populations, and with the rapid increase in Florida's human population has come intense development of coastal and riverine habitat essential to manatees.

In 1996 the encouraging information on the higher-than-realized minimum size of the Florida manatee population was offset by an alarming increase in documented mortality. For the year, 415 manatee deaths

were confirmed — nearly twice the previous high of 214 deaths in 1990. The increase was due to several causes: an unprecedented die-off during which more than 150 manatees were found dead in association with a red-tide event in southwestern Florida; a record high number of deaths from collisions with boats (60 deaths); and near-record levels of deaths from entrapment in water control structures (10 deaths) and perinatal deaths (55 deaths). Even without the red-tide event, the total of 264 deaths from other causes would have exceeded the previous annual mortality record by nearly 25 percent. On the west coast, where a total of 283 carcasses was found in 1996 (including red-tide associated deaths and deaths from all other causes), the confirmed deaths equaled 24 percent of the west coast manatees counted in the February 1996 survey.

The U.S. Fish and Wildlife Service has lead Federal agency responsibility for the recovery of Florida manatees. Many other agencies and groups, however, have important programs and responsibilities that bear directly or indirectly on manatee conservation needs. Foremost of these is the Florida Department of Environmental Protection. With direction and support from the Florida Governor and Cabinet and the State Legislature, the Department has assumed major obligations for many vital recovery tasks. In doing so, it has shared a leadership role for the recovery program with the Fish and Wildlife Service.

Among the other Federal agencies that have made especially noteworthy contributions to the Florida manatee recovery program are the Army Corps of Engineers, the Coast Guard, the National Aeronautics and Space Administration, the National Biological Service (now a part of the U.S. Geological Survey), and the U.S. Navy. At the state and local levels, outstanding contributions have been made by the Florida Department of Community Affairs, the Florida Game and Freshwater Fish Commission, the Florida Inland Navigation District, the Manatee Technical Advisory Council (an advisory body to the Secretary of the Florida Department of Environmental Protection), the South Florida Water Management District, various county governments throughout Florida, and the Georgia Department of Natural Resources. Important non-governmental participants in the recovery program include the Florida Power & Light

Company, Lowry Park Zoo, the Miami Seaquarium, Save the Manatee Club, and Sea World, Inc.

In light of the spring manatee die-off, the need to ensure that lessons from the event are applied to any future die-offs, and the high levels of human-related manatee deaths, the Commission devoted a full day of its 12-14 November 1996 annual meeting to a review of the response to the die-off event and the status of the overall manatee recovery program. Representatives of most of the above-mentioned agencies and groups participated in the review. The results of that review and activities undertaken during 1996 as part of the manatee recovery program are described below.

### **The 1996 Florida Manatee Die-off**

From early March to late April 1996 a number of manatees, variously reported by the Department of Environmental Protection at 151, 155, and 158, died in an epizootic event on the southwest coast of Florida. Mortalities were centered around the estuarine areas of the Caloosahatchee River, northward to Venice, and southward to Marco Island, just south of Naples. Deaths attributed to the epizootic event constituted more than 12 percent of the February 1996 west coast manatee count. As noted above, these losses, combined with human-related and other mortality since January 1996, brought the known mortality for 1996 to 415 animals. This is the highest annual mortality ever reported and is a level of loss that the population cannot sustain on an annual basis.

On 14 March 1996 the Florida Department of Environmental Protection announced that 25 manatees had died in southwestern Florida since 5 March. While no conclusions were given with respect to cause, the deaths were thought by the Department not to be caused by an occurrence of red tide. Rather, in early press releases, the Department of Environmental Protection speculated that pneumonia was the cause of death. By 15 March, 33 dead animals had been recovered; by 18 March the number had risen to 51.

On 14 and 15 March the Marine Mammal Commission notified the Working Group on Unusual Marine Mammal Mortality Events of the deaths. The Commission suggested to the leader of the die-off response team established under the Department of

Environmental Protection's Marine Research Institute that he prepare a summary of events for the working group so that it could start to examine the situation and provide the response team advice.

On 20 March the leader of the response team provided a report to the working group as follows: over 13 days, 53 dead manatees had been recovered, of which nearly all were adults; the carcasses received on 5 March were fresh adults in good condition; on necropsy, all systems appeared normal except the lungs, which were fully inflated and uniformly blotchy purple and bright red on the serosal surface; on the cut surface, the lungs were congested and the primary airways contained a serosanguinous adherent exudate which occluded the secondary airways; microbiological and histological samples were collected from all systems; no abnormalities were found in the entire gastrointestinal tract; several more carcasses, identical in appearance, trickled in through 10 March; by 13 March, confirmation of 11 more manatees in the same area was received; from 14 March through noon on 18 March, 35 more necropsies were done under field conditions at the J.N. "Ding" Darling National Wildlife Refuge; and findings were consistent in each case, the only indication of any grossly visible abnormality being the appearance of the lungs which, on histological examination, showed extensive hemorrhage and edema and a conspicuous absence of inflammation, findings suggestive of either a toxic insult or an extremely aggressive infectious agent resulting in rapid death from pulmonary failure. Early microbiological analyses from lungs indicated mixed bacterial isolates that, in the absence of inflammatory response, were more likely secondary to the event. The response team leader made clear his intent to contact many colleagues for help, and noted that he had been in touch already with scientists at the National Biological Services' National Wildlife Research Health Laboratory in Madison, Wisconsin, as well as colleagues at the University of Miami, the College of Veterinary Medicine at the University of Georgia, and the National Marine Fisheries Service's laboratory in Charleston, South Carolina.

He noted dissimilarities between this die-off and the 1982 epizootic. For example, in 1982 scientists reported on 65 sick animals behaving abnormally with some animals recovering, whereas to date this event

had no reports of sick or strangely acting manatees, only deaths. In 1982 most carcasses had been less than fresh whereas nearly all of the carcasses to date in the 1996 event were in good condition. He also noted that in 1982 there was a 79 percent prevalence of ascidians in the gastrointestinal tracts of the animals while none had been observed in this event, and he remarked on geographic differences between recovery locations in the two die-offs.

In answer to the response team leader's request for suggestions, the Working Group on Unusual Marine Mammal Mortality Events responded on 22 March, recommending, among other things, that the working group be given periodic updates; brevetoxin analyses be done on lung tissues and blood samples (noting that red tide toxins can be inhaled as well as ingested); brain histopathology be conducted; an inventory be made of tissue and serum samples, noting where they were sent and for what analyses; necropsies be detailed; all organs, including those that appear normal, be examined histologically; each lung be sampled from four or five different sites; serum be collected and frozen; lung and heart blood be cultured; lung, brain, liver, and kidney tissue be frozen; herbicide, pesticide, and other chemical use in the area of the epizootic be investigated; water samples be collected; tissue residue analyses for anthropogenic chemicals be done; a range of brevetoxin analyses be done; a full panel of morbillivirus histochemical analyses be done; paraquat toxicity be ruled out; and reproductive tracts and other tissues and organs be examined for life history studies.

On 22 March the Florida Department of Environmental Protection reported that the death toll stood at 83 manatees.

On 23 March the director of the Institute of Virology at Erasmus University in The Netherlands expressed to the Marine Mammal Commission his willingness to analyze specimen material for morbillivirus and the Commission put him in touch with the response team leader.

A 27 March 1996 press release from the Florida Department of Environmental Protection announced that 83 dead manatees had been recovered, including 21 in the preceding five days; the advice of the Work-

ing Group on Unusual Marine Mammal Mortality Events was being sought; scientists from the Fish and Wildlife Service, the National Marine Fisheries Service, the National Biological Service, the University of Florida, the University of Miami, Miami Seaquarium, and Erasmus University were now involved in the study; 70 Department of Environmental Protection employees had been temporarily reassigned to deal with the response; and there was no indication that the problem, whatever it may have been, was affecting other marine species or humans.

By memorandum of 28 March 1996 the regional director for the Fish and Wildlife Service designated an onsite coordinator pursuant to the provisions of section 404 of the Marine Mammal Protection Act.

On 30 March 1996 the response team leader provided an update to the Working Group on Unusual Marine Mammal Mortality Events in which he noted that carcasses were still being recovered and now numbered 87; the need to do necropsies was affecting the team's ability to ship specimen material quickly; scientists from the University of Miami and the University of Florida were continuing histopathological analyses; the team was focusing on either an infectious agent, a toxin, or both; there had been no indication of any toxic spill in the area; water samples had been unremarkable; there had not been associated die-offs of other species even though red tide was present (a point with which others took issue); brain cholinesterase tests were being done; testing for red tide was being done at the University of Miami and the National Marine Fisheries Service's Charleston, South Carolina, laboratory; tissue samples and whole blood had been sent to Erasmus University for viral isolation; further viral workups were being done at the Plum Island facility of the Department of Agriculture and at the Armed Forces Institute of Pathology; Sea World of Orlando was assisting with the capture of animals for collection of specimen materials; fewer carcasses per day were now being reported; red tide was beginning to appear to be the likely cause; and overflights were planned to determine movements of animals.

On 4 April 1996 the Florida Department of Environmental Protection announced that 103 manatees had died since 5 March; carcasses continued to be re-

covered daily; all animals shared one common finding, lung lesions indicating pneumonia; most dead animals had been large, otherwise healthy adults; blood had been taken from six live manatees for analyses; preliminary blood screening for red tide had been negative; bacterial workups had not indicated bacteria to be the cause; brain tissue was being examined for pesticides or herbicides; scientists from Sea World, the University of Florida, the University of Miami, and the Miami Seaquarium were helping to collect and analyze samples; scientists from laboratories of the Fish and Wildlife Service, the National Marine Fisheries Service, the National Biological Service, and the Armed Forces Institute of Pathology were also involved; and there was no evidence that the manatee mortality event was directly related to recent mortality events of sea turtles, dolphins, cormorants, or catfish. That same day, a Department of Environmental Protection press release reported that a disoriented manatee having trouble swimming, a possible sign of red tide intoxication, had been rescued, and that lab work had not yet been completed.

On 5 April the Fish and Wildlife Service provided \$15,000 to the Florida Department of Environmental Protection for further analyses of samples associated with the die-off.

On 8 April the death toll had reached 120 and by 10 April 125 manatees had been recovered dead in southwestern Florida since 5 March.

On 12 April the Marine Mammal Commission convened a conference call meeting to discuss response efforts. Representatives of the Florida Department of Environmental Protection, the Florida Marine Research Institute, the College of Veterinary Medicine at the University of Florida, the University of Miami, Miami Seaquarium, the National Aquarium in Baltimore, the National Biological Service, Colorado State University, Eckerd College, the Fish and Wildlife Service, and the Commission participated.

It was noted that 132 manatee carcasses had been found in southwestern Florida between Sarasota and Marco Island since 5 March. Added to other manatee deaths statewide, that brought the year's total to 226 animals, more than had died in any previous entire year (see Table 2).

With respect to analyses that were being carried out, it was noted that the following were underway: red tide, liver, University of Miami; red tide, serum and duodenal contents, National Marine Fisheries Service's Charleston Laboratory; viral isolation, spleen, liver, blood, lung, and kidney, Institute of Virology, Erasmus University; histopathology, various tissues, the University of Miami and the College of Veterinary Medicine, University of Florida; viral isolation, serology, various tissues and blood, American Type Culture Collection and the U.S. Department of Agriculture; immunohistochemistry, various tissues, the University of Miami and the Armed Forces Institute of Pathology; bacteria, swabs, College of Veterinary Medicine, University of Florida; and cholinesterase (herbicides and pesticides), brain and eyes, National Wildlife Health Laboratory, Fish and Wildlife Service. (By 25 April the list of participating institutions had been augmented as follows: histopathology, various tissues, John Sealy Hospital, Galveston Texas, and National Wildlife Health Center, National Biological Service; red tide, lung and nasal mucosa, College of Medicine, University of Miami; high-pressure liquid chromatography of lung tissue, Mote Marine Laboratory; mycoplasma testing, lung tissue, Department of Pathobiology, University of Florida; and aging of ear bones, Eckerd College.)

During the meeting, the chief of the Florida Marine Research Institute, who had assumed leadership of the Florida Department of Environmental Protection's response shortly before, announced the establishment of three teams to (1) gather and analyze all relevant environmental data (*e.g.*, water quality, red tide concentrations, water temperatures, climatologic data, and animal mortality); (2) coordinate weekly aerial surveys to monitor animal movement; and (3) develop an integrated geographic information systems database.

Other matters discussed during the meeting were the need for additional funding to support essential analyses, the importance of chains-of-custody, human health concerns (both with respect to workers handling animals and the public), the potential for introducing infectious agents into captive manatee populations, the need to collect reproductive tracts and other materials to better assess manatee life history, the importance of information exchange among all participants, addition-

al analyses that might be done, the importance of undertaking a retrospective review with involved investigators and other experts to help develop a good contingency plan, and the need for accurate press releases (something that had been a problem).

With respect to follow-up, participants agreed that brevetoxin analyses should be expanded to include lung tissues in addition to the liver samples; manatee stomach contents and serum samples should be examined for brevetoxin; tissues from unaffected manatees and affected cormorants should be provided for use as controls in immunoperoxidase staining analyses for brevetoxin; additional assays should be done for morbillivirus; contaminant analysis needs and costs should be identified; weekly updates on sample collection and analyses should be distributed, an improved chain-of-custody system for recording and tracking tissue samples should be put in place; a one-day review of GIS data planned by the Florida Marine Research Institute should be held to assess possible correlations of other events with the manatee die-off; and a debriefing meeting should be held soon after the die-off is over.

On 10 May the Marine Mammal Commission wrote the Fish and Wildlife Service recommending that it convene a group of experts to do a comprehensive review of the die-off to determine whether additional studies might be appropriate and for the purpose of developing a protocol to govern the management of future die-offs. The Commission appended an extensively annotated outline of the following points for inclusion in the review: pre-planning; timing; lead responsibility; composition of the investigating team; sampling and data collection protocols (field protocols for manatees, field protocols for other affected species, environmental sampling, analytical protocols, laboratory/investigator selection, and geographic information systems); chain-of-custody; media and public relations; funding; scientific review of the process; and actions needed to plan for future events.

The Service responded by letter of 18 July saying that it felt that a more objective review could be done by the Marine Mammal Commission, inasmuch as the Service itself had been and was so heavily involved in the die-off response. Recognizing the wisdom of the

Service's suggestion, the Commission agreed to do the review. To this end, it contracted for an independent scientist knowledgeable in manatee biology and management issues to assist in preparation of materials related to the Commission's review and to participate in the review. On 14 November 1996 the Commission and its Committee of Scientific Advisors on Marine Mammals convened a meeting of experts from the Department of Environmental Protection, the Florida Marine Research Institute, the Fish and Wildlife Service, various other State and Federal agencies and laboratories, the University of Miami, Sea World of Florida, and elsewhere to participate in the review.

In its review, the Commission noted that the response to the die-off was handled primarily by personnel at the Florida Department of Environmental Protection/Florida Marine Research Institute, with the assistance of numerous collaborating institutions and individuals. In fairly reasonable time and under difficult circumstances, the team had gathered scientifically persuasive evidence that brevetoxin was the cause of the event. The team did a commendable job of incorporating data from various sources into a geographic information system to plot the course of the event and to assess relationships among databases.

Unfortunately, the response team had to proceed without the benefit of the contingency plan that should have been in place for dealing with manatee die-offs. Although completion of such a plan had been given highest priority in the 1989 Florida Manatee Recovery Plan, with an assigned completion date of January 1990, no plan existed by March 1996. Therefore, the team had to adopt an *ad hoc* approach to the investigation, and it is remarkable that so many aspects of the response were done as well as they were. Most deficiencies in the die-off response, from first notification, through administration, coordination, and specimen and data collection, can be attributed directly or indirectly to the lack of a contingency plan.

In its review, the Commission recommended that a contingency plan for manatee die-offs be developed by mid-February 1997 so that it would be in place should there be another die-off in March or April 1997. In fact, a very preliminary draft plan was circulated by the Service in late December. The

Commission's report stressed the plan's importance since other die-offs, perhaps even more severe than the one just ended, will doubtless occur. With respect to specific elements in the review, the Commission commented as follows:

**Advance Planning** — The lack of a contingency plan was a problem from the start. Without clearly established lines of authority between the Fish and Wildlife Service and the Florida Department of Environmental Protection, leadership and coordination were at times confusing, and occasionally this led to less than full cooperation. In addition, some individuals, institutions, and agencies that could have provided considerable expertise and help were not called upon until the die-off was well underway, so their contributions came relatively late and, in some cases, had minimal impact. With no collection protocols to follow, sampling opportunities were missed and valuable information on basic biology and life history lost.

**Timing** — The Working Group on Unusual Marine Mammal Mortality Events was not approached early in the die-off, possibly because of a lack of awareness of the working group's statutory role. The working group was not officially notified, in accordance with statutory protocol, until 18 March after nearly 50 manatees had died, 11 of them in a single day. Matters were further complicated by the inability of the Federal bureaucracy managing the working group to react quickly to formally designate this an unusual mortality event. However, once the formal determination was made and communications were established, the working group was kept closely informed by the response team and provided useful guidance on sources of information, resources, and expertise.

**Lead Responsibility** — Although the Fish and Wildlife Service has overall lead responsibility for manatee management under the Endangered Species Act and the Marine Mammal Protection Act, true control of die-off related activities was not exercised by the Service from the outset. Eventually, this was remedied somewhat when the Service's manatee recovery team leader was designated as the onsite coordinator, the person who directs the response process by managing personnel and the use of facilities, acting as liaison among offices, and coordinating public relations. One immediate benefit of this was

that the onsite coordinator was able to require that two carcasses be sent to an independent laboratory for necropsy so as to bring a new perspective to the investigation. However, the fact that the onsite coordinator was appointed so late in the process and that his authority was challenged underscored the need for a contingency plan that (1) clearly vests ultimate authority in the Fish and Wildlife Service, (2) clearly describes the responsibilities of the onsite coordinator, and (3) grants clear authorization to the onsite coordinator to carry out the assignment.

**Team Composition and Leadership** — Under normal circumstances, the Florida Department of Environmental Protection manatee salvage and recovery team competently processes carcasses, collects and analyzes certain samples, records mortality patterns and trends, and identifies curious or extraordinary events. It would be entirely unreasonable, however, to expect the same team, whose size, structure, and leadership have evolved to meet routine demands, to respond effectively to an event on the scale of the 1996 die-off. A die-off response team requires a wider range of expertise, with specialists in organization, communications, logistics, veterinary medicine, pathology, toxicology, vertebrate and/or marine mammal anatomy, life history, ecology, public health, chain-of-custody, environmental sampling, and public and media relations.

These needs were recognized and, by late March, the bureau chief at the Florida Marine Research Institute had established a multidisciplinary approach by adding aerial survey, environmental, and geographic information systems teams to the investigation to meet the challenge.

One important lesson learned was that, in a major die-off, forming a team and selecting the team leader rank among the most important early administrative decisions; these decisions cannot be made in the midst of a crisis. The leader's role should be to build a multidisciplinary, multiagency, public/private team; facilitate the conduct of the investigation in any way possible; maintain the objectivity and scientific integrity of the investigation; and establish and maintain open lines of communication amongst all participants. The Commission felt, therefore, that the contingency plan should (1) identify the range of expertise to be

represented in the response team; (2) list the criteria for appointing the team's leader and members; and (3) maintain an updated list of prospective candidates for each position. This underscores the need for a contingency plan to be periodically updated.

**Field Operations** — The response team, noting that the volume of carcasses was greatest in Charlotte, Lee, and Collier Counties, moved the base of operations in mid-March to a central location, the Fish and Wildlife Service's J.N. "Ding" Darling National Wildlife Refuge on Sanibel Island. This action was sensible, and the Fish and Wildlife Service is to be commended for making the site available. Had the die-off occurred elsewhere, however, the response team would have been unlikely to have such a convenient location at its disposal. For purposes of logistic planning for future die-offs, the Commission felt that the contingency plan should include an updated list of comparable facilities throughout the manatee's range and that memoranda of agreement or understanding should be developed with these facilities now to secure prompt access to them when needed.

The pathology team included specialists from the Florida Department of Environmental Protection/Florida Marine Research Institute, the National Biological Service, the University of Florida, the University of Miami, the Armed Forces Institute of Pathology, and the John Sealy Hospital in Galveston, Texas. The histopathologic evaluations suggested a non-infectious, possibly toxic, respiratory condition, and brevetoxin poisoning was later confirmed.

Samples for microbiology and virology were sent to the American Type Culture Collection, Bethesda, Maryland; Erasmus University; the University of Florida; and the University of Wisconsin. The Working Group on Unusual Marine Mammal Mortality Events contacted the Department of Agriculture for additional work with morbillivirus. Had the working group been brought in earlier and an onsite coordinator taken charge sooner, the Commission noted that the involvement of specialists from other organizations could have been more rapid and comprehensive. With this point in mind, the review suggested that the contingency plan call for memoranda of agreement or understanding between the Fish and Wildlife Service and other appropriate private and public diagnostic

laboratories to provide priority diagnostic services when manatee die-offs occur in the future.

The Commission also felt that the contingency plan should call upon agencies to recognize the unique value of private oceanaria for clinical observation and rehabilitation; maintain an updated list of facilities that can be used without the risk of introducing disease to resident colonies; reach agreements with the institutions on their roles before the next die-off occurs; and provide a mechanism for facilities to be better represented on the response team. The review also suggested that the plan should call for tissue samples to be collected for contaminant analyses and material archived to provide the opportunity to test for contaminants at a more leisurely pace.

Reviewers also felt that die-offs present a rare opportunity for collecting ancillary data on marine mammal biology. Unfortunately, in this instance, the lack of prior planning meant that personnel were focused almost entirely on the cause of illness and death, and numerous sampling opportunities that could have led to a better understanding of anatomy, reproduction, feeding habits, parasite burdens, and other aspects of manatee biology and life history were lost.

The event demonstrated the value of environmental sampling with respect to weather and oceanic data; monitoring red tide occurrence, location, and movement in relation to historic trends; fish and cormorant kills in the region at roughly the same time; and turtle mortalities. Such information, which can help the medical and pathology teams interpret their findings within a larger context, thereby helps to guide diagnostic activities, as well as to develop strategies and models for mitigating such events and predicting their occurrence.

The Commission commended the Florida Department of Environmental Protection for its exemplary use of geographic information systems to integrate data during the die-off. Since the environmental sampling and geographic information system teams were quite effective, the Commission felt that the process by which they were formulated and their operating guidelines should be incorporated into the contingency planning for use in future die-offs of manatees and other marine mammals.

On the other hand, procedures for recording and tracking individual samples from source to final destination were not in place throughout the die-off. From both scientific and legal perspectives, this is important, and the reviewers felt a directive to establish and maintain clear chains-of-custody should be an essential element of the contingency plan.

**Mitigation** — It has been hypothesized that the prevailing drought and the high salinity of the Caloosahatchee River may have energized the red tide bloom in the 1981-1982 manatee die-off. In 1996 the response team approached the South Florida Water Management District concerning the possible release of freshwater from Lake Okeechobee as a mitigation measure. The decision was made to defer release because it was uncertain whether the brevetoxin problem would be exacerbated by sudden killing and lysing of the dinoflagellate cells. This issue points to the serious need, noted in the Commission's review, for the Fish and Wildlife Service to initiate or resume studies on the feasibility of using large volumes of freshwater to dilute highly saline environments within the manatees' range as a way to reduce the potential threat of brevetoxin as well as to examine other means of mitigating harm to manatees and other species.

**Media and Public Relations** — Because there was no specialist with responsibility for dealing with the media, response team members had to do it themselves. Not surprisingly, problems arose with respect to occasionally confusing and sometimes misleading reporting, which led to speculation that the reporting was biased or even politically motivated.

Since conditions at any die-off are often chaotic, team members are working at the limits of endurance, and scientists are not usually trained in media relations, reviewers found it unacceptable to ask scientists to take on the added task of dealing with the media and recommended that the contingency plan include a mechanism for designating a single, qualified spokesperson to provide timely, accurate information to the media and public.

**Funding** — Demands for response to the die-off quickly outstripped available funds, thereby illustrating that the ultimate effectiveness of any response depends on the availability of dedicated, accessible

contingency funds. The Commission therefore suggested that the contingency plan propose creative ways of generating funds at both the State and Federal levels to meet future die-off response needs.

**Scientific Review Panel** — The Commission also noted that the Working Group on Unusual Marine Mammal Mortality Events is composed of specialists selected for their expertise in disciplines relating to marine mammal health, stranding, and die-offs, and that the Fish and Wildlife Service should take advantage of its statutory involvement in the working group for consultation and ongoing review. Furthermore, mechanisms for quick activation of the working group should be included in the contingency plan.

**Future Planning and Actions** — The Commission concluded its review by noting that the response to the 1996 die-off had much to commend it, and that valuable lessons could be drawn from it. It highlighted, for example, the absolute need for a contingency plan setting forth actions needed to mount a die-off response, from first notification to post-event evaluation. Among other things, the plan should include necessary steps to:

- identify the Fish and Wildlife Service as the agency with authority and responsibility for overseeing and coordinating the response to the event;
- establish clear lines of authority between the Fish and Wildlife Service and the Florida Department of Environmental Protection;
- select an onsite coordinator to lead the response;
- notify the Working Group on Unusual Marine Mammal Mortality Events promptly and initiate consultations with the group;
- streamline the bureaucratic workings of the working group to ensure its prompt and adequate involvement;
- build a multidisciplinary team capable of investigating all potential causes of illness and mortality and evaluating possible measures for mitigation;
- ensure concurrent studies on carcasses for life history information (reproduction, age structure, parasitology, morphometrics, *etc.*), independent of a focus on the causes of death;
- identify regional sites throughout Florida for rehabilitating live animals and for conducting necropsy examinations, with administrative details

and logistic responsibilities worked out in advance, preferably through memoranda of agreement or understanding;

- identify a single media spokesperson;
- identify Federal and state funding sources to support the investigation;
- develop memoranda of agreement or understanding between the Fish and Wildlife Service and appropriate laboratories/agencies/individuals to do analyses warranted during the investigation and to afford such analyses high priority;
- develop a clear chain-of-custody; and
- take into account the potential impact of infectious agents on public health and safety.

While discussions leading to the Commission's review were underway, two other significant events took place. First, the chief of the Florida Marine Research Institute asked the director of the National Biological Service's National Wildlife Health Center in Madison, Wisconsin, to assist in the manatee die-off investigation and to have his staff produce an informal report that might aid the manatee recovery community in improving responses in the future. The report was not intended to be comprehensive, but rather to be the thoughts of one informed person as to what might be done to improve matters.

The 21 August 1996 report addressed preparing for an epizootic event, recognizing such an event, responding to the event, and reporting on the event. Regarding response to an epizootic event, the report focused on the objectives of the investigation, the team, case definition, the epidemic curve, information control, media relations, and managing the epizootic. The report was a useful, constructive contribution.

The second significant event took place on 27 September 1996 when Mr. Miller, Mrs. Meek, and Mr. Goss, all members of the United States House of Representatives from Florida, introduced a bill "to require the director of the Fish and Wildlife Service to expedite issuance of and implement a contingency plan for responding to red tide events involving Florida manatees, and to authorize the director to make grants for research and evaluation of potential methods of therapeutic intervention for manatees intoxicated by red tide brevetoxins." The bill called upon the Fish and Wildlife Service to issue a contin-

agency plan and implement such a plan as part of the recovery program. The bill also authorized the director of the Service, subject to the availability of funds, to make grants for research and to evaluate potential methods for therapeutic intervention with manatees poisoned by red tide brevetoxins, including immunotherapy using brevetoxin antibodies. The bill called for grants to be awarded on a competitive basis in consultation with the Marine Mammal Commission, the National Institute for Environmental Health Sciences, and the Florida Department of Environmental Protection. The proposed authorization of appropriations for these activities was \$800,000. The bill also called upon the Marine Mammal Commission, not later than six months after the date of enactment, to conduct a comprehensive review of the die-off, conduct an interdisciplinary conference to discuss the findings, and to submit to Congress recommended actions to protect manatees from red tide events. The proposed authorization of appropriations under this section of the bill was \$200,000. Although introduced, the bill was not enacted into law, and there were no monies authorized and subsequently none appropriated. As described earlier in this chapter, however, the Commission did conduct a comprehensive interdisciplinary review of the die-off.

### **The Florida Manatee Recovery Plan and Recovery Team**

A central tool used by the Fish and Wildlife Service to identify and direct work by the many agencies and groups involved in the manatee recovery program is the Florida Manatee Recovery Plan, a document that is periodically updated. The initial recovery plan, developed with the assistance of the Marine Mammal Commission, was adopted in 1980. It was the first such plan prepared for any marine mammal and has served as a model for other marine mammal recovery plans developed since then. As changes occurred, the first plan became outdated and, at the recommendation of the Commission, the Service revised and adopted a second recovery plan in 1989. The revision projected recovery needs over a five-year period and, again at the recommendation of the Commission, the Service initiated steps to develop a third edition of the plan in 1992. At that time it asked the Florida Manatee Recovery Team to prepare

a recommended plan based on a draft outline prepared by the Commission.

The Florida Manatee Recovery Team, chaired by the Service's manatee recovery activity coordinator, includes representatives of key agencies and groups directly involved in recovery work. In response to the Service's request, the team constituted a drafting committee, chaired by the Commission's representative on the team, and immediately began work on a third edition. In September 1993 the team submitted its recommended revision to the Service. The Service subsequently circulated the draft plan for public review and comment late in 1994 and, with minor changes, it was approved on 29 January 1996 by the Service's regional director with the concurrence of the heads of nine cooperating agencies and groups, including the Marine Mammal Commission.

The third edition of the plan identifies and ranks 100 specific tasks to meet four fundamental objectives: (1) assess and minimize causes of manatee mortality and injury; (2) protect essential habitat; (3) determine and monitor the status of manatee populations and essential habitat; and (4) coordinate and oversee cooperative recovery work. For each task, the plan identifies the work that is required, its relationship to other tasks, the agencies involved in carrying out those tasks, and the estimated costs. Although the plan does not commit agencies to funding or undertaking specific tasks, it provides a basis for cooperating agencies and groups to identify where their efforts are needed; it also projects the needs for funding, staffing, and interagency coordination to carry out that work.

In the past, periodic meetings of the Florida Manatee Recovery Team were used to coordinate and direct agency activities under the recovery plan. However, after developing the recommended draft recovery plan late in 1993, this function devolved to various working groups and committees established to address specific issues or advisory functions. Among these is the Manatee Technical Advisory Council, established with help from the Marine Mammal Commission, to advise the Secretary of the Florida Department of Environmental Protection on state-level manatee recovery needs. Others include working groups and task forces to coordinate work on the

rescue, rehabilitation, and captive care of manatees, the development of a manatee geographic information system, the development of measures to reduce mortality in flood gates and navigation locks, and planning for aerial surveys.

Because of the existence of these many separate groups, the recovery team had not been convened since 1993. However, events surrounding the 1996 manatee die-off underscored the importance of the recovery team's role in coordinating interagency work, reaching a mutual understanding on key issues, and maintaining a broad overview of recovery program progress. With completion of the revised recovery plan, and in recognition of the need to improve interagency coordination, the Fish and Wildlife Service advised the Commission at its 12-14 November annual meeting of its intent to reconstitute and reconvene the Florida Manatee Recovery Team. At the end of 1996 it was the Commission's understanding that the Service planned to take steps in this regard during 1997.

### **The Sirenia Project**

To provide a sound information base for developing and implementing a well-conceived recovery program, the Fish and Wildlife Service established the Sirenia Project in 1974 to gather and analyze biological and ecological data on manatees. Since then the program has been a fundamental source of scientific information, essential for making informed management decisions. Among other things, its staff (1) initiated a salvage and necropsy program to identify and monitor sources and levels of manatee mortality; (2) developed aerial survey techniques for assessing manatee distribution and relative abundance; (3) pioneered the development of telemetry techniques to track manatees in the wild; (4) established a manatee photo-identification catalogue to assess long-term life history and survival parameters; and (5) documented manatee food preferences and foraging areas.

The expertise and information provided by the Sirenia Project have been a cornerstone of the recovery program since its inception. Under the new recovery program, the Sirenia Project is assigned lead responsibility for several key tasks, including developing information and models to determine whether the

population is increasing or decreasing, and tracking rehabilitated animals released back into the wild so that those efforts will be as successful as possible.

On 17 June 1992 the Commission wrote to the Service providing a five-year projection of funding needs for the Sirenia Project based on assigned high-priority tasks in the 1989 edition of the Florida Manatee Recovery Plan. For fiscal year 1996 the Commission projected a need for \$701,000 and for fiscal year 1997 it projected a need for \$666,000. In 1994 the Sirenia Project was moved from the Fish and Wildlife Service to the National Biological Survey (soon renamed the National Biological Service). The National Biological Service was unable to maintain the previous level of support provided by the Fish and Wildlife Service (more than \$600,000), and for fiscal year 1996 it reduced the project funding to \$336,000. The Fish and Wildlife Service was able to transfer \$152,000 to help defray the funding shortfall, and an additional \$84,000 was provided from contracts with other agencies, one-time gifts, and other sources. Despite these contributions, support for the project fell 20 percent from its previous funding level in 1995.

In 1996 the National Biological Service became the Biological Resources Division of the U.S. Geological Survey. During the Commission's 12-14 November annual meeting, the Sirenia Project leader responded to the Commission's questions about the potential impacts of further cuts in the program's funding base for fiscal year 1997 by describing how such funding cuts would necessitate a reduction in the program's staff and virtually eliminate operating funds.

On 20 November 1996 the Commission wrote to the U.S. Geological Survey noting that the project's fiscal year 1996 funding base was completely inadequate and that the further cuts being contemplated were totally inconsistent with the recent demands for sound biological data caused by the 1996 manatee die-off and the nearly twofold increase in manatee mortality. Based on its review of only the highest priority recovery tasks assigned to the Sirenia Project in the new recovery plan, the Commission recommended that, assuming the Fish and Wildlife Service would again be able to provide \$152,000 to the project, the Survey increase the program's base budget to at least

\$460,000. As of the end of 1996 the Commission was looking forward to a response to its letter.

### **Boating Regulations**

As indicated in Table 2, the largest source of human-related manatee mortality is collisions with boats. Because manatees are not easily seen from boats, vessel operators are unable to reliably detect and avoid hitting them. Therefore, in 1989 the Florida Governor and Cabinet directed the Department of Natural Resources (now the Department of Environmental Protection) to develop networks of boat speed zones throughout 13 key Florida counties where manatees are most common and manatee mortality was highest. In doing so, the Governor and Cabinet sought to slow boats down in specific areas where manatees are most likely to occur so that manatees would have a greater chance of avoiding vessels.

In response to its directive, the Department entered into negotiated rulemaking with county officials and local citizens in each of the 13 key counties. The objective was to establish a series of site-specific, county-wide rules, such as channel-exempt, channel-inclusive, and shoreline-only slow-speed zones, high-speed water sport areas, and no-entry areas that would balance needs for both manatee protection and vessel use of state waterways.

In 1996 the Department of Environmental Protection completed rules for a portion of Lee County, the last of the 13 key counties identified by the Governor and Cabinet in 1989. As noted in the previous annual report, a rule challenge in 1995 necessitated further work to develop a county-wide rule package. While county-wide rules are now in place for 12 counties and part of one other county, their implementation in many areas has been slowed by intense controversy and debate that lengthened the negotiation process, prompted formal rule challenges, and precipitated work to revise many of the provisions initially adopted. In many cases, these and other factors have caused delays in posting regulatory signs and enforcing established rules. As a result, it will probably be several more years before a reasonable basis is established for evaluating the effectiveness of the rules.

### **Flood Gates and Navigation Locks**

The second largest source of human-related manatee mortality is entrapment in flood control gates and navigation locks. Manatees routinely travel through these structures when they open, but sometimes they become pinned in closing gates or partially open gates, causing them to be crushed or held underwater and drowned. In recent years the numbers of animals killed in these structures has increased. The gates and locks in which most deaths have occurred are owned and operated by the South Florida Water Management District and the Army Corps of Engineers.

To address this problem engineers with the Water Management District and the Corps initiated work in 1992 to evaluate pressure-sensitive gate-reversing mechanisms, similar to those on elevator doors, that could be installed on gate and lock doors. Initial designs involved mechanical plunger devices that would trigger a reversing mechanism to open the doors, should a manatee become trapped. Unfortunately, tests of the mechanism proved them to be unreliable and costly to maintain.

Under a cost-sharing agreement with the Corps, engineers with the Water Management District therefore identified a new approach for flood gates using a strip of piezoelectric film — a tough plastic material that converts mechanical pressure, such as that from an object pinned in a closing door, into an electric current that will activate the reversing mechanism. Design of a system using the new material was completed in 1996, and a prototype was installed at one gate for testing. Because the piezoelectric film system has no moving parts, the new design is not expected to encounter the problems experienced with the initial plunger designs. If tests prove successful, installation of the new system is expected to cost about \$50,000 per gate and would proceed over a several-year period, beginning with those gates that have caused the most manatee deaths.

In addition to the work on flood gates, the Corps' Jacksonville District Office and Vicksburg Experimental Station have explored two approaches to reduce entrapment in navigation locks: acoustic arrays to detect manatees in lock chambers and alert gate-tenders to their presence, and gate-reversing

mechanisms using piezoelectric elements embedded in tiles installed along gate edges. Testing of both systems is to be undertaken in 1997. It is envisioned that both systems would be installed at navigation locks so that if one system fails, the other could provide a backup means of protection.

To retrofit flood gates and navigation locks with new devices, the Corps of Engineers has received \$2 million under provisions of the Water Resources Development Act.

During the Commission's 12-14 November annual meeting, representatives of the Corps and the Water Management District reviewed the status of their investigations and plans. The Commission was impressed by the agencies' efforts and accomplishments to date and was encouraged by the prospects for testing new prototype designs in the near future. In this regard the Commission wrote to the Corps on 12 December 1996 to identify a potential approach for testing the reliability of sensors to trigger gate-opening mechanisms in the presence of manatees. Specifically, the Commission provided information on signal detection theory, which involves studying an animal's behavior in relation to the ability of sensing devices to detect their presence. Should the Corps or the District be interested in pursuing such a study in conjunction with operational testing, the Commission noted that one of its Committee members with experience in this approach would be willing to help.

### **Manatee Geographic Information System**

In the 1980s the Florida Marine Resources Institute (part of the Florida Department of Environmental Protection) developed a marine resources geographic information system. The system was designed to help compile, analyze, and speed access to extensive site-specific databases on the state's grassbeds, water quality, shoreline characteristics, *etc.* Also during the 1980s there was a significant increase in both the amount of site-specific data available on manatees (*e.g.*, databases developed by the Sirenia Project and the Institute on manatee mortality, movements, distribution, and feeding areas) and the need to make those data available to county planners and state regulators. The Institute therefore began work on a manatee component for its marine resources geo-

graphic information system. The Commission assisted in organizing this effort by supporting a 1989 workshop convened by the Institute and Eckerd College to identify and design an optimal system for compiling, organizing, and maintaining a state-of-the-art manatee geographic information system (see Appendix B, Reynolds and Haddad, 1990).

During the early 1990s, in close cooperation with the Sirenia Project, the Institute digitized base maps and entered key manatee data sets into the system. The manatee geographic information system is now an information cornerstone for the manatee recovery program. Among other things, the system provides ready access to site-specific manatee data for purposes of developing and evaluating county boat speed rules, reviewing permit applications for development projects in manatee habitat, and analyzing manatee population ecology and life history parameters.

In 1996 the Institute further improved use of the system by incorporating system databases onto a CD-ROM for distribution and use by county, state, and Federal agencies involved in work related to the manatee recovery program. The system and the steps taken by the Institute to develop and maintain it now provide a state-of-the-art model for developing similar data management systems under other marine mammal management programs. During the Commission's 12-14 November annual meeting, Institute staff described the system's establishment and demonstrated its capabilities for other resource managers and scientists present.

### **The Crystal River National Wildlife Refuge**

Kings Bay, at the headwaters of the Crystal River on Florida's west coast, constitutes the most important natural warm-water refuge for manatees in Florida. The bay is fed by numerous underwater warm-water springs that, in winter months, attract more manatees than any other natural warm-water spring system in Florida. During cold winter periods, more than 300 animals may seek refuge in the bay's warm waters. The sheltered, clear, warm waters and the presence of manatees also attract large numbers of recreational divers, most of whom seek out manatees for a close viewing experience. While some animals approach

underwater divers with little apparent trepidation, others avoid divers.

To provide an area into which manatees could withdraw to avoid divers, the Fish and Wildlife Service established three small manatee sanctuary areas covering a total of about 10 acres in Kings Bay. These were closed to all human access. Manatees wishing to avoid divers soon learned they could do so by retreating into the sanctuary areas. To better administer and protect the bay's manatee habitat, the Fish and Wildlife Service purchased the islands in Kings Bay in 1984 and established them as the Crystal River National Wildlife Refuge. Since then, the numbers of divers and manatees have increased steadily, and in 1994 the Service expanded the number of manatee sanctuaries in the bay to six, covering a total of about 39 acres.

In 1996 the Commission received reports of frequent and, in some cases, blatant harassment of manatees by divers using Kings Bay and an area a few miles south of Kings Bay adjacent to another natural warm-water spring on the Homosassa River. There were reports of animals being forced from a small warm-water spring called Three Sisters Spring just off Kings Bay, of calves being separated from their mothers, of divers standing on manatees, and of hundreds of divers lining the edge of sanctuaries and impeding manatees moving in and out of the areas.

In response to these reports, the Commission wrote to the Service on 9 May 1996. It noted that the Service's efforts to establish manatee sanctuaries and to work with local dive shops to inform divers of measures needed to protect manatees have been well placed. However, it noted that increasing numbers of divers wishing to swim with manatees had outpaced management efforts. The Commission therefore recommended that the Service immediately re-examine its system of manatee sanctuaries and take steps to designate the Three Sisters Spring, and perhaps other areas in Kings Bay and the Homosassa River, as manatee sanctuaries. It also recommended that the Service explore options for expanding enforcement of rules to prevent manatee harassment at Kings Bay, developing a permit system for divers in areas immediately around designated manatee sanctuaries, charging a nominal permit fee to help defray enforcement

and management costs, reviewing programs and guidance to advise divers about manatee protection needs, and establishing a flexible regulatory framework for annually adjusting sanctuary boundaries based on shifting patterns of manatee distribution in Kings Bay.

On 8 August 1996 the Service replied to the Commission's letter. It noted that it was aware of the many anecdotal reports of manatee harassment and that it planned to convene a subcommittee of the Florida Manatee Recovery Team to prepare a study plan for documenting information on manatees and human activities. Results of the study would then be used as a basis for management decisions regarding additional sanctuary areas and related regulatory actions. As part of that effort, the Service noted it would evaluate the alternative approaches outlined in the Commission's letter. Subsequently the Commission was advised that the subcommittee met and that a study to document manatee-human interactions in the Kings Bay area would be initiated early in 1997.

### **Hawaiian Monk Seal** *(*Monachus schauinslandi*)*

The Hawaiian monk seal is the most endangered seal in U.S. waters. It also is the nation's second most endangered marine mammal; only the northern right whale is more endangered. The Hawaiian monk seal population, numbering 1,300 to 1,400 seals, breeds only in the Hawaiian Archipelago. Most monk seals belong to one of five more or less discrete breeding colonies located in the remote, largely uninhabited Northwestern Hawaiian Islands (see Figure 1). The five largest colonies are on French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Reef, and Kure Atoll. Small colonies also occur on Niihau, Necker, Nihoa, and the Midway Islands. Other than on Niihau, births in the main Hawaiian Islands are rare.

Although there are few written references to Hawaiian monk seals before the 1950s, those available suggest that the number of Hawaiian monk seals was reduced significantly in the 1800s by a short-lived sealing venture and the killing of seals for food by

shipwrecked sailors, bird hunters, and other transient visitors. Since the early 1900s, the status of individual seal colonies has been determined by various combinations of human-related and natural factors.

Probably the most important human factor has been unmanaged or poorly managed use of beaches by people and their pets. Repeated human disturbance that forces seals, particularly juveniles, into the water can increase their exposure to predators, such as sharks, and eventually cause seals to abandon a preferred site. More recent human-related factors include interactions with commercial fishing operations, entanglement in derelict fishing gear and other debris, reduction of prey resources by commercial fisheries, pollution from human activities and abandoned equipment, and entrapment in deteriorating shore protection structures.

Natural factors suppressing population growth include the limited amount of beach and reef habitat available to seals, predation by sharks, die-offs due to disease or naturally occurring biotoxins, attacks on female and juvenile seals by aggressive groups of adult male seals (called "mobbing"), and fluctuations in environmental conditions, such as current patterns or water temperature, that may periodically alter the abundance of important prey species.

### **Hawaiian Monk Seal Population Status**

As noted above, the overall status of Hawaiian monk seals is determined by a composite of trends at individual colonies. In general, the population appears to have declined significantly in the 1960s and 1970s, at least in part due to human disturbance. In the early- to mid-1980s, the trend appeared to reverse, with an overall increase largely due to growth of the seal colony at French Frigate Shoals. Since the late 1980s, overall abundance has again declined due to another reversal in trends at French Frigate Shoals.

With a resumption of the decline, the National Marine Fisheries Service has increased efforts in the past two years to monitor seals at key breeding colonies. The results, some of which are summarized below, provide the most complete assessment of the population since the Service began its recovery program early in the 1980s.

**French Frigate Shoals** — French Frigate Shoals is an atoll with several small islets and sandbars on which seals can haul out and pup. One of the atoll's islands, Tern Island, is the only permanently occupied island between the main Hawaiian Islands and Midway Atoll, a distance of about 1,200 nautical miles. During World War II the island was expanded and stabilized by the Navy for use as a landing strip. A sheet-pile bulkhead was constructed and, by back-filling with sand and coral from the surrounding lagoon, the island was expanded from about 11 acres to 40 acres. From 1952 to 1979 Tern Island was used by the Coast Guard as a LORAN station. Since 1979 it has been occupied by the Fish and Wildlife Service as the only permanent field station for the Hawaiian Islands National Wildlife Refuge, which includes the small islands stretching from Nihoa Island to Pearl and Hermes Reef.

Few counts of seals were done at French Frigate Shoals before 1970, and population trends before then are uncertain. Since 1970 the colony has grown into the species' largest. Mean beach counts (*i.e.*, the mean number of seals counted in a series of census counts at an atoll in a given year) doubled from about 160 seals early in the 1970s to more than 300 by the late 1980s. At that time, counts were nearly three times greater than those at Laysan Island, the home of the species' second largest colony. Throughout the 1980s about half of all monk seal pups born were born at French Frigate Shoals.

Late in the 1980s, however, survival of young seals at French Frigate Shoals began declining sharply. Survival rates of animals between weaning and age two declined from more than 80 percent in the early- and mid-1980s to 20 percent or less by the early 1990s. With fewer juveniles surviving, mean beach counts have now decreased to early-1970s levels, even though the number of births has remained near the high levels seen late in the 1980s.

Concurrent with decreased juvenile survival has been an increase in the number of pups and juveniles in underweight or starving condition. Adult animals also appear to be smaller than similarly aged animals at other colonies. This and related evidence strongly indicate that limited food availability is the cause of reduced juvenile survival.

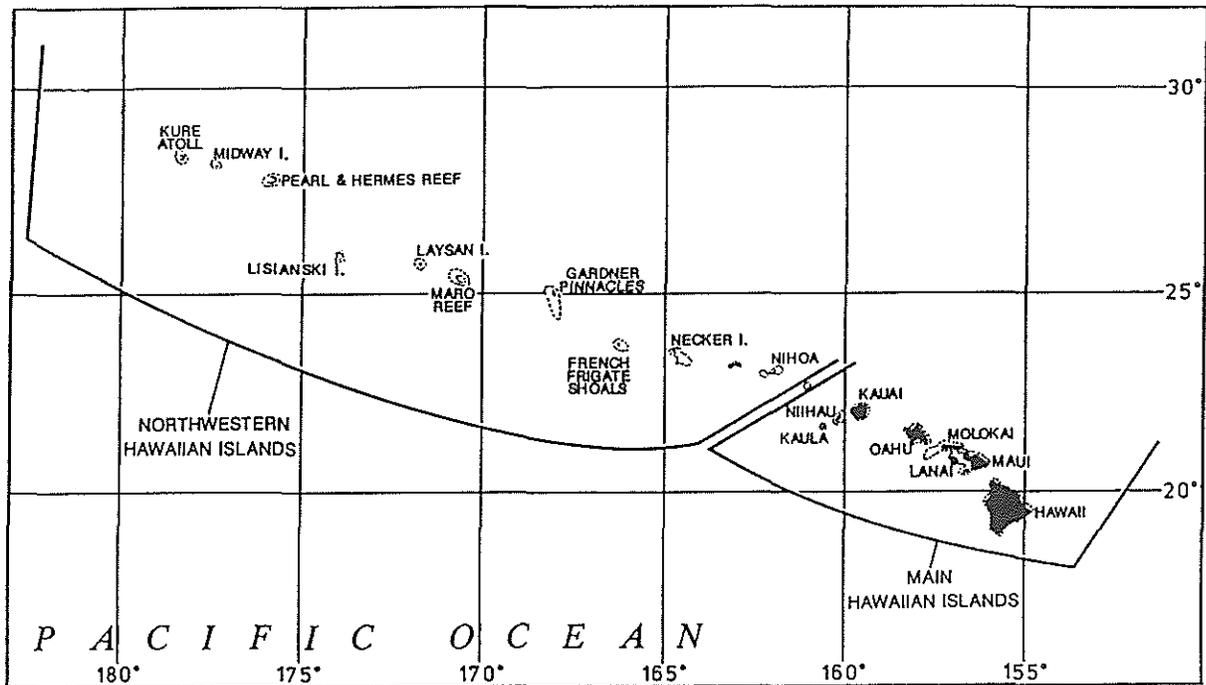


Figure 1. The Hawaiian Archipelago

Monitoring studies in 1996 continued to document low juvenile survival rates and substantial numbers of underweight and starving juveniles at French Frigate Shoals. The continuation of the trend raises concern that reduced recruitment of breeding age females will soon cause the number of births at the atoll to decline as older animals die or become less fecund. During the 1996 field season at French Frigate Shoals, the mean beach count for 10 surveys was 160 seals, about 25 percent below counts in 1991. Also, a total of 445 individual seals was identified, including 94 pups. Field crews also found one entangled seal, which was disentangled and released unharmed.

**Laysan Island** — Unlike French Frigate Shoals, which consists of several islets, Laysan Island is the only land mass at this atoll. Mean beach counts at Laysan Island underwent a steady decline, from more than 250 the mid-1960s to about 120 in the late 1970s. The count declined more slowly early in the 1980s, and by the middle of the decade began to show a brief increase. Subsequently, however, counts

returned to low levels of about 100 seals late in the 1980s. Although the cause of the colony's decline in the 1960s and 1970s is unknown, a die-off of at least 50 seals at Laysan Island in 1978 was a contributing factor. The 1978 die-off appeared to be caused by a natural biotoxin, ciguatera, that can accumulate in reef fishes on which the seals feed. No other suspected cases of ciguatera poisoning have been reported at Laysan Island, either before or since 1978.

In the 1980s scientists with the National Marine Fisheries Service documented a high incidence of "mobbing" behavior by adult male seals at Laysan, and they concluded that mobbing was impeding the colony's recovery. Mobbing appears to be an aberrant sexual behavior involving successive attacks by adult males who surround and repeatedly bite the back of an individual adult female or juvenile in apparent attempts to copulate. Seriously injured victims can be left gravely weakened with gaping wounds. Seals in such condition frequently disappear, presumably dying of their wounds or being eaten by sharks.

Researchers also determined that the atoll's adult sex ratio was skewed towards males, which was thought to be contributing to the behavior. To reduce mobbing, the Service evaluated alternatives for (1) balancing the atoll's sex ratio by reducing the number of male seals, and (2) treating some adult males with a testosterone-suppressing drug. Prospects for effective use of drugs were limited, and in 1994 Service scientists captured 22 adult male seals at Laysan Island. All but one, which died during capture, were released in the main Hawaiian Islands. The removals left the adult sex ratio slightly biased towards females. None of the male seals removed in 1994 has reappeared at Laysan Island.

During the 1996 field season, one mobbing incident and seven mobbing-like injuries were observed, suggesting that the male-biased sex ratio alone does not account for the high incidence of mobbing at Laysan. The observed incident involved seven males and an adult female who sustained serious injuries.

Researchers also found four entangled seals; two were able to free themselves, one was disentangled, and the fourth was observed entangled but could not be caught. The mean beach count from 23 surveys in 1996 was 111 seals. A total of 261 individual seals was identified, including 47 pups. In the past few years, it also appears that juvenile survival rates have begun to decline. While the decline is less pronounced than at French Frigate Shoals, new evidence of emaciated juveniles at Laysan Island suggests that this population also may be food-limited.

**Lisianski Island** — The seal colony at Lisianski Island is slightly smaller than that at Laysan Island, but its trend over the past 35 years is similar. Mean beach counts of nearly 200 seals early in the 1960s declined to about 100 seals by the early 1970s for unknown reasons. Since then, beach counts have remained relatively stable. Also like the Laysan Island colony, there is some evidence that mobbing behavior may be limiting its recovery; however, monitoring efforts at Lisianski Island have been less extensive and the prevalence of mobbing events is less well known. In 1996 one mobbing incident was observed at Lisianski Island involving five males and an adult female. The female was uninjured.

More derelict fishing debris washes ashore at Lisianski Island than at any of the other atolls, suggesting that entanglement problems could be greatest at Lisianski Island. This concern was borne out in 1996 when seven entangled seals were observed. One was able to free itself, and the other six were freed by researchers. The mean beach count for 1996 was 77 seals, and 202 individual seals were identified, including 24 pups.

**Pearl and Hermes Reef** — During the early 1960s monk seal numbers at Pearl and Hermes Reef underwent an even steeper decline than at Laysan and Lisianski Islands. Mean beach counts declined from about 200 seals in the 1960s to fewer than 50 seals by the mid-1970s. Unlike the other two sites, however, beach counts at this atoll have increased steadily since the mid-1970s, and current counts are again comparable to those at Laysan and Lisianski Island. In 1996 the mean beach count for eight surveys at Pearl and Hermes Reef was 86.5 seals, and researchers counted 224 individual seals, including 26 pups. Marine debris was observed on three weaned pups, and all three were disentangled successfully by field crews.

**Kure Atoll** — Kure Atoll, the westernmost atoll in the Northwestern Hawaiian Islands, supports a relatively small colony of monk seals. From 1960 to 1994 the Coast Guard maintained a LORAN station on the atoll's principal island, Green Island, which also provides most of the atoll's suitable haul-out beaches for seals. Kure Atoll is the only atoll in the Northwestern Hawaiian Islands not managed as a national wildlife refuge by the Fish and Wildlife Service; when the station closed in 1994, the State of Hawaii resumed primary management responsibility.

After the LORAN station was established, disturbance by station personnel and their pets walking island beaches had a significant adverse effect on the resident seal colony. In the first two decades of Coast Guard occupation, beach counts of seals declined from about 90 to less than 30, and pupping declined steadily. By the early 1980s only a few births per year were observed. In addition, survival rates of newly weaned pups declined substantially, perhaps due to being forced into the water by human disturbance and subsequent shark predation.

In the late 1970s the Coast Guard began restricting beach access by station personnel, and in 1981 the National Marine Fisheries Service initiated a headstart program in which weaned pups born at the atoll were captured and maintained in an enclosure for several months before being released back into the wild. The purpose of the program was to increase survival rates among the atoll's newly weaned pups. In 1984 the Service supplemented the headstart program with an effort to release young female seals that had been rescued from French Frigate Shoals in underweight condition and rehabilitated. Between 1984 and 1995, 49 juvenile monk seals from French Frigate Shoals were rehabilitated and released at Kure.

The combined efforts of the Coast Guard and the Service reversed the decline, and since the early 1980s beach counts at Kure Atoll have increased slowly but steadily. As the headstart and introduced seals reached maturity, the number of births also increased. In 1996 the mean beach count for 15 surveys at Kure Atoll was 47 seals, and 115 individual seals, including 17 pups, were identified. One adult female and two pups were found entangled and released without injury by field personnel. One of the pups was entangled on two separate occasions.

**The Midway Islands** — The most intensively developed atoll in the Northwestern Hawaiian Islands is Midway Atoll, which includes two principal islands. In 1903 a trans-Pacific cable relay station was built on the largest island, Sand Island, and in 1935 it was further developed as a refueling base for the first commercial trans-Pacific Clipper flights. On 4-6 June 1942 the Battle of Midway, a key U.S. naval victory and turning point in World War II, was fought in the area. The atoll's other major island, Eastern Island, was the focal point of Midway's airborne defense capabilities containing three major runways and various associated facilities and structures.

After the battle, the Navy developed Sand Island into a major naval air station. The Navy continued to operate the facility after World War II, and in the late 1950s it mounted a major facility expansion project. At times, more than 3,000 people lived on the two islands; however, in the past decade, the Navy reduced operations to a minimum caretaker status and eventually closed the facility in 1993.

The size of the atoll's monk seal colony before human occupation is unknown, but it likely was greater than the level reported late in the 1950s when the first seal surveys were made, and beach counts of up to 68 seals were reported. Following expansion of the Navy's facility, the seal colony all but disappeared. When the next survey was made in 1968, only a single seal was seen. In the 1980s Navy use of the facility declined substantially, and a few seals have been seen at the atoll. In the early 1990s mean beach counts ranged from 0 to 10, with few documented births.

The Midway Islands also provide one of the most important seabird nesting sites in the central North Pacific, and in 1988 the Fish and Wildlife Service signed a cooperative agreement with the Navy to manage wildlife on the Midway Islands as an overlay national wildlife refuge. The future of the atoll's wildlife habitat, however, became uncertain in 1993 when, as part of a nationwide effort to close non-essential military bases, the Navy announced plans to close and clean up the Midway Naval Air Station and transfer it to a new owner. The Fish and Wildlife Service expressed an interest in assuming ownership, as did others, including the State of Hawaii and a private foundation interested in developing Midway Atoll as a historical park.

These and related actions, including transfer of the atoll from the Navy to the Fish and Wildlife Service in 1996 (discussed below), significantly improved prospects for restoring a major breeding colony of monk seals at Midway Atoll. Recognizing the impending changes at Midway, the National Marine Fisheries Service has increased its efforts in recent years to assess and rebuild the resident monk seal colony (see below). In 1996 field personnel obtained a mean beach count of 16 seals at Midway Atoll and identified 42 individual seals, including six pups. Researchers also documented movements by nearly half of the seals identified between Midway and nearby Kure Atoll and Pearl and Hermes Reef. The results suggest that many seals at Midway are transient visitors from those colonies. Although Service personnel observed no entangled animals during the 1996 field season, Coast Guard personnel freed two seals that were badly entangled in a large derelict net in Midway's lagoon in July, and a third seal was freed

by Fish and Wildlife Service staff from another large net in June.

**Other Northwestern Hawaiian Island atolls** — A few seals also occur at Necker Island, Nihoa Island, and Gardner Pinnacles. Because the predominantly steep rock shores at these locations severely limit suitable haul-out sites, these islands cannot support substantial breeding colonies. In 1996 field crews obtained a mean beach count of 20 seals (three pups) on Nihoa Island, 28 seals (two pups) on Necker Island, and 3 seals (no pups) at Gardner Pinnacles. Researchers also documented 8 seals that had moved to Necker Island from French Frigate Shoals. These included seven adult animals and one subadult female.

### Marine Mammal Commission Program Review

In light of the species' decline and significant changes in management authority at several monk seal breeding sites, the Marine Mammal Commission, in cooperation with the National Marine Fisheries Service, convened a panel of marine mammal scientists and resource managers on 11 April 1995 to review the Hawaiian monk seal recovery program. Representatives of key agencies and groups with important roles in assisting the National Marine Fisheries Service with recovery work also participated. These included the Army Corps of Engineers, the Coast Guard, the Fish and Wildlife Service, the Hawaii Division of Forestry and Wildlife, the Hawaiian Monk Seal Recovery Team, the Navy, Sea Life Park, and the Western Pacific Regional Fisheries Management Council.

As discussed in the previous annual report, on 4 August 1995 the Marine Mammal Commission provided recommendations based on a report of panel findings in separate letters to the National Marine Fisheries Service, the Fish and Wildlife Service, the Navy, and the Coast Guard. The review indicated that the National Marine Fisheries Service had already taken a number of important steps to strengthen its efforts, and based on the findings, the Commission's 4 August letter to the Service provided recommendations on a number of critical issues. The panel and the Commission also were impressed by the attention of other agencies to their related obligations and roles in the Hawaiian monk seal recovery program. Based

on the panel's findings, the Commission also provided comments and recommendations on important actions to be taken under their respective programs.

Initial follow-up actions taken by the National Marine Fisheries Service and other agencies regarding key panel findings and Commission recommendations are discussed in the previous annual report. Further developments in 1996 are discussed below.

**Program Funding and Personnel** — In past years, both the Commission and the Hawaiian Monk Seal Recovery Team had noted that funding support provided by the National Marine Fisheries Service was insufficient to carry out all priority recovery needs. To address this shortcoming, the Service increased funding for monk seal recovery work to approximately \$1.1 million in fiscal year 1995. Among other things, the increased support allowed the Service to hire a field crew and cover related logistic costs for monitoring all key breeding sites, and to contract through a cooperative university program for additional help in addressing needs that could not previously be met.

The Commission concluded that the Service's funding level and field plans were consistent with its leadership role in recovery work and recommended that the Service maintain its fiscal year 1995 funding level over the next three years. For fiscal year 1996, the Service increased its funding level to \$1.45 million. The increase was needed because of unanticipated medical and maintenance costs arising from the long-term care of seals that had been taken for rehabilitation purposes but which could not be released back into the wild (see below).

As of the end of 1996 it was the Commission's understanding that the Service planned to provide approximately \$1.1 million for fiscal year 1997. Problems necessitating the 1996 funding increase had not been resolved as of the end of the year, and, as noted above, the species' decline continued in 1996. Thus, the Commission anticipated writing to the Service early in 1997 recommending that funding be maintained at a level near that provided in 1996.

Based on its 1995 program review, the Commission also noted in its letter to the Service that the

recovery program leader had announced plans to retire in 1996 and that, due to staff reduction efforts within the Service, it was uncertain whether his position would be retained. Given pressing staff needs for the program, the Commission recommended that the Service move quickly to hire a new recovery program leader. The Service did so and, in mid-1996 a new program leader was appointed with no reduction in the recovery program's staff level.

Because of health issues related to the care and maintenance of monk seals brought into captivity for rehabilitation and release back to the wild and for research, the Commission also recommended that the Service hire a full-time veterinarian to oversee captive maintenance and rehabilitation work. The Service also responded favorably to this recommendation and in 1996, through a cooperative program with the University of Hawaii, it contracted for the services of a veterinarian with a background in epidemiology.

**Population Monitoring** — To provide solid information for analyzing population trends and management needs, the Service announced plans at the 1995 program review to monitor monk seals at all major breeding colonies plus Midway Atoll in 1995. In its 4 August follow-up letter to the Service, the Commission endorsed these plans and recommended that the effort be continued in 1996. It also recommended that, after 1996, the Service determine if some sites might subsequently be monitored at a less frequent interval so that additional resources could be allocated to other pressing research and management needs.

As indicated above, the Service monitored all major monk seal breeding colonies, plus Midway Atoll, in both 1995 and 1996. The results have yielded the most complete understanding of population trends and management needs to date. At the end of 1996 the Hawaiian Monk Seal Recovery Team had scheduled a meeting for early 1997 to consider monitoring needs and other priority work for the coming field season.

**Pup Rehabilitation and Release Program** — In 1984 the National Marine Fisheries Service began capturing underweight female seals at French Frigate Shoals, rehabilitating them at Sea Life Park and another small facility (Kewalo Basin) on Oahu, and

then releasing them back to the wild. Because of apparent food limitations for seals at French Frigate Shoals, the Service decided to release the rehabilitated animals at Kure Atoll where past declines had apparently been halted by improved management of human activity on the atoll's beaches and where there were no signs of food limitations. The program proved to be very successful. Most underweight seals gained weight in captivity and reintroduced animals had a very high survival rate. Rehabilitated females now comprise a significant portion of the Kure Atoll colony.

Given the success of efforts at Kure Atoll, the Service decided to switch the site for releasing rehabilitated seals to Midway Atoll and to increase its efforts to rehabilitate underweight pups. As an initial effort, the Service released 18 seals at Midway Atoll in 1992 and 1993. All but two of the animals released at Midway soon died or disappeared although no observed deaths were seen among resident animals. In light of the findings, 14 other rehabilitated seals scheduled for release at Midway were instead released at Kure Atoll in 1993, and 15 additional seals were released at Kure in 1994 and 1995. A number of those seals also disappeared. The cause of the poor survival rate for recently released animals is uncertain; however, because of limits in funding, personnel, and space for rehabilitating animals, the procedures used to handle many of the released seals differed from those used previously.

In 1994 the Commission recommended that the Service expand its rehabilitation facilities, hire a veterinarian to oversee rehabilitation work, and make another attempt to release seals at Midway. Although the review panel convened by the Commission in 1995 was concerned about the high cost of rehabilitating seals, the adequacy of criteria to guide the work, and the relatively small number of seals that would be added to the population, it also supported further rehabilitation efforts. The Commission therefore again recommended that the rehabilitation facilities be expanded and also recommended that criteria be developed to guide decisions on when and how to take and release seals, and that a full-time veterinarian be hired to oversee rehabilitation work.

In 1995 the Service captured 12 underweight female pups at French Frigate Shoals for rehabilitation. However, in the last four months of 1995, 9 of the animals developed corneal opacities. The cause of the condition was not apparent and, because of concern about spreading the affliction to wild seals, none of the animals were released in 1995. Further efforts to identify the cause of the condition in 1996 were unsuccessful despite examinations by eye specialists and extensive consultations with marine mammal veterinarians. After initial signs of improvement late in 1995, some animals began to develop cataracts late in 1996. With these developments, all 12 animals remained in captivity throughout 1996, and no additional underweight pups were captured for rehabilitation purposes.

The Service, however, did begin expanding its captive maintenance and research facility at Kewalo Basin, but as of the end of 1996, construction had not been completed. Also in 1996 Sea Life Park declared bankruptcy. This was the facility where most captive monk seals have been kept, including the 12 animals captured for rehabilitation in 1995. The park's financial problems raise serious concern about the future availability of adequate space to maintain and rehabilitate the seals.

**Rebuilding the monk seal colony at Midway Atoll** — In 1996 no action was taken to supplement the resident monk seal colony at Midway by releasing rehabilitated seals rescued from French Frigate Shoals because of the continuing health problems among the seals taken for rehabilitation in 1995. Pending resolution of those problems, other means of helping rebuild the colony were to be discussed at a meeting of the Hawaiian Monk Seal Recovery Team scheduled for 7-8 January 1997. The possible actions include initiating a headstart program for seals born at Midway (*i.e.*, temporarily maintaining pups born at Midway to increase juvenile survival) and moving monk seals directly from French Frigate Shoals to Midway.

Significant progress was made, however, in 1996 to improve and secure the atoll's wildlife habitat in conjunction with actions begun by the Navy in 1993 to close the Midway Naval Air Station and transfer the atoll to a new owner. Soon after the Navy had

announced the planned closure, the Fish and Wildlife Service and others expressed an interest in assuming ownership. Pending a final decision on a new owner, the Navy made several important decisions.

First, the Navy determined that any future owner would need to maintain an operational airfield and harbor on Midway to meet vital needs, such as refueling Coast Guard enforcement planes and ships and providing an emergency landing site and port for North Pacific air and boat traffic. Second, recognizing its obligations to clean up contaminants and wildlife hazards left after years of use, the Navy contracted for a thorough assessment of contaminant levels and wildlife hazards and, in consultation with the Fish and Wildlife Service and the National Marine Fisheries Service, identified priority needs. And third, it established a 30 June 1997 target date for completing clean-up work and transferring ownership of the atoll. As noted in past annual reports, the Commission commented to the Navy on clean-up needs and recommended that ownership be transferred to the Fish and Wildlife Service for use as a national wildlife refuge.

In both regards, the Navy, the Fish and Wildlife Service, and the National Marine Fisheries Service have made outstanding progress. Based on results of the environmental assessment and advice from the two Services, the Navy contracted for work to clean up contaminants and debris and to mitigate hazards for seals and other wildlife. Among other things, the work has involved cleaning up fuel that had leaked from old storage tanks and contaminants that had leached from municipal and solid waste landfills. Also debris has been removed from atoll beaches, and deteriorating structures, including a rusted seawall posing hazards to seals and sea turtles, have been demolished. As of the end of 1996 almost all wildlife hazards had been remediated. Remaining work, including further treatment of soil and water to remove hydrocarbons, is still scheduled to be completed by the end of June 1997.

The Navy made a preliminary decision in 1994 to transfer Midway Atoll to the Fish and Wildlife Service for use as a national wildlife refuge. In response, the Service developed a proposed plan and environmental assessment for refuge logistics, opera-

tional support, and public use. To assure maintenance of important facilities at Midway Atoll, the Service proposed establishing a long-term contract with a private company to maintain and operate the airfield and harbor infrastructure. The contractor also would be responsible for some aspects of a program to provide the public with a first-hand opportunity to view refuge wildlife and learn about the atoll's natural and historic resources. Proceeds from the public use program would enable the company to recover costs associated with facility maintenance without imposing substantial new funding obligations on the Service.

The Service's plan envisioned a human population of up to 250 people on Midway, including about 150 people to maintain facilities and support refuge operation and up to 100 visitors at a time. It also envisions up to 30 flights per week. To protect wildlife and wildlife habitat, the plan proposed visitor orientation briefings, a system of area access restrictions on Sand Island, and controlled access to Eastern Island and sensitive wildlife areas on Sand Island.

The Service's draft environmental assessment on the proposed plan was circulated for agency and public comment in March, and on 11 April 1996 the Commission, in consultation with its Committee of Scientific Advisors, responded. In its letter the Commission noted that the proposed activities seemed reasonable and appropriate, and that the assessment reflected a great deal of thought given to ensuring that human activity would be carried out in a manner compatible with wildlife protection. In this regard, the Commission noted that, while uncontrolled or poorly controlled human use of monk seal haul-out beaches would clearly be incompatible with monk seal protection needs, experience by the Fish and Wildlife Service at Tern Island and the Coast Guard at Kure Atoll demonstrates that human presence at a monk seal breeding site can be managed in ways that will not interfere with recovery and growth of a resident monk seal colony.

Given the possibility of unforeseen impacts or inadequate protection measures, however, the Commission noted that it was important that the Service retain adequate authority to change permitted operations and human uses. It therefore recommended that the Service's agreement with the contracting facility

manager incorporate provisions to assure that the Service has the flexibility and means necessary to modify or withdraw initial projections regarding levels of use, and to institute other limitations that the Service may determine necessary to protect the atoll's wildlife or historic resources.

Further efforts by the Navy and the Fish and Wildlife Service reached a major milestone late in 1996. On 31 October 1996, President Clinton signed an Executive Order transferring jurisdiction and control over the Midway Islands and surrounding reef from the Department of the Navy to the Department of the Interior for purpose of management by the Fish and Wildlife Service as the Midway Atoll National Wildlife Refuge. In part, the order directed the Service to conserve and manage wildlife and wildlife habitat within the refuge, and to provide opportunity for scientific research, public education, and compatible wildlife-dependent recreation.

Subsequently, the Service signed an agreement with a private contractor to maintain the atoll's infrastructure and assist in carrying out a public use program for the refuge. In recognition of the Navy's outstanding efforts to secure protection of wildlife and historic resources and to expedite the transfer of Midway to the Fish and Wildlife Service, the Navy was given a special award by the Service.

As of the end of 1996 portions of the Midway Islands had been opened for managed public access for the first time since World War II. Ensuring that provisions for managing public use provide adequate protection for wildlife in such confined areas as occur on Midway Atoll's small islands will present a challenging task for refuge administrators. In 1997 special attention will be needed to ensure that precautionary measures in place to manage public use of the new refuge provide necessary protection for monk seals and other resident wildlife.

**Predator-Prey Interactions and Lobster Fishing** — As noted above, survival of juvenile seals at French Frigate Shoals has declined sharply since the late 1980s due to limited food availability. Lobsters and octopuses are components of the monk seal diet, but their relative importance is uncertain. Compared to bones of reef fishes, lobster shells and octopus

beaks occur rarely in scat samples, but were present in 14 percent (7 of 49) of the spew samples collected and examined between 1991 and 1994. Scat and spew samples have been the principal sources of data on monk seal prey preferences, but the relative proportions of identified prey remains may be biased by different rates of passage through digestive tracks. Because there are few samples from animals of known ages, they also provide a limited basis for evaluating differences in the diet of juveniles and older animals. Recent studies using video cameras attached to adult male seals at French Frigate Shoals indicate that they use a benthic foraging strategy, turning over rocks and coral rubble in search of prey.

Absent better data on prey preferences, it seems possible that young seals inexperienced in catching food could depend more on easily caught prey and that lobster and octopuses, which are less mobile than fish, could be a particularly important component in their diets. In light of this possibility and the alarming decline in juvenile survival at French Frigate Shoals, the Commission, in letters of 30 November 1994 and 1 December 1995, recommended that the National Marine Fisheries Service suspend lobster fishing at French Frigate Shoals until there is sufficient information to indicate that lobster fishing is not contributing to the decline or compromising potential recovery of that monk seal colony. In its 1995 letter, the Commission also noted that a promising new technique had been developed to identify prey species and their relative composition in the diet. The technique involves analyzing fatty acid signatures of consumed prey from seal blubber, and the Commission noted that it could be a useful means of resolving uncertainties about the importance of lobster in monk seal diets.

Commercial lobster fishing in the Northwestern Hawaiian Islands began in 1977. Catch levels soon exceeded sustainable levels, and lobster stocks declined. Between 1983 and 1991 catch per unit of effort in the Northwestern Hawaiian Islands declined from 2.75 to 0.56 lobsters per trap haul. The cause of the decline may have been due to combined effects of overfishing and natural factors associated with climate cycles; however, with further declines in lobster stocks in 1992, the stocks reached levels defined as overfished. The National Marine Fisheries

Service, at the recommendation of the Western Pacific Regional Fishery Management Council, therefore closed the Northwestern Hawaiian Islands lobster fishery in 1993.

In November 1995 the Council developed a proposed amendment to the fisheries management plan for lobsters in the western Pacific and, by letter of 27 February 1996, the Service asked the Commission for comments on the proposal. The amendment proposed new management measures under which the lobster fishery could be reopened. In part, it proposed (a) replacing annual catch quotas with an annual harvest guideline specifying a numerical harvest objective, and (b) allowing, but not requiring, fishermen to retain all lobsters caught regardless of reproductive condition or size so that all lobsters caught would be counted against new harvest limits. Accompanying the Council's proposed amendment was a biological assessment required for consultations with the Service under section 7 of the Endangered Species Act. The assessment concluded that the proposed action was not expected to affect the status of Hawaiian monk seals. The proposal did not include a provision to close waters around French Frigate Shoals.

The Commission returned comments to the Service on the proposed action by letter of 1 April 1996. The Commission disagreed with conclusions in the proposed amendment and biological assessment, which indicated that the best available information provides reasonable assurance that monk seals at French Frigate Shoals would not be adversely affected by the proposed action. Rather, the Commission opined that the best available data suggest that monk seals at French Frigate Shoals could already have been adversely affected by fishery-caused reductions in the abundance of lobster and other prey species, such as octopuses, taken as bycatch in lobster traps.

The Commission therefore reiterated its previous recommendation that lobster fishing at French Frigate Shoals be prohibited until critical uncertainties about the importance of lobsters and octopuses as monk seal prey are resolved. It also recommended that no action be taken to adopt the amendment until consultations under section 7 of the Endangered Species Act had been completed, and that, to discourage high-grading (*i.e.*, discarding small lobsters and keeping larger

ones to increase the value of the catch), the provision allowing retention of all caught lobsters be made a requirement.

In a separate letter to the director of the Service on 1 April, the Commission noted that its past recommendation on closing French Frigate Shoals for lobster fishing had not been accepted and asked that it be advised as to the economic impact of such a measure on the fishery and why the Service had concluded that such a closure was not a reasonable precautionary measure to protect the French Frigate Shoals monk seal colony.

The Service replied to the letters on 30 April 1996, noting that the Commission's comments were being considered and that consultations pursuant to the Endangered Species Act had been initiated.

The Service's biological opinion on the proposed amendment was issued on 24 May 1996. It concluded that the proposed action was not likely to jeopardize the continued existence of Hawaiian monk seals or adversely affect its designated critical habitat. As a non-binding conservation recommendation, it also recommended that the Council consider expanding an existing 10-fathom closure around French Frigate Shoals. The 10-fathom closure, which was established early in the 1980s and also applies to all banks in the Northwestern Hawaiian Islands, limits but does not prohibit fishing at any atoll.

After the opinion was issued, the Service, at the recommendation of the Council, reopened the Northwestern Hawaiian Islands lobster fishery effective 1 July 1996 with no expanded closure around French Frigate Shoals. In doing so, it established a harvest guideline of 150,000 lobsters. On 1 August 1996 the Service announced in the *Federal Register* that it had closed the lobster fishery effective 30 July because the harvest guideline limit had been taken as of 21 July. The average daily catch as of 21 July was more than 7,800 lobsters, most of which were taken around Necker Island. During the brief 1996 fishing season, apparently no vessels chose to fish at French Frigate Shoals.

The Commission did not receive the information requested in its 1 April letter to the director of the

Service, and therefore wrote again on 20 December 1996. The Commission again asked why the Service had concluded that closing French Frigate Shoals to lobster fishing was not a reasonable and prudent measure to protect the declining monk seal colony. It also asked to be advised of (1) the criteria the Service will use to decide whether the lobster fishery is causing or contributing to the decline of monk seals at French Frigate Shoals, (2) what information it needs to resolve uncertainties about the importance of lobster in the diet of juvenile seals and the effect of lobster fishing on monk seal prey availability, (3) what studies have been done to resolve those uncertainties and their results, and (4) what additional steps it will take to resolve remaining uncertainties.

As of the end of 1996 the Service was considering whether to undertake the studies suggested by the Commission for analyzing prey species using fatty acid signatures from samples of seal blubber.

**Tern Island** — As noted above, Tern Island at French Frigate Shoals is a permanently occupied field station for the Hawaiian Islands National Wildlife Refuge. The island's airstrip enables rapid airlifts of underweight juvenile seals for rehabilitation. The continued existence of the runway and field station, however, are in grave doubt because the sheet-metal bulkhead that surrounds most of the island, built by the Navy in World War II, is badly deteriorated. In 1993 the Fish and Wildlife Service contracted the Army Corps of Engineers to develop construction plans for a rock revetment to replace the decaying bulkhead. The designs were completed in 1995; however, the Fish and Wildlife Service has been unable to obtain funding to begin construction.

If the bulkhead failed, the airstrip would be lost, the field station would have to be abandoned, and support for vital research and management projects, including the rescue of underweight seals, would be compromised. Moreover, the formation of erosion pockets behind the seawall and exposure of debris and toxic chemicals buried in the island when it was built would create serious entrapment hazards for sea turtles and seals that itself would require expensive demolition and clean-up work.

In 1996 funding for construction of a new seawall was again unavailable, and the Service was not able to make any progress in resolving the dilemma and identifying an acceptable course of action.

**Entanglement in Marine Debris** — Entanglement in marine debris is a serious concern for the Hawaiian monk seal recovery program. Seals unable to free themselves from entangling debris are likely to die from injuries, reduced ability to catch food, or reduced ability to avoid sharks. Field crews therefore routinely remove entangling debris from animals and beaches whenever possible. The vast majority of entangled Hawaiian monk seals are newly weaned pups and, for some colonies, entanglement may be a significant factor affecting juvenile survival. Most entanglements involve fragments of net and line from fisheries outside the Northwestern Hawaiian Islands.

In 1996 field crews encountered more entangled seals than in any previous year. Whether this reflects an increase in the entanglement rate or increased monitoring effort is unclear; however, considering unobserved entanglements that result in the death of animals at sea and occur at times of the year when there is no monitoring, entanglement impacts could be significant at some locations. No entanglement-related deaths were observed in 1996, but Service field teams reported 19 incidents of entanglement. Four of the cases involved two pups that became entangled on two separate occasions. Occasionally entangled seals were able to free themselves, but in most cases debris was removed by field crews and the seals were released uninjured. The site of the greatest number of entanglements (seven) was Lisianski Island, where accumulations of entangling debris appears to be greatest. At that site, 5 of 24 (21 percent) pups born on the island were seen entangled. As noted above, at least three other entangled seals were found and released by other personnel in the Northwestern Hawaiian Islands during 1996.

While almost all entangled animals are observed alive on beaches, it is possible that other animals die undetected caught in debris snagged underwater on surrounding reefs. To assess the amounts of hazardous debris that could entangle and kill seals away from shore, underwater surveys were conducted in 1996 in four different parts of the lagoon at French

Frigate Shoals. A combined total of 0.5 km<sup>2</sup> was searched in the four sampling sites and 31 fragments of net or line were found, including 15 pieces of net measuring at least 5 m<sup>2</sup> in size. No nets were found in one of the four areas; however, extrapolations of debris densities for the other three areas sampled suggest the presence of 7, 92, and 340 pieces of debris per km<sup>2</sup>, respectively. Whenever possible, encountered debris was removed.

Virtually all observed debris drifts into the Northwestern Hawaiian Islands from unknown sources in or around the western North Pacific Ocean. Other than removing hazardous debris and freeing entangled seals as they are found, there is little direct action that can be taken as part of the Hawaiian monk seal recovery program. The findings, however, illustrate the importance of greater international vigilance with regard to reducing sources of marine debris, particularly by participants in fisheries (see Chapter VII).

## **Steller Sea Lion** *(Eumetopias jubatus)*

Steller or northern sea lions inhabit coastal areas along the rim of the North Pacific Ocean from the Channel Islands in southern California through the Gulf of Alaska and Aleutian Islands to northern Hokkaido, Japan. In the United States, Steller sea lions are most abundant in the Aleutian Islands and the Gulf of Alaska. About three-fourths of all Steller sea lions haul out along U.S. shorelines.

Over the past 30 years Steller sea lion numbers have declined substantially throughout most of the species' range (see Table 3). Surveys at major rookeries and haul-out sites in the western Gulf of Alaska and eastern Aleutian Islands in the United States, and the Kuril Islands in Russia, indicate declines in some areas of up to 90 percent. The declines have occurred principally since the mid-1980s. Between 1985 and 1989, for example, the number of sea lions counted in the eastern Aleutian Islands declined by more than 70 percent. As noted below, recent surveys indicate that the declines continue in some areas.

**Table 3. Steller sea lion population estimates, 1960s to 1994 († = estimates excluding pups; ‡ = estimates including pups)**

<u>Area</u>	<u>1960s</u>	<u>1970s</u>	<u>1985</u>	<u>1989</u>	<u>1994</u>	<u>% Difference 1960s to 1994</u>
<u>Western Stock</u>						
Russia†	41,000- 52,300	--	--	10,000	--	--
Aleutian Islands‡	127,300	115,700	78,400	24,400	19,000	-85%
Bering Sea‡	11,600	5,200	3,800	1,200	2,200	-81%
Gulf of Alaska‡	88,700	70,700	48,900	40,600	22,000	-75%
Total Western Stock‡ (U.S. areas only)	227,600	191,600	131,100	66,200	43,200	-81%
<u>Eastern Stock</u>						
Southeast Alaska‡	9,000	10,300	10,300	15,800	14,600	+62%
British Columbia†	11,500	6,100	6,100	6,100	8,100	-30%
Oregon & California‡	10,300	6,400	6,700	6,800	9,300	-10%
Total Eastern Stock‡ (U.S. area only)	19,300	16,700	17,000	22,600	23,900	+24%

## Sources:

Loughlin, T.R., A.S. Perlov, and V.A. Vladimirov. 1992. Range-wide estimation of total abundance of Steller sea lions in 1989. *Marine Mammal Science* 8:220-239.

Small, R.J., and D.P. DeMaster. 1995. Alaska marine mammal stock assessments 1995. NOAA Tech. Memo. NMFS-AFSC-57. National Marine Fisheries Service. 93p.

P. Olesiuk, pers. comm. as cited in National Marine Fisheries Service. 1995. Proposed change in listing status of Steller sea lions under the Endangered Species Act. *Federal Register* 60(192):51968-51978.

The cause or causes of the declines are uncertain and may be due to a combination of factors. Among the possible contributing causes are reduced prey availability due to commercial fishing or climate change, incidental taking by foreign and joint-venture trawl fisheries between the late 1960s and late 1980s, human disturbance at haul-out sites, deliberate shooting by fishermen, a commercial sea lion harvest in parts of Alaska from the 1950s to the early 1970s, hunting in British Columbia from the early 1900s to the early 1960s to reduce predation on commercial fish stocks, and continuing subsistence hunting by Natives in Alaska and Russia.

In 1990 the National Marine Fisheries Service listed the Steller sea lion as threatened under the Endangered Species Act. Under provisions of the Act the Service also established a recovery team in 1990, and in 1992 it adopted a recovery plan based on a draft plan prepared by the recovery team.

As part of its Steller sea lion recovery program, the Service increased research efforts to monitor the status of the population and determine possible causes of the decline. In addition, the Service designated major rookeries and adjacent waters as critical habitat; restricted commercial fishing near major rookeries; limited proposed increases in commercial catch quotas for pollock, a major sea lion prey species; and adjust-

ed area fishing quotas to prevent fisheries from concentrating their efforts in sea lion foraging areas. Despite these measures, the overall decline in Steller sea lion numbers has continued.

### Results of the 1996 Census

Steller sea lion aerial censuses are conducted biennially by the National Marine Fisheries Service and the Alaska Department of Fish and Game at trend sites, *i.e.*, pre-selected locations used to monitor sea lion abundance trends. In June 1996 Service and Department biologists conducted surveys, as they did in 1994, at trend sites from southeast Alaska westward through Attu Island in the western Aleutian Islands. Abundance data through 1994 are presented in Table 3. The 1996 survey results were made available in October 1996. These data are discussed below; however, at the end of 1996 they had not yet been summarized by the National Marine Fisheries Service in the geographic categories used in Table 3.

An overall decrease of 7.8 percent was observed in adult and juvenile sea lions at trend sites in Alaska since the 1994 counts. This was similar to the decline (5.5 percent) observed between 1992 and 1994. Although sea lion counts increased 6.6 percent in the eastern Aleutian Islands and one percent for the Aleutian Islands as a whole, the numbers decreased 7.2 and 17.6 percent in southeast Alaska and the Gulf of Alaska, respectively, since 1994. An overall 4.6 percent decrease occurred at trend sites in the Kenai-Kiska area.

The 1996 eastern Aleutian Islands estimates are notable because they reaffirm observations since 1990 that the sea lion population there has stabilized, particularly in the area from Krenitzen Islands to Unimak Island. Decreases in southeast Alaska sea lion numbers may be the result of sampling variability, but suggest that the population there is not increasing at the present time.

The Service and the Department also conducted a partial survey of Steller sea lion pups at nine rookeries from southeast Alaska to the eastern Aleutian Islands during the period 24 June-14 July 1996. Since 1994 pup numbers have decreased by 6.1 percent at the sites surveyed. This is less than the 22.9 percent

decrease observed at the same sites between 1991-1992 and 1994 counts. A decrease of 1.5 percent occurred in southeast Alaska, while the greatest decrease, 37.5 percent, was observed in the eastern Gulf of Alaska. Numbers also decreased at two central Gulf of Alaska sites.

### Proposal to Change Steller Sea Lion Listing Status

As noted above, the Steller sea lion was designated as threatened under the Endangered Species Act in 1990. In view of continuing declines in sea lion numbers, the National Marine Fisheries Service published a *Federal Register* notice in November 1993 announcing its intent to review the listing status of Steller sea lions to determine if the species should be reclassified as endangered.

The Steller Sea Lion Recovery Team reviewed information on the species' status and advised the National Marine Fisheries Service that it had concluded that Steller sea lions should be managed as two separate stocks — an eastern stock from Cape Suckling, Alaska, east and south to California, and a western stock from Cape Suckling west to Russia. The team also concluded that the western stock should be listed as endangered, and the eastern stock should remain listed as threatened. These conclusions were based on recently completed molecular genetics studies and results of the 1994 population survey, which confirmed that there were two relatively distinct stocks and that one, the western stock, was continuing to decline.

Based on the recovery team recommendations, data from the 1994 population survey, and comments regarding the review by the Commission and others, the Service published a proposed rule in the *Federal Register* on 4 October 1995 to change the listing status for Steller sea lions. The notice recognized two stocks separated east and west of Cape Suckling, Alaska, and called for listing the western stock as endangered and the eastern stock as threatened.

Regarding the western stock, the Service noted that from 1990 to 1994 counts of adult and juvenile sea lions at trend monitoring sites had declined by 21 percent and pup numbers had declined by 28 percent.

Using population data from 1985 to 1994 in two population viability models — one based on composite population trends and the other on individual rookery trends — the Service found a 100 percent probability of extinction within 100 years in both cases. Considering only data from 1989 to 1994, the models predicted 100-year extinction probabilities of 65 and 10 percent, respectively.

Unlike the decline of the western stock, the numbers of Steller sea lions in the eastern stock have been relatively stable. Overall counts of juvenile and adult animals at monitoring sites in the eastern stock's range increased by 17 percent between 1990 and 1994 and, given its trend, the Service predicted that the eastern stock would persist for the foreseeable future. It also noted that Steller sea lion numbers in California, the stock's southern limit, had declined 50 percent between 1950 and 1980 and 19 percent between 1990 and 1994, suggesting that the range of the eastern stock may be receding northward. Also, pup counts in central and southeast Alaska, which had been stable or increasing before 1991, declined by 20 percent between 1991 and 1994. Based on this information, the Service concluded that the eastern stock should be considered vulnerable and remain listed as threatened.

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, reviewed the Service's listing proposal and provided comments by letter of 11 January 1996. The Commission found that the notice provided a thorough, well-reasoned analysis of the proposed changes. The Commission commented that the recent genetic studies and phylogenetic analyses cited in the notice provide convincing justification for recognizing two stocks of Steller sea lions. It noted further that the Service's proposal to list the western stock as endangered was justified inasmuch as counts in 1994 indicated that the stock is now less than 20 percent of its size in the 1960s, and results from the population viability analyses indicated that extinction within 100 years was highly probable if the decline did not stop. Also, the Commission agreed with the Service's conclusion to list the eastern stock as threatened because, while the overall size of the stock appears to be stable, numbers have declined at the southern end of its range, and recent declines in pup production have occurred at the northern end of its range in southeast Alaska. Therefore, the Com-

mission recommended that the Service proceed with its proposal to list the western stock of Steller sea lions as endangered and the eastern stock as threatened under the Endangered Species Act.

On a related point, the Commission noted the possibility that commercial fishing is among the factors affecting food availability for sea lions. However, despite considerable research efforts, information remains insufficient to determine which fisheries may have had or be having the greatest effect on sea lion prey resources, or the extent to which fisheries may have affected prey availability. The Commission commented that although it is not clear whether or to what extent current fishing regulations are enhancing the recovery of Steller sea lions, the continuing decline of the western stock suggests that existing regulations have not been adequate to halt the stock's decline. Therefore, the Commission recommended that the Service, in conjunction with the recovery team, convene a panel of independent experts to evaluate and make recommendations on the full range of fishery management practices that may be affecting the recovery of Steller sea lions.

The Commission also noted the Service's reference to a recovery team recommendation for detailed reviews of components of the Steller sea lion research program. Specifically, the team suggested constituting separate review panels of recovery team members and outside experts to examine population monitoring, satellite telemetry studies, physiology/ health studies, and food habits studies. Other topics that could usefully be examined by this approach include regulations restricting human approaches to rookeries and fishing activities. In this regard, the Commission noted that these reviews could be of great use to the Service in allocating resources, evaluating and developing management measures, and updating the recovery plan. Therefore, the Commission recommended that the Service allocate sufficient funding for the recovery team to conduct necessary program reviews and update the recovery plan.

At end of 1996 the Service had not published a final rule on the change in listing status for Steller sea lions. It was the Commission's understanding that the final rule was being reviewed internally by the Service and that final action would be taken in 1997.

## Steller Sea Lion - Fisheries Interactions

The Steller Sea Lion Recovery Team met on 20-21 February 1996 to discuss the progress of the various activities within the recovery program. It concluded that detailed reviews were needed of the survey, monitoring, and research portions of the recovery program to determine if they are as effective as they might be in leading to meaningful management actions. In addition, National Marine Fisheries Service staff provided information to the team on the past and current fishery management practices. The team concluded that certain fisheries, especially groundfish fisheries, may affect the availability of prey species for Steller sea lions.

As a follow-up to the meeting, the recovery team wrote to the National Marine Fisheries Service on 15 May 1996 with regard to the above-mentioned reviews. In its letter, the recovery team noted that there are uncertainties about whether and how fisheries may be affecting the recovery of Steller sea lions. Therefore, the team recommended that the National Marine Fisheries Service convene a group of managers, sea lion scientists, and recovery team members to do a detailed reviewed of current fishery management practices, and that such a review should consider all fisheries and gear types in both Federal and state jurisdictions.

The team also endorsed a proposal by the North Pacific Fisheries Management Council to prohibit the development of fisheries targeting small forage fishes. The team observed that there is good reason to believe that small forage fishes provide good nutritional opportunities and may encourage population recovery. Also, with regard to the availability of pollock to sea lions, the team noted that a study is needed to determine how altering the seasonal distribution of pollock catches might influence the abundance and availability of small pollock to sea lions.

In this context, the Commission wrote to the Service regarding the status of Steller sea lion recovery efforts and the management of fisheries potentially affecting sea lions. In its 6 December 1996 letter, the Commission noted the historic declines in Steller sea lion numbers and cited the 1996 survey data indicating that the declining trend was continuing.

**Table 4. Estimated take of Steller sea lions, 1992-1995**

<u>Year</u>	<u>No. Landed</u>	<u>No. Struck &amp; Lost</u>	<u>Total Take</u>	<u>95% Confidence Limit for Total Take</u>
1992	370	179	549	452-712
1993	348	139	487	390-629
1994	336	80	416	330-554
1995	307	32	339	258-465

Source: Wolfe, R.J., and C. Mishler. 1996. The subsistence harvest of harbor seal and sea lion by Alaska Natives in 1995. Technical Paper 238. Alaska Department of Fish and Game, Juneau, Alaska.

In its letter, the Commission referenced the recovery team's 15 May 1996 recommendation and stated that, to its knowledge, the Service had neither responded to the letter, nor acted on its recommendations. The Commission noted further that it believed that the recommendations provided by the team were sound and, if acted upon, that they could contribute to the recovery of the western stock of Steller sea lions. Therefore, the Commission recommended that the Service undertake the review of the fishery management practices as discussed in the recovery team's letter. In this same regard, the Commission stated that the key to such a review was to include persons with scientific expertise outside the Service, including academia, *e.g.*, marine mammal experts, fish biologists, marine ecologists, population modeling experts, and fishery managers. The Commission also indicated that representatives of Alaska Natives who hunt and may be affected by the continuing decline of the Steller sea lion stock also should be invited to participate in the review.

## Steller Sea Lion Subsistence Harvests

Although Steller sea lions have been harvested by Alaska Natives in some coastal areas for centuries for subsistence purposes, little information is available on historical harvest levels. In 1992 the National Marine Fisheries Service contracted with the Alaska Department of Fish and Game to assess subsistence use of

Steller sea lions and harbor seals. In the years 1992 through 1995, the Department surveyed Native hunters in about 2,000 households in about 60 coastal communities within the geographic range of the Steller sea lion in Alaska. Approximately 43 of the communities surveyed are within the range of the western U.S. stock. The surveys provide information on the size, season, geographic distribution, and age and sex of the harvest.

As indicated in Table 4, the estimated take of Steller sea lions from the western stock was 549, 487, 416, and 339 for the years 1992, 1993, 1994, and 1995, respectively. In 1995, sea lions were taken by 17 of the communities surveyed, and the 1995 take was the lowest reported for the four-year survey period. In that period, the majority of sea lions were taken by Aleut hunters in the Aleutian and Pribilof Islands from the western U.S. stock of sea lions. Similar surveys were again undertaken in 1996; however, the results were not yet available as of the end of 1996.

### Harbor Seals in Alaska (*Phoca vitulina richardsi*)

In the North Pacific, harbor seals occur nearly continuously along the Pacific Rim from San Ignacio Lagoon, Baja California, Mexico, north through southeast Alaska, and west to the Bering Sea, the Aleutian, Commander, and Kuril Islands, and south to Hokkaido, Japan. Harbor seals occur principally within 20 km of shore, and in some cases they move seasonally into freshwater streams and lakes. Harbor seals haul out along the shoreline and on ice, especially when pupping (May-June) and molting (August-October). Their diet is diverse and includes herring, Pacific cod, walleye pollock, squid, shrimp, octopus, salmon, and capelin.

The National Marine Fisheries Service recognizes three harbor seal stocks in Alaska: a southeast Alaska stock occurring in an area from the Alaska/British Columbia border to Cape Suckling, Alaska; a Gulf of Alaska stock ranging from Cape Suckling to Unimak Pass; and a Bering Sea stock whose range includes waters north of Unimak Pass.

Approximately 270,000 harbor seals were estimated to occur in Alaska coastal waters in the early 1970s. However, substantial declines were observed in the 1980s in the central and western Gulf of Alaska from Prince William Sound through the Kodiak Island region, as well as in the southeastern Bering Sea.

In Prince William Sound, harbor seal numbers declined nearly 60 percent from 1984 to 1992. Although the decline began prior to the 1989 oil spill caused by the grounding of the *Exxon Valdez*, the sharpest decrease was in the year of the spill and may have lessened thereafter. A steady decrease in numbers of harbor seals has occurred throughout the Kodiak Archipelago since 1976 although small increases in the area have been observed recently. For example, on southwestern Tugidak Island, previously one the world's largest harbor seal colonies, maximum counts declined 85 percent from 1976 to 1988 and 33 percent between 1988 and 1994. The population around Kodiak Island appears to have been stable or slightly increasing during the years 1993 to 1995. Despite some signs of growth in certain areas, the overall Gulf of Alaska stock remains small compared to its size in the 1970s and 1980s.

The number of harbor seals in the Bering Sea stock is thought to be declining although data to support this conclusion are unavailable. The number of harbor seals counted on Otter Island, one of the Pribilof Islands, declined more than 80 percent between 1974 and 1995, and counts from the north side of the Alaska peninsula are now less than 42 percent of the 1975 counts, which represents a decline of 3.5 percent a year. The number of seals in northern Bristol Bay is also lower now but has remained steady since 1990.

With regard to the southeast Alaska stock, population trend data dating back to 1983 are available from two locations, Sitka and Ketchikan. When counts from 1993 are compared to those made in the early 1980s, mean counts at both locations were lower. However, mean counts in 1995 from both sites were higher than in the early 1980s. When including the 1995 trend site data, the number of harbor seals at the Sitka trend sites appears to be stable, and the number of seals at the Ketchikan trend site appears to have increased at approximately eight percent per year in the period from 1983 to 1995.

The reasons for the decline of harbor seals in the central Gulf of Alaska and southeastern Bering Sea are uncertain and may be due to a combination of factors, including natural population cycles, disease, predation, past commercial harvesting, subsistence take by Natives, and pollution. Changes in important habitat components, caused either naturally or by humans, also may affect harbor seal numbers. Increased commercial fishing catches in the Gulf of Alaska have undoubtedly affected the composition and abundance of fish available to harbor seals. The similarities between harbor seal and Steller sea lion declines in Alaska, and the fact that Steller sea lion declines may be related to nutrition, suggest that the harbor seal decline may also be food-related.

### **Subsistence Harvests by Alaska Natives**

Harbor seals have been and are taken in many areas by Alaska Natives for subsistence purposes. However, information on historic take levels is limited. In 1992 the Alaska Department of Fish and Game, through a contract with the National Marine Fisheries Service, began statewide surveys of Alaska Native subsistence use of harbor seals and Steller sea lions. In the years 1992 to 1995, data were collected through systematic interviews with hunters and users of marine mammals in approximately 2,000 households in about 60 coastal communities within the geographic range of the harbor seal in Alaska. In addition, interviews were conducted in 14 communities in the Bering Sea and Aleutian Islands within the range of the Bering Sea harbor seal stock. Most of the interviews have been conducted by local researchers as part of a local and regional research network. Through the surveys, estimates were obtained on the size, seasons, and geographic distribution of the harbor seal harvest. Also, the age and sex of the seals taken were determined.

The estimated total Native subsistence take of harbor seals in Alaska was 2,854 in 1992, 2,736 in 1993, 2,621 in 1994, and 2,742 in 1995. In each of those years, most of the take occurred in southeast Alaska, where harbor seal numbers have generally been stable or increasing. In 1995, 8.9 percent of the take was struck and lost, the lowest rate reported for any survey year. Results of the 1996 survey are expected to be available in 1997.

### **Co-Management of Harbor Seals in Alaska**

In 1994 the Marine Mammal Protection Act was amended to include provisions for establishing agreements between the National Marine Fisheries Service and Alaska Native organizations for the cooperative management of marine mammals in Alaska. Efforts were initiated in 1995 and 1996 to develop a cooperative approach for managing the Gulf of Alaska harbor seal stock, but a final agreement has not been approved to date.

In response to the 1994 amendments, Native harbor seal hunters in villages along the Gulf of Alaska formed the Alaska Native Harbor Seal Commission to assist in harbor seal co-management efforts. The goals of the Commission include educating and informing the public and scientists on the traditional and contemporary relationship between harbor seals and Alaska Natives; informing scientists about the type and extent of knowledge held by local people about harbor seals; and involving Alaska Natives directly in the research, regulatory, and management processes pertaining to harbor seals.

As discussed in the previous annual report, the Marine Mammal Commission provided support in 1995 for a study to determine what might usefully be done by the Alaska Native Harbor Seal Commission and others to facilitate the co-management process. Among other things, the study reviewed data collected by Native harbor seal hunters to determine how the data might be made available to scientists and managers without compromising proprietary information. The data are presently stored with the Alaska Native Harbor Seal Commission and the Alaska Department of Fish and Game.

The report, which was released late in 1995, recommended, among other things, that (1) regional subsistence harvest reports and any related co-management documents be developed and made available to the co-management team members and others making decisions about harbor seal management; (2) regionally oriented reports based on traditional knowledge, local observations, the results from the biological sampling program, and other relevant scientific knowledge about harbor seals be developed and circulated among the Native and scientific communi-

ties, and that these reports be used to set priorities for particular research needs; and (3) the traditional knowledge database being maintained by the Alaska Department of Fish and Game be continued.

### Ongoing Research and Population Monitoring

As noted earlier, there are uncertainties about the abundance and apparent population declines of harbor seals in certain areas in Alaska. In an attempt to improve population estimates and resolve other uncertainties, a workshop was held in Fairbanks on 14-16 November 1995 to discuss methods for population assessments of harbor seals in Alaska. The workshop was funded by the National Marine Fisheries Service and was attended by Alaska Natives, private researchers, and representatives of the Marine Mammal Commission, National Marine Fisheries Service, Alaska Department of Fish and Game, Oregon Department of Fish and Wildlife, Washington Department of Fish and Wildlife, Canadian Department of Fisheries and Oceans, and various universities. A report distributed in 1996 described the discussions, conclusions, and recommendations of the workshop. The major recommendations were that (1) trend count surveys be continued for at least five years in currently surveyed areas using existing techniques; (2) rangewide surveys be continued; (3) additional statistical analyses and modeling of survey data be done and survey methods modified if appropriate; (4) a central database for harbor seal population research be established at the National Marine Mammal Laboratory; (5) effort be directed to studying the haul-out behavior of seals on glacial ice; and (6) harbor seal population assessment be discussed with Alaska Natives and traditional knowledge be incorporated into co-management agreements.

Also, a number of studies are being done of harbor seal declines, natural history, movements, and abundance. Research projects in Prince William Sound that began after the *Exxon Valdez* oil spill have continued as restoration science studies supported by the Trustee Council. They have included monitoring harbor seal numbers, satellite tagging, investigations of trophic relationships, and detailed physiological studies. The Trustee Council and the National Marine Fisheries Service have also supported a biosampling program that involves the collection and analysis of

samples from seals harvested by Alaska Native subsistence hunters. In the years 1991 through 1996, National Marine Mammal Laboratory biologists conducted replicate abundance surveys throughout Alaska and radio-tracking studies to estimate the fraction of seals likely to be away from a haul-out beach during a survey period to develop a correction factor for calculating total abundance. Beginning in 1993 funding was provided by Congress to the Alaska Department of Fish and Game, through the National Oceanic and Atmospheric Administration, to conduct studies in the southeast Alaska and Kodiak areas. They include studies of harbor seal behavior on land and at sea, physiology, disease, population dynamics, and trophic relationships. Research projects described above have involved collaborators from the National Marine Fisheries Service, the University of Alaska, Texas A&M University, and elsewhere.

In 1996 researchers from the National Marine Fisheries Service and Alaska Department of Fish and Game continued the radio-tagging studies and conducted satellite tagging studies to assess harbor seal movements. In addition, biologists from both groups captured harbor seals and took samples of blood, blubber, whiskers, and skin to assess body condition and indications of disease or stress and to help determine diet and stock structure.

### Northern Fur Seal (*Callorhinus ursinus*)

Northern fur seals occur in coastal waters of the North Pacific Ocean from southern California to Japan and in pelagic waters from about 35 degrees north latitude to the central Bering Sea (Figure 2). Approximately three-fourths of all northern fur seals breed and pup on Alaska's Pribilof Islands. Most other northern fur seals breed in Russia on the Robben Islands, the Kuril Islands, and the Commander Islands. Two small rookeries also occur on San Miguel Island in southern California and Bogoslof Island in the central Aleutian Islands. When not at these islands, northern fur seals generally remain at sea feeding. Northern fur seals exhibit a high degree of site fidelity and usually return to their natal islands.

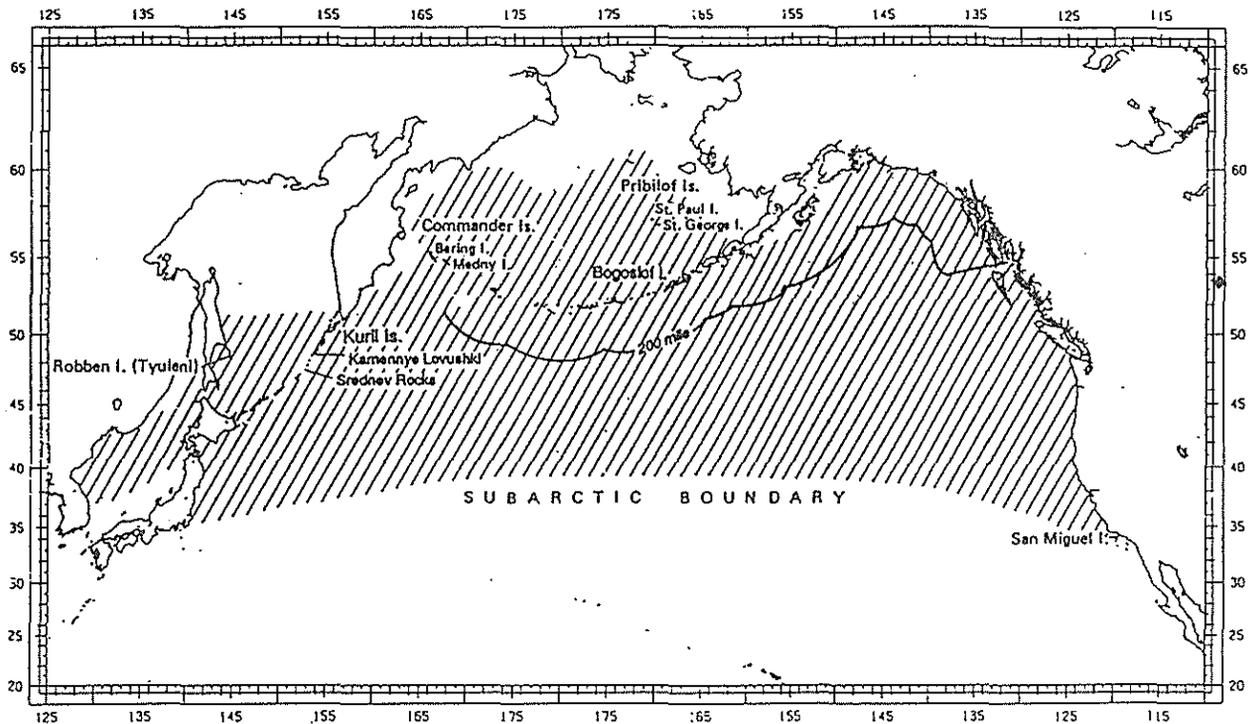


Figure 2. Range and breeding islands of the northern fur seal

Northern fur seals were harvested commercially for their pelts beginning in the late 1700s. By the 1800s excessive pelagic harvests of males and females of all ages threatened the species' economic and biological viability. As a result, the principal harvesting nations — Canada, Japan, Russia, and the United States — signed the Fur Seal Treaty of 1911. The treaty banned pelagic harvests in lieu of arrangements to share pelts from a managed onshore harvest of sub-adult male seals taken on U.S. and Russian rookeries. By limiting the harvest to sub-adult males, fur seal numbers were able to increase substantially over the next 30 years.

With World War II, the treaty and fur seal harvests lapsed, and by the early 1950s the Pribilof Islands fur seal herd had swelled to about two million animals — a number thought to be at or near its pre-exploitation size. Harvests were soon resumed on the Pribilof Islands. At the time, the prevailing wildlife management theory predicted that, after an initial decline in fur seal numbers, pup production and survival would increase as the population attempted to compensate for

animals removed by the harvest. Therefore, beginning in 1956 some female as well as juvenile male fur seals were taken in an effort to increase population productivity. In 1957 the four signatories to the former treaty signed the Interim Convention for the Conservation of North Pacific Fur Seals, under which land-based harvests were again managed and the take of both adult females and juvenile males continued.

Under the harvest strategy, the population began to decline as expected, but instead of rebounding a few years later, it continued to decline. The take of females was therefore stopped in 1968 but the population continued to decline through 1970. The population began to increase early in the 1970s, but from 1976 through the early 1980s it again declined at a rate of about eight percent a year for reasons that could no longer be attributed to the female harvest. By 1983 the population had dropped to about 877,000 animals, less than half its size in the early 1950s.

Throughout this period the interim convention was extended by a series of protocols until 1984 when it

lapsed. At that time management authority for fur seals in the United States reverted to domestic authority under the Fur Seal Act of 1966 and the Marine Mammal Protection Act. Under these acts, commercial harvests were stopped and only a much smaller subsistence harvest by Aleut Natives on the Pribilof Islands continued. Since the early 1980s the Pribilof Islands fur seal herd has remained relatively stable, but because of the magnitude of its decline prior to that time, the population was designated as depleted under the Marine Mammal Protection Act in 1988. Based on a 1994 census (the most recent survey), its current size is estimated at about 1,014,000 animals, or about 1,019,000 animals if Bogoslof Island fur seals are included.

While causes of the population decline in the 1970s remain puzzling, research indicates that it was related to an increase in mortality of juvenile seals during their first few years of life. Among the more plausible factors thought to have been involved are entanglement in marine debris, incidental take in high seas driftnet fisheries in the North Pacific Ocean, long-term environmental change, and reduced prey availability. Effects of disease and parasites are poorly understood but also may have been a factor. Causes not thought to be significant include lingering effects of the commercial harvest of females in the 1960s, the commercial harvest of sub-adult males prior to 1985, emigration, and predation. Failure of the population to recover since the early 1980s is equally puzzling but may be related to the continuing effects of marine debris, environmental change, and reduced prey.

### Subsistence Harvest

Before 1985 Aleut residents of St. George and St. Paul Islands in the Pribilof Islands used a portion of the commercial fur seal harvest for food and other purposes. Since then, these needs have been met by a much smaller subsistence harvest of sub-adult male seals taken between June and August using methods similar to past commercial harvests. The subsistence harvest is managed by the National Marine Fisheries Service pursuant to regulations authorized by the Fur Seal Act and the Marine Mammal Protection Act.

The regulations require that, before the actual harvests begin, the Service estimate the upper and

lower harvest levels likely to meet the annual subsistence needs of Aleut residents on the Pribilof Islands. Whenever the estimated lower level is reached, harvesting is suspended until it can be determined how many additional seals are needed. In 1994 the Service projected that subsistence needs for 1994, 1995, and 1996 could be met by annual harvests of between 281 and 500 fur seals on St. George Island and between 1,645 and 2,000 fur seals on St. Paul Island.

**Table 5. Subsistence harvest levels of northern fur seals in the Pribilof Islands, 1985-1996<sup>1</sup>**

<u>Year</u>	<u>St. Paul</u>	<u>St. George</u>	<u>Total</u>
1985	3,384	329	3,713
1986	1,299	124	1,423
1987	1,710	92	1,802
1988	1,145	113	1,258
1989	1,340	181	1,521
1990	1,077	164	1,241
1991	1,645	281	1,926
1992	1,482	194	1,676
1993	1,518	319	1,837
1994	1,616	161	1,777
1995	1,265	260	1,525
1996	1,590	232	1,822

<sup>1</sup> Data provided by the National Marine Fisheries Service, Alaska Region.

In 1996 the total subsistence harvest was 1,822 fur seals, including 232 animals on St. George and 1,590 animals on St. Paul. As shown in Table 5, the 1996 harvest was higher than the past two years but still below the range projected by the Service in 1994. Catch limits are authorized for three-year periods, and the most recent period expired in 1996. New harvest ranges for 1997-1999 will have to be developed.

### Northern Fur Seal Research Activities in 1996

In response to recommendations by the Marine Mammal Commission and a requirement added to the Marine Mammal Protection Act in 1988, the National Marine Fisheries Service developed and in 1993 adopted a conservation plan for northern fur seals. The plan's primary purpose is to identify and guide

research and management actions needed to restore the depleted Pribilof Islands fur seal population.

To provide an informed basis for making management decisions, the fur seal conservation plan includes research provisions for monitoring the status and trends of fur seal populations, and clarifying the causes of the recent population decline and lack of recovery of the Pribilof Islands population. In the first two years following adoption of the plan, funding provided by the Service was sufficient to carry out little more than population monitoring. This work has been supplemented by cooperative studies with Native organizations, universities in the United States, and research institutes in nations party to the former Fur Seal Convention — particularly Japan and Russia.

In 1995, however, the Service provided \$291,000 for fur seal research, significantly increasing the species' research budget. Service scientists continued to apply this funding toward basic population monitoring work and cooperative studies in 1996. Also in 1996 the Service conducted counts of adult males at rookeries on the Pribilof Islands, collected and analyzed scat samples to monitor prey utilization, took measurements of pups to assess their condition, and evaluated the accuracy of the methodology used to estimate population size.

As noted above, the decline in fur seal numbers has been linked to a decrease in juvenile survival. To help assess factors affecting juvenile survival rates, the Service is continuing studies begun in 1995 to investigate the proportion of time pups spend at sea and on land prior to their weaning and departure from the rookeries to begin their one- to three-year period of life at sea. During the 1996 field season, the Service developed lightweight satellite tags and deployed them on seal pups to determine their migration routes and at-sea habitat-use patterns. In addition, the Service collected dive data on pre-migration pups using time-depth recorders.

Among the cooperative research projects continued from 1995 were genetic studies to assess movement of animals between rookeries in different parts of the species' range; an assessment of the effect of pollutants on the immune response system of fur seal pups; monitoring marine debris entanglement rates among

juvenile male fur seals returning to the rookeries after their first few years at sea; a study of paternity as it relates to territorial male behavior; monitoring population trends and mortality at rookeries on the Pribilof Islands for possible impacts associated with discharges from seafood processing plants; and investigating differences in female foraging patterns and rates of milk transfer to pups during the lactation period. This last study was expanded in 1996 to include direct measures of metabolic rates of pups and assessment of the development of thermoregulatory and oxygen storage capacity in pups. A cooperative study, which was begun in 1996, will analyze territorial male recognition, behavior, and reproductive success.

### **Pacific Walrus** *(Odobenus rosmarus divergens)*

The Pacific walrus is a subspecies of walrus that occurs only over the continental shelf from the southern Bering Sea to the northern Chukchi Sea between Alaska and Russia. Most Pacific walruses migrate seasonally with the advance and retreat of the pack ice (Figure 3). They feed on clams, snails, worms, and other benthic invertebrates by rooting through soft sandy and muddy bottoms. Numbering more than 200,000 animals, about 80 to 90 percent of all walruses worldwide, the Pacific walruses comprise one of the perhaps seven or eight separate stocks of walrus that occur in Arctic waters.

Pacific walruses have been a vital subsistence and cultural resource used for food, fuel, tools, and other purposes for as long as native peoples have inhabited the arctic coasts between North America and Asia. Prior to the 1860s there is no evidence that human use adversely affected the Pacific walrus population. Since then, Pacific walruses have experienced at least three cycles of depletion and recovery due to episodes of excessive commercial hunting. The first was by Yankee whalers in the 1870s, the second was by U.S., Canadian, and Norwegian traders early in the 1900s, and the third was by Russian hunters in the decades before and after World War II. The depletion in the 1870s was particularly severe and caused widespread starvation and death among Native villages around the Bering Sea.

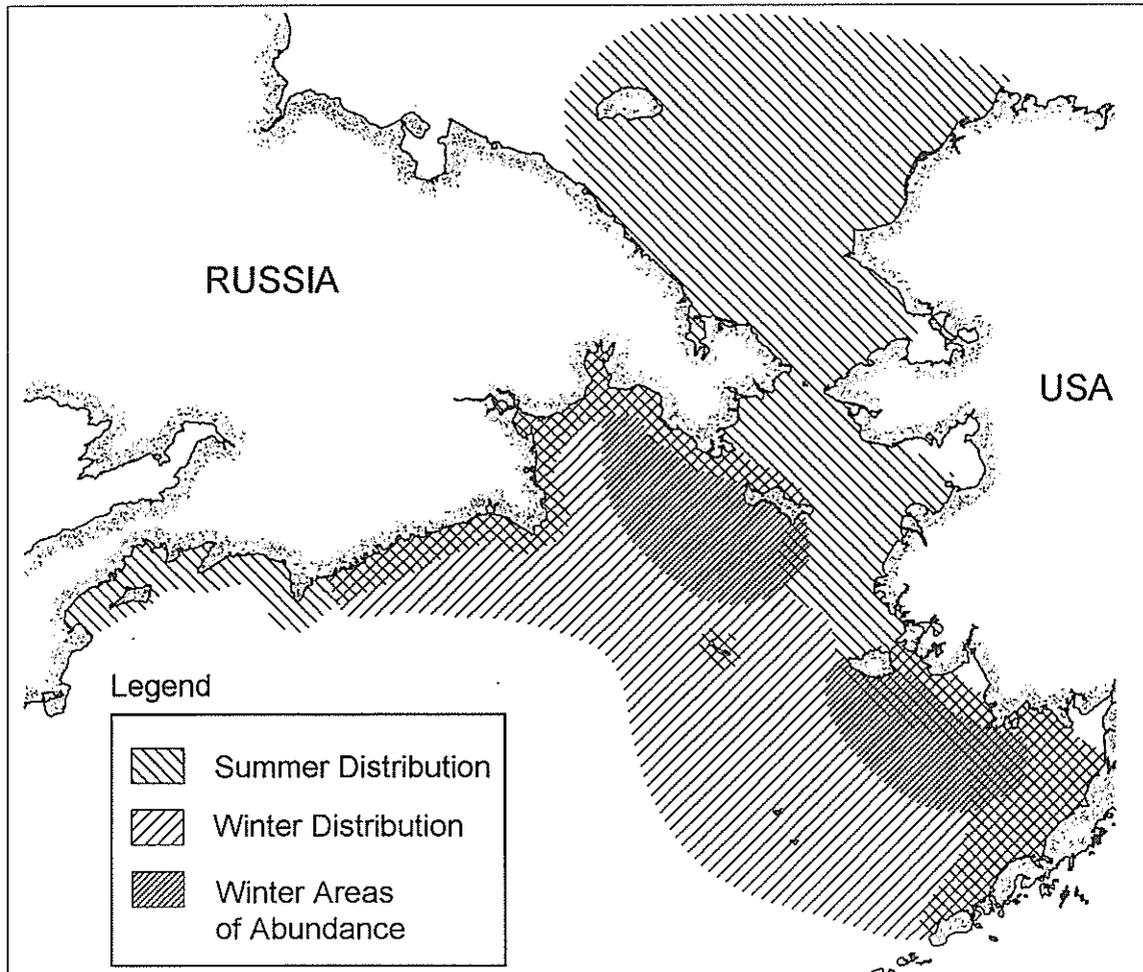


Figure 3. Range of the Pacific walrus

The most recent recovery occurred in the 1960s and 1970s under management measures adopted independently by the State of Alaska and the Soviet Union. Following passage of the Marine Mammal Protection Act in 1972, lead responsibility for walrus research and management shifted from the State of Alaska to the U.S. Fish and Wildlife Service. In 1988 the Act was amended to include provisions for preparing marine mammal conservation plans. With passage of the amendments, and recognizing the importance of walrus for native subsistence and handicraft purposes, the Marine Mammal Commission recommended that the Fish and Wildlife Service develop a conservation plan for Pacific walrus. The Service agreed and, as discussed in past annual

reports, the Commission, in cooperation with the Native community, the State of Alaska, and others, assisted the Service in developing a Pacific Walrus Conservation plan adopted by the Service in 1994.

The plan identifies a framework of measures that the Service will take in cooperation with the Native community and others to manage the Pacific walrus stock. Among other things, it identifies actions for monitoring the status and trends of the walrus population; protecting important walrus habitats from adverse human impacts such as disturbance, noise, chemical contaminants, and depletion of food resources; ensuring proper management of walrus harvests by Native hunters; monitoring contaminant levels in

walruses that could pose human health hazards to coastal residents who use walruses for food; and maintaining effective lines of communication and cooperation with Native villages, Federal and state agencies, foreign governments, and others whose actions may bear on the conservation of Pacific walruses and their availability for Native subsistence and handicraft needs.

As indicated above, the Pacific walrus population inhabits both U.S. and Russian waters. In light of progress in developing the U.S. Pacific walrus conservation program and recent changes in the government of Russia, the Fish and Wildlife Service and the Alaska Native community began steps in 1994 to establish cooperative agreements for the conservation of Pacific walruses (and also polar bears) with their respective counterparts in Russia. In 1994 representatives from both countries signed an protocol agreeing to develop bilateral government-to-government and Native-to-Native agreements on cooperative walrus research and management measures. The status of efforts to prepare these agreements is discussed in Chapter V. The following describes results and progress with regard to the domestic walrus conservation program in 1996.

### **Pacific Walrus Harvest Monitoring Program**

Because of the particular importance of marine mammals to Native people in Alaska, the Marine Mammal Protection Act includes an exemption from its general moratorium on the taking of marine mammals to preserve the rights of Native residents along Alaska's coast to harvest marine mammals for subsistence and handicraft purposes. Constraints on the exemption are limited to cases where a population is depleted or taking is done in a wasteful manner.

Although Native residents in at least 20 coastal villages in Alaska have taken walruses in recent years, the majority of the animals are taken by Native hunters from three coastal villages on islands in the northern Bering Sea: Gambell and Savoonga on St. Lawrence Island, and Diomede on Little Diomede Island. In some years 80 percent of the annual harvest is taken by these three villages.

Except in 1990 and 1991, when funding was inadequate, efforts to monitor the harvest have been undertaken jointly by the Fish and Wildlife Service and the Eskimo Walrus Commission, a Native organization composed of village walrus hunters from around the State to coordinate their mutual interest in maintaining a healthy walrus stock. Under the program, harvest monitors are placed in the principal walrus hunting villages to record data on catch levels and harvested animals. Data from the program has been used to extrapolate annual estimates of total catch. The program also offers important opportunities for Service staff to work with Native hunters and to collect biological samples for studies of walrus health and population status.

As shown in Table 6, estimates of walrus catch levels in Alaska have ranged from about 1,300 to 2,000 animals in recent years. The 1996 estimated catch of 1,994 remained within that range. The catch estimates do not reflect harvest-related mortality from animals that are shot but sink before being retrieved or escape mortally wounded. Recent data to assess mortality and injury rates for animals shot but not retrieved have not been collected. Data from before 1972 suggest that about 40 percent of the animals shot by hunters were not recovered in the 1950s and 1960s, but not all animals that are shot die as a result.

A separate source of walrus catch data is from a marking, tagging, and reporting program initiated by the Service in 1988 to help control illegal trade in marine mammal parts, such as walrus ivory, and to improve harvest monitoring. Under the program, tags are affixed by an authorized agent to all walrus tusks taken in the harvest. For the years 1990 to 1995, tusks were tagged from 1,467, 2,164, 1,683, 1,179, 1,320, and 1,085 animals. As of the end of 1996, tagging data for the 1996 harvest was not yet complete although it appeared that the total would be comparable to levels recorded in recent years. Because walruses without tusks, such as calves, are sometimes taken, not all harvested walruses are reflected in annual tag totals.

In the past, estimates of walrus harvests in Russia have been developed by Russian officials; however, due to funding problems, those programs have been

suspended. As a result, recent estimates of walrus catch levels in Russia are unavailable.

In 1995 the Service developed a stock assessment for the Pacific walrus population that determined the potential biological removal level (excluding natural mortality) for assuring that the Pacific walrus stock would not be reduced below its optimum sustainable population level was 7,533 animals. Available data on catch levels in Alaska and Russia, plus animals struck but lost, suggest that current harvest levels are well below levels that could cause the stock to decline below its optimum sustainable population level.

As noted in the previous annual report, Native hunters from several villages along northern Bristol Bay resumed a small subsistence hunt at Round Island in 1995. Hunting at that site, which is one of four major terrestrial haul-out areas for walrus in the United States, was prohibited in 1960 when the State of Alaska designated the Walrus Islands, including Round Island, as a state game sanctuary. In recent years, peak summer counts of walrus at Round Island have ranged from about 4,000 to nearly 8,000 animals. In 1996 the high summer count was 6,331 walrus. Under terms of a joint agreement signed in 1995 by the Alaska Department of Fish and Game, the Fish and Wildlife Service, the Eskimo Walrus Commission, and the Qayassic Walrus Commission (a Native group of walrus hunters from villages near Round Island), a controlled fall harvest of up to 10 animals was authorized at Round Island for that year.

In 1995 ten walrus were taken in the hunt. Based on monitoring of walrus haul-out patterns before, during, and after the hunting periods, there was no evidence of abandonment of the haul-out site except while hunters were on the beach. A report of the monitoring results was reviewed by parties to the agreement in 1996, and a harvest of up to 10 walrus at Round Island again was approved for 1996. Poor weather and an early freeze during the harvest period (October) limited hunting effort and only six walrus were taken. Walrus haul-out patterns again were monitored during the hunt, and a report of the results will be reviewed in 1997 to determine appropriate measures under which next year's hunt might occur. Preliminary results again indicate only short-term effects on walrus haul-out patterns.

**Table 6. Estimated catch of Pacific walrus in Alaska and total reported catch of walrus in Russia, 1980-1996 (Catch figures do not include animals struck and not retrieved)<sup>1</sup>**

<u>Year</u>	<u>Alaska Catch</u>	<u>Soviet Catch</u>	<u>Total Catch</u>
1980	2,625	2,653	5,278
1981	3,518	2,574	6,092
1982	2,557	3,569	6,124
1983	2,261	3,946	6,207
1984	4,929	4,424	9,353
1985	3,903	4,708	8,611
1986	3,207	3,884	7,091
1987	2,734	4,673	7,407
1988	2,567	3,989	6,556
1989	1,008	3,678	4,686
1990	--	3,269	--
1991	--	2,514	--
1992	1,485	1,750	3,235
1993	1,352	856	2,208
1994	1,681	1,103	2,784
1995	1,979	--	--
1996	1,994	--	--

<sup>1</sup> Estimates are extrapolated from recorded catches at selected villages.

Sources: Fay, F.H., and C.E. Bowlby. 1994. The harvest of Pacific walrus, 1931-1989. Technical Report MMM 94-2. Fish and Wildlife Service, Anchorage, Alaska. 44 pp. Data since 1990 from Fish and Wildlife Service.

## Walrus Research and Monitoring Studies

Between 1975 and 1990 Service and Russian scientists conducted a series of cooperative range-wide fall surveys every five years to count walrus hauled out on the edge of the pack ice and at terrestrial habitats. The surveys have provided the best available estimates of the total size of the Pacific walrus stock; however, because of uncertainties in the percentage of animals underwater and not visible at the time of the survey, and because of high variability in the distribution of walrus aggregations, the reliability of the estimates and their usefulness for detecting population trends over time is considered very limited. Given

these limitations and the expense, range-wide counts have not been repeated since 1990.

To resolve questions about the proportion of time walrus spend hauled out on sea ice as well as to answer other questions about their movements and habitat use patterns, the U.S. Geological Survey has been testing methods to tag and track walrus using satellite telemetry. In 1996 Survey scientists developed a drugging protocol for anesthetizing walrus in order to attach tags and perform other studies, and global positioning system tags were attached to five adult males. The tagging work was done in August at Cape Peirce, one of four principal terrestrial walrus haul-out sites in Bristol Bay. Three tags were still functioning at the end of 1996. During the summer, movements were documented to each of the region's other three major haul-out sites (Cape Newenham, Round Island, and Cape Seniavin), and in fall the animals began migrating northwest to St. Lawrence Island in the northern Bering Sea.

In 1997 the Survey plans to expand its tagging efforts and attach satellite-linked tags to six animals at each of Bristol Bay's four major terrestrial haul-out sites to determine the extent to which animals move between the various sites and spend time on the beach. Also in 1997 Survey scientists plan to investigate the use of ultrasound technology to measure the thickness of walrus blubber layers. As an indicator of feeding success, trends in the thickness of blubber layers could provide evidence of food availability that could indicate trends in population size. In conjunction with efforts to assess potential disturbance of walrus on sea ice for the Minerals Management Service, work also has been done to develop a geographic information system combining all available Russian and U.S. data on walrus in the Bering and Chukchi Seas. Development of the system also is expected to continue in 1997.

### Co-management with Alaska Native Hunters

As indicated above, Pacific walrus and certain other marine mammals are important resources to Alaska Native peoples for subsistence and handicraft purposes. Recognizing this importance and the conservation interest of Alaska Natives in marine mammal resources, the 1994 amendments to the

Marine Mammal Protection Act include funding provisions for Native organizations to collect and analyze marine mammal population data, establish cooperative agreements with Native groups on monitoring harvests, participate in ongoing research programs, and develop marine mammal co-management agreements with Federal and state agencies.

During 1996 the Fish and Wildlife Service and the Eskimo Walrus Commission took steps to prepare a cooperative agreement and to transfer funds to the Walrus Commission to develop a co-management structure setting forth shared responsibilities for carrying out the walrus conservation program. Although the agreement was not completed in 1996, it is expected to be signed early in 1997. In addition, in October 1996 the Service and the Walrus Commission signed a memorandum of understanding on steps they would take regarding law enforcement actions, the release of statements to the media, and dissemination of information to Native hunters on matters concerning provisions that prohibit wasteful taking of walrus under the Marine Mammal Protection Act.

### Sea Otter (*Enhydra lutris*)

The sea otter is believed to be the smallest marine mammal in the world. It is the only member of the genus *Enhydra*, which comprises three identified subspecies: *E. lutris lutris*, *E.l. nereis*, and *E.l. kenyoni*.

Sea otters were found historically in nearshore waters of the North Pacific Ocean, from Hokkaido in northernmost Japan through the Kuril Islands, Kamchatka Peninsula, the Commander Islands, the Aleutians, peninsular and south coastal Alaska, and southward down the west coast of North America to Baja California. The worldwide population of sea otters is estimated at 150,000 to 300,000 animals prior to commercial exploitation.

The Russian discovery of Alaska in 1741 led to intense commercial exploitation of sea otters that continued without regulation for 150 years. By the early 1900s the total sea otter population was reduced

to as few as 1,000 to 2,000 animals existing in 13 small and widely scattered remnant groups.

Commercial exploitation was ended by the North Pacific Fur Seal Convention of 1911, an agreement among the United States, Russia, Great Britain, and Japan. With this protection, sea otters have recolonized or have been reintroduced into a substantial part of their historic range in Russia, the Aleutian Islands, south coastal Alaska, British Columbia, Washington, and California.

In the past 20 years, however, new threats have developed. They include possible oil spills from tanker accidents and well blow-outs, entanglement in fishing gear, and marine pollution.

Efforts by the Marine Mammal Commission and others to ensure the continued protection of sea otters and their habitat have been discussed in previous annual reports. A summary of these actions and a description of efforts undertaken in 1996 follows.

### **The Central California Population**

The sea otter population in California was nearly eradicated by commercial hunting. By the time protection was afforded in 1911, the total population in California may have numbered fewer than 50 animals found within a few miles of nearshore habitat along the rocky Point Sur coast. Under the Fur Seal Convention and additional protective measures later implemented by the State of California, the population increased slowly. By the mid-1970s, approximately 1,800 sea otters inhabited nearshore areas along 160 miles of the central California coast. More recent population counts are shown in Table 7.

Because of its small size and limited distribution, and the growing risk of oil spills as a result of increasing tanker traffic in the area, the population was designated as threatened under the Endangered Species Act in January 1977. At that time, it was recognized that perhaps the best way to minimize the threat from oil spills would be to encourage expansion of the population's range. However, such range expansion could impact commercial and recreational abalone and other shellfish fisheries that had developed in the absence of sea otters. In response to this realization,

the Fish and Wildlife Service, acting on a December 1980 recommendation by the Marine Mammal Commission, adopted and implemented a management strategy recognizing the need for "zonal" management of sea otters and the need to 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 range. The zonal management concept was incorporated into the Service's Southern Sea Otter Recovery Plan adopted in February 1982. Subsequently, the Fish and Wildlife Service, in consultation with the Marine Mammal Commission, the California Coastal Commission, and the California Department of Fish and Game, undertook a translocation program to establish a reserve sea otter colony at San Nicolas Island in the California Channel Islands. The program is described in detail in previous Commission reports.

### **Update of the Southern Sea Otter Recovery Plan**

— In 1989 the Fish and Wildlife Service reconstituted the Southern Sea Otter Recovery Team to review and recommend changes necessary to update the Southern Sea Otter Recovery Plan. This action was precipitated, in part, by the 1989 *Exxon Valdez* oil spill and the subsequent realization that the entire California sea otter population could be jeopardized by a similar large oil spill.

Based on the recovery team's recommendations, the Fish and Wildlife Service drafted a plan update and in August 1991 provided it to the Commission and others for review and comment. The Commission, in consultation with its Committee of Scientific Advisors, reviewed the draft and provided comments to the Service on 8 November 1991. As discussed in previous annual reports, the Commission thought that the draft failed to adequately address several important issues and recommended that a second draft be done and be provided to the Commission and others for review and comment.

A recommended revision of the recovery plan update was done by the recovery team and forwarded to the Service's regional director in January 1994. The Service revised the update, taking into account the recovery team's recommendations, and on 3 July 1996 provided a second draft of the recovery plan revision to the Commission and others for review and comment. The Commission, in consultation with its

Committee of Scientific Advisors, reviewed the draft plan and forwarded comments to the Service on 24 September 1996.

In its transmittal letter, the Commission noted that the draft revision provided a good overview of the factors that led to listing the southern sea otter as threatened under the Endangered Species Act. Likewise, the revision provided a good overview of the current status and factors that could jeopardize recovery of the population. The Commission pointed out that the document differed in several significant ways from the original Southern Sea Otter Recovery Plan adopted in 1982. For example, it proposed criteria for removing the southern sea otter population from the List of Endangered and Threatened Wildlife, for listing the population as "endangered," and for continuing the present "threatened" listing, something that had not been done in the original plan. Further, it proposed to discontinue the "zonal" management approach embodied both in the original recovery plan and in Public Law 99-625, which provided the statutory authority for establishing the sea otter colony at San Nicolas Island and for preventing range expansion elsewhere south of Point Conception.

With respect to oil spills, the draft revision recognized that the threat posed by spills depends upon a number of variables, including the size, location, and area affected by the oil spill, and the size and range of the sea otter population. It proposed that the southern sea otter population be removed from the List of Threatened and Endangered Wildlife when, based on standard survey counts, the average population level over a three-year period exceeds 2,650 animals. The proposal appeared to assume, for reasons which were not indicated, that the area occupied by sea otters in California will expand as the population grows to the point that, when the population exceeds 2,650 animals, fewer than 800 otters would be expected to be contacted by oil from a major spill. In its letter, the Commission noted that the recovery plan revision did not, but should, explain the rationale for this apparent determination. The Commission also expressed the view that the recovery plan revision should provide a more detailed assessment of steps that have been and are being taken to reduce the risk of oil spills occurring, as well as to reduce the risks of a major oil spill endangering the southern sea otter population.

**Table 7. California sea otter population counts by the Fish and Wildlife Service and the California Department of Fish and Game, 1982-1996**

<u>Year</u>	<u>Independent Otters</u>	<u>Dependent Pups</u>	<u>Total</u>
1982 Spring	1,124	222	1,346
1982 Fall	1,194	144	1,338
1983 Spring	1,131	120	1,251
1983 Fall	1,062	164	1,226
1984 Spring	1,181	123	1,304
1984 Fall	—	—	—
1985 Spring	1,124	236	1,360
1985 Fall	1,066	155	1,221
1986 Spring	1,345	225	1,570
1986 Fall	1,088	113	1,201
1987 Spring	1,430	220	1,650
1987 Fall	1,263	104	1,367
1988 Spring	1,505	219	1,724
1988 Fall	—	—	—
1989 Spring	1,574	290	1,864
1989 Fall	1,484	115	1,599
1990 Spring	1,466	214	1,680
1990 Fall	1,516	120	1,636
1991 Spring	1,700	241	1,941
1991 Fall	1,523	138	1,661
1992 Spring	1,810	291	2,101
1992 Fall	1,581	134	1,715
1993 Spring	2,022	217	2,239
1993 Fall	1,662	143	1,805
1994 Spring	2,076	283	2,359
1994 Fall	1,730	115	1,845
1995 Spring	2,095	282	2,377
1995 Fall	2,053	137	2,190
1996 Spring	1,963	315	2,278
1996 Fall	1,858	161	2,019

The Commission noted that, because of its threatened designation under the Endangered Species Act, the southern sea otter population is considered depleted under the Marine Mammal Protection Act (*i.e.*, below its optimum sustainable population level). The estimates of the carrying capacity of sea otter habitat

along the California coast, provided in an appendix to the plan revision, suggested that the population will still be below its optimum sustainable population level when it meets the proposed criterion for removal from the List of Endangered and Threatened Wildlife. The Commission advised the Service that, if this is the case, the revision should (1) note that, following or prior to "delisting" under the Endangered Species Act, action would have to be taken to designate the southern sea otter population as "depleted" under the Marine Mammal Protection Act; and (2) indicate steps that would have to be taken to determine and restore the population to its optimum sustainable population level — *e.g.*, prepare and implement a conservation plan in accordance with section 115 of the Marine Mammal Protection Act.

Further, the draft revision did not but, in the Commission's view, should (a) identify the possible impacts of the recovering sea otter population on recreational and commercial shellfish fisheries that have developed in the absence of sea otters; (b) describe the intent and provisions of Public Law 99-625 and the Memorandum of Understanding concluded by the Service and the California Department of Fish and Game in August 1987, setting forth responsibilities for translocating and studying sea otters in California; and (c) indicate how implementation of the provisions of Public Law 99-625 and the Memorandum of Understanding between the Service and the California Department of Fish and Game would be affected by the proposed revision of the Southern Sea Otter Recovery Plan.

With respect to implementation of the revised plan, the Commission noted that the draft revisions identified Federal and state agencies responsible for carrying out the various tasks, but that the basis of determining lead and cooperating agencies was not evident. Likewise, there was no indication as to whether the various agencies had been consulted or if they had concurred that they were responsible for the tasks assigned to them.

The Commission noted that effective implementation of the recovery plan will require the cooperative efforts of a variety of Federal and state agencies. It recommended that the Service consult with the other agencies with relevant research and management

responsibilities to ensure that they concur with the recommended actions and with the assignment of responsibilities for implementing them. Further, the Commission recommended that appropriate representatives of the various agencies be asked to endorse the revised recovery plan, as has been done for both the first and second revisions of the Florida Manatee Recovery Plan.

At the end of 1996 the comments forwarded by the Commission and others on the draft revision were under consideration in the Service's regional office.

### **The Alaska Sea Otter Population**

Small groups of sea otters survived the era of commercial exploitation in several remote areas of Alaska. Since then, sea otters have repopulated most of their former range in Alaska although they have not yet reached carrying capacity in some areas. No sea otters survived in southeast Alaska, and repopulation of that area was initiated in the late 1960s and early 1970s by translocating otters from Amchitka Island and Prince William Sound.

The best available data indicate that there currently are 100,000 to 150,000 sea otters in Alaska. Although the population is large and growing in most areas, there are a number of threats and conservation issues. They include (1) conflicts with commercial, subsistence, and recreational shellfish fisheries that developed in the absence of sea otters; (2) incidental take in gillnet and other fisheries; (3) oil and gas development and transportation; (4) logging, mariculture, and other coastal development; (5) Native subsistence hunting; and (6) the increasing tourist industry. The reality of these threats is illustrated by the 1989 *Exxon Valdez* oil spill, which directly killed 3,500 to 5,500 sea otters and may have affected many others through contamination and destruction of food species.

On 29 October 1996 the Fish and Wildlife Service announced a significant and unexplained decrease in the sea otter population in the vicinity of Adak Island, Alaska. Counts conducted by the National Biological Service under the Navy Legacy Program showed a decline from approximately 1,800 sea otters in 1994 to 400 animals in 1996. The reason for the decline is

not known. The possibilities include limited food resources, effects of contaminants, new or increased predation by killer whales, disease, emigration, hunting, poaching, and fisheries interactions. Further research, including an additional population survey, is being contemplated for 1997.

As described in past reports, the Commission initiated efforts in 1984 to develop conservation plans for sea otters and other marine mammals in Alaska. Also as described in past reports, the Fish and Wildlife Service completed and adopted conservation plans for sea otters, walruses, and polar bears in 1994.

**Marking, Tagging, and Reporting Program** — In 1981 the Marine Mammal Protection Act was amended to give the Fish and Wildlife Service and the National Marine Fisheries Service authority to promulgate regulations requiring the marking, tagging, and reporting of marine mammals taken by Alaska Natives. The purposes of the amendment were to obtain better information on the species and numbers of marine mammals taken for subsistence and hand-craft purposes and to help control illegal trade in products from those species.

Marking, tagging, and reporting regulations were issued by the Fish and Wildlife Service on 28 June 1988. They require that within 30 days of taking a polar bear, walrus, or sea otter, Native hunters must report the take to the Service and present specified parts of the animal to be marked and tagged. Since promulgating its regulations, the Service has worked closely with Native groups and the State of Alaska to implement the marking, tagging, and reporting program. Data obtained from the program are maintained by the Service in a computerized database. The number of sea otters tagged in the years 1990 through 1995 were 166, 231, 637, 1,248, 832, and 608, respectively. In 1996, 583 sea otters were presented for marking and tagging by Alaska Natives.

**Co-Management of Sea Otters** — In December 1988 Alaska Natives formed the Alaska Sea Otter Commission to promote Native participation in development of policies and programs affecting sea otters and their use in Alaska. The Commission is comprised of representatives of coastal Alaska Native communities in areas where sea otters occur.

To facilitate Native involvement in developing and implementing an agreed sea otter conservation plan, the Alaska Sea Otter Commission drafted and in 1991 proposed that the Fish and Wildlife Service, the Alaska Department of Fish and Game, and the Sea Otter Commission enter into a formal Memorandum of Agreement specifying their respective responsibilities related to the conservation of sea otters in Alaska. Subsequently, the Marine Mammal Commission, in consultation with members of the Sea Otter Commission, the Fish and Wildlife Service, and the Alaska Department of Fish and Game, developed a draft sea otter conservation plan, which it provided to the Fish and Wildlife Service on 5 May 1992. The Sea Otter Commission also began work on regional sea otter management plans to complement the statewide sea otter conservation plan being developed by the Fish and Wildlife Service.

A memorandum of agreement satisfactory to all three parties was signed on 1 February 1994 by representatives of the Fish and Wildlife Service, the Alaska Department of Fish and Game, and the Alaska Sea Otter Commission. The purpose of the agreement is to assist the signatories in the cooperative management of sea otters in Alaska by providing for the exchange of biological, management, and socioeconomic information, and to support the requirements of pertinent laws, regulations, and resolutions. During 1994 and 1995, the Sea Otter Commission completed draft management plans for sea otters in the Chugach-Cook Inlet, Kodiak, Bristol Bay, Aleutian-Pribilof, and southeast regions. All draft plans have been presented to the Native communities for review, and some have been revised. When the internal review is completed, the draft plans are to be provided to the Fish and Wildlife Service, the Alaska Department of Fish and Game, and the Marine Mammal Commission for review. As of the end of 1996, the Fish and Wildlife Service had reviewed and provided comments on one plan, that for the southeast region. The Marine Mammal Commission had yet to receive a regional sea otter management plan for review.

As discussed in Chapter V, the 1994 amendments to the Marine Mammal Protection Act included, among other things, a new section 119 which authorized funding for and encouraged development of cooperative agreements between the Secretaries of

Commerce and the Interior and Alaska Native organizations to conserve and provide for co-management of marine mammals used by Alaska Natives for subsistence and handicraft purposes. Under such agreements, the Secretary may make grants to Native organizations for, among other purposes, collecting and analyzing data on marine mammal populations, monitoring the taking of marine mammals for subsistence purposes, participating in marine mammal research, and developing marine mammal co-management programs with Federal and state agencies.

Under a pending co-management agreement between the Fish and Wildlife Service and the Alaska Sea Otter Commission, the Service would transfer \$70,000 to the Sea Otter Commission in fiscal year 1997. The funds would be used to support the Native Commission's co-management operations, a sea otter biomonitoring program, U.S./Russia sea otter talks, sea otter harvest monitoring, local sea otter management plans and ordinances, and activities related to addressing traditional Native knowledge of sea otter distribution and relative abundance in southeast Alaska. As of the end of 1996, the co-management agreement had not been signed, but was expected to be signed early in 1997.

As noted above, as part of the co-management effort, the Alaska Sea Otter Commission and the Fish and Wildlife Service have initiated a program of collecting biological samples from sea otters harvested throughout Alaska by Native hunters for subsistence and handicraft uses. The purpose of the program is to assess and monitor the condition and health of sea otters in Alaska, and to collect ecological and life history information. A major goal of the program is to train Alaska Natives in the collection of biological samples from sea otters taken for subsistence and handicraft purposes. During 1996 three training sessions were conducted; two additional sessions are planned for January 1997.

### **Northern Right Whale** *(Eubalaena glacialis)*

The northern right whale is the most endangered marine mammal in U.S. waters and the most endan-

gered large whale in the world. It faces a significant risk of extinction due to human impacts. Populations occur in both the North Atlantic and North Pacific Oceans. In both areas, however, their numbers were decimated by relentless whaling that began in the 11th century or earlier in southern Europe, and in the 1600s in Japan, and continued at least through the early 1900s.

Right whales were so named because they had a tendency to float when killed and yielded large amounts of high-quality oil and baleen; thus, they were the "right" whale to hunt. By the early 1900s right whales were commercially extinct and numbered perhaps a few hundred animals in both oceans. Nevertheless, whalers in search of other whale species continued to take northern right whales opportunistically until the mid-1900s. Although whaling is no longer a threat to northern right whales, low reproductive rates, small population sizes, and human-caused mortality from ship strikes and entanglement in fishing gear could push the largest remaining populations below viable levels.

In the eastern North Atlantic and eastern North Pacific, viable populations already have disappeared. Over the past 25 years, there have been about 10 reliable sightings of right whales in each region. Most of these were single animals and none involved calves. In the western North Pacific and Okhotsk Sea, available information is limited, but sightings are more numerous, and it is possible that a population numbering in the low hundreds may still exist.

The only other northern right whale population, and by far the best studied one, is in the western North Atlantic off the eastern United States and Canada. As this population is known to include about 300 animals, its survival may well determine the species' future existence. Much of what is known about the population has been learned from photo-identification studies begun late in the 1970s. These studies have focused on five seasonal high-use areas: a winter calving area along eastern Florida and Georgia; a late-winter feeding and nursery area in Cape Cod Bay, Massachusetts; a spring feeding area in the Great South Channel east of Cape Cod; a summer-to-early-fall nursery and feeding area in the Bay of Fundy just north of the U.S.-Canada border;

and a late-summer-to-fall feeding area in the Roseway Basin south of Nova Scotia. The three areas in U.S. waters (*i.e.*, the southeastern U.S. calving grounds, Cape Cod Bay, and the Great South Channel) were designated as right whale critical habitat under the Endangered Species Act by the National Marine Fisheries Service in 1994.

Scientists began identifying individual whales from scars and callosity patterns in the 1970s. By the early 1980s the number of known individuals was growing rapidly, and researchers at the New England Aquarium began compiling a catalogue with photographs and individual sighting histories contributed by cooperating scientists. Since 1989 the number of new individuals (other than calves) added to the catalogue has slowed to an average of about four per year. As most recent additions have been young animals newly recruited to the population, it appears that the catalogue, with about 360 individually identified animals, now includes nearly the entire population. Given known and unobserved deaths of some whales since they were first identified, it seems likely that the population now numbers about 300, or perhaps fewer.

The continued survival of such a small population is in grave doubt. Surveys of calving and nursery areas from 1982 to 1992 documented an average of only 12 births per year. However, in 1993, 1994, and 1995, scientists counted only 6, 8, and 7 calves, respectively. Although a record high 22 calves were documented in 1996, the recent four-year average is still below the previous 10-year average, and calving intervals for mature females, which typically have been three years, are thought to be increasing.

At the same time, the number of confirmed deaths has increased with a growing proportion attributed to two human causes — ship strikes and entanglement in fishing gear. Since 1970, 41 right whale carcasses have been confirmed, including 16 (nearly 40 percent of the total) since 1991 and 8 (nearly 20 percent) between July 1995 and the end of 1996. From 1970 through 1990, 8 of 25 known deaths (32 percent) were due to human causes — seven from ship strikes and one from entanglement.

However, from 1991 through 1996 the proportion of known human-caused deaths was significantly

higher; 9 of 16 deaths (56 percent) were attributed to human causes, including eight due to ship strikes and one due to entanglement in fishing gear. The proportions of human-related deaths are minimum figures as some deaths classified as of unknown cause, such as unrecovered floating carcasses, also may have been due to humans.

The recent increases in both the total number of confirmed deaths and the proportion of human-related deaths corresponds with increased reports of floating carcasses from more intensive offshore aerial surveys in the species' calving grounds and better reporting from ship-based sources. For example, four of the eight confirmed ship-related deaths since 1991 were reported from offshore vessels. Thus, the increases may reflect a more accurate accounting of total mortality and the proportion of human-related deaths, rather than an increase in those rates. Considering the unknown number of unobserved deaths, it may be that total annual mortality, particularly in some recent years, has exceeded annual recruitment. The high proportion of human-related deaths is therefore particularly alarming. With such a low recruitment rate, it seems likely that survival of the population will depend on the reduction of human-related mortality over the next 10 to 20 years.

Most ship strikes are identified from massive injuries, such as crushed skulls, severed spines or tails, or large propeller slashes that indicate large vessels were responsible. While it may seem that whales could avoid oncoming vessels and that alert vessel operators should be able to avoid hitting whales, the experience of Coast Guard vessel operators (see below), as well as the high proportion of right whale deaths attributed to ship strikes, indicate that such assumptions are not entirely valid. Entanglement in fishing gear also may be a factor contributing to some ship strikes. For example, two of eight carcasses struck and killed by ships since 1991 had ropes and buoys from fishing gear entangled around their tail stock or flippers, which may have impeded their ability to avoid the ships that hit them.

The National Marine Fisheries Service has lead responsibility for developing and implementing a recovery program for northern right whales. At the recommendation of the Marine Mammal Commission,

the Service developed a recovery plan, adopted in 1991, to guide recovery work. As discussed below, many other Federal and state agencies, particularly those with management responsibility for vessel traffic, fisheries, or endangered species, share obligations for developing and carrying out recovery tasks. Important developments and actions taken by the Service, the Commission, and others related to right whale recovery in 1996 are discussed below.

### **Right Whale Mortality and Injuries in 1996**

In 1996 six right whale deaths were confirmed in the western North Atlantic. Five carcasses were recovered or photographed early in 1996 during the winter calving season (December through March) in or near the population's only known calving area off eastern Florida and Georgia. This number was more than twice the number of carcasses found in this area in any year since right whale monitoring began off Florida and Georgia early in the 1980s. This spate of deaths precipitated extensive efforts to increase protection of right whales on the calving grounds and elsewhere.

The first confirmed death was that of a female calf two to four weeks old that stranded on a northern Florida beach on 2 January 1996. There was no evidence of human-related injuries, and the cause of death could not be determined. Dead calves have stranded along Florida and Georgia in previous years, and the event was not considered unusual. However, it was soon followed by at least four more deaths in a 24-day period from late January to late February.

On 30 January a dead right whale was reported to the Coast Guard by a passing ship. The animal was floating 10 miles off Sapelo Island, Georgia, and 15 miles north of the designated right whale critical habitat. The Coast Guard notified the Georgia Department of Natural Resources, which immediately dispatched an airplane to confirm the report and subsequently sent a vessel to retrieve the carcass. It was a 46-foot-long adult male that had been first recorded in the right whale photo-catalogue in 1986. A crushed skull and other injuries indicated that a ship strike was the cause of death.

On 5 and 7 February 1996 Navy pilots reported right whale carcasses floating east of the St. Johns River mouth in Florida at distances of about 48 miles and 28 miles, respectively. On 8 February a carcass believed to be that of the animal seen on 7 February was photographed by researchers from an aircraft and a small Florida Department of Environmental Protection vessel. The animal, drifting southeast away from shore, was about 15 miles southwest of the 7 February sighting. Efforts to find a Navy or Coast Guard ship large enough to tow the animal to shore on such short notice were unsuccessful before losing track of the carcass, but photographs indicate the animal was a 37-foot female right whale. Efforts to relocate a carcass near the 5 February sighting were unsuccessful. Given the distance between the two initial sightings and prevailing currents, it is unlikely that both involved the same animal; however, in the absence of more information, only one death was considered confirmed.

On 19 February 1996 a right whale aerial survey team found a fourth carcass floating 25 miles east of the St. Mary's River mouth on the Florida-Georgia border. The animal, a female calf in very fresh condition, was towed ashore by a Georgia Department of Natural Resources vessel and necropsied. It had no signs of disease or injury, was in robust condition, and still had milk in its stomach. With no apparent reason why the calf died, its cause of death was listed as unknown; however, because the calf had been nursing successfully shortly before death and apparently died abruptly, the death was considered unusual.

On 22 February 1996 another dead calf, the fifth confirmed carcass of the year, was found floating 25 miles offshore and about 20 miles north of the location of the previous dead calf. The carcass was towed ashore and necropsied. It was a male calf with lung lesions and a hemorrhage around one eye, which suggested to the necropsy team that the animal may have been exposed to a concussive force. Subsequent examination of the animal's ears revealed no clear evidence of trauma, although one ear contained a small amount of fluid possibly caused by a blow to the skull. Given that fluid was found only in one ear, it was considered unlikely that the condition was related to a massive pressure shock as would occur in

an explosion. Considering all findings, the cause of death was listed as unknown.

Although no further deaths were confirmed near the winter calving grounds, a small unidentified carcass that may have been a right whale was seen floating 90 miles east of Cape Canaveral, Florida, on 25 March 1996 from a Navy submarine. Because of a lengthy, unavoidable delay in reporting the sighting, efforts to search for the carcass were unsuccessful.

On 9 March 1996 the year's sixth confirmed carcass washed ashore in Wellfleet, Massachusetts, on Cape Cod. It was that of a 44-foot-long adult male entangled in lobster gear with a Canadian identification tag. A badly fractured skull and a large gash on the back indicated that the proximal cause of death was a ship strike. Subsequent inquiries with Canadian officials revealed that the owner of the lobster gear fished just north of the U.S.-Canada border and that the gear was lost in mid-December 1995.

### **Actions Taken by the Navy during the 1995-1996 Right Whale Calving Season**

The U.S. Navy's Atlantic Fleet operates several facilities adjacent to the right whale calving grounds. Among these are the Kings Bay Submarine Base in southern Georgia, the Mayport Naval Station at the mouth of the St. Johns River in northeastern Florida, and naval air stations in Jacksonville, Florida. The Navy also has designated some offshore areas for use in military exercises. Because several of the above-mentioned carcasses were seen near a Navy gunnery range and, initially, it seemed possible some deaths were related to underwater explosions, there was initial concern that Navy activities may have been involved in some deaths.

Concern was heightened by results of aerial surveys conducted early in 1996 as part of a southeast U.S. early warning system and efforts to better document the distribution of right whales seaward of the designated critical habitat (see below). The surveys found unusually large numbers of right whales farther offshore than in previous years and close to a Navy gunnery range whose shoreward boundary was about 25 miles offshore. Upon learning of the fourth

carcass found in February 1996, the Commission wrote to the Navy on 23 February 1996 recommending that gunnery practice and related activities in the area be suspended pending a review of the situation.

The Navy promptly began a review of its activities relative to the occurrence and location of observed whale carcasses and met with National Oceanic and Atmospheric Administration officials on 29 February. The latter agency convened a subsequent meeting on 4 March with Navy officials and scientists involved in right whale aerial surveys and necropsies. During the meeting, Navy officials explained that gunnery exercises conducted in the designated range used practice shells with very small charges designed to explode in air. The Navy also reported that several 500-lb. bombs had been dropped during 16 February exercise in another designated range about 90 miles southeast of where a carcass was seen on 19 February. No other ordnance drops had occurred since the beginning of 1996.

Although some of the injuries to some animals were not inconsistent with exposure to an explosion, the evidence for such an impact was weak, and the possibility of exposure to a blast as the cause of death of any of the animals was dismissed. Representatives of the Commission and the National Marine Fisheries Service were invited by the Navy to observe a gunnery exercise and subsequently did so in late March. Given the small charges and aerial detonation of practice shells used in the exercises, it is highly improbable that such exercises could have caused any of the observed whale deaths. Given the timing of the bombing exercise, its distance from observed carcasses, and the condition of carcasses, it was also unlikely to have caused any of the observed deaths. Full examination of the ears from recovered carcasses, considered a good indicator of exposure to concussive forces, had not been done by the 4 March meeting, but subsequent examination by an independent scientist found no clear evidence of a concussive blow to any of the dead animals except the adult male whose fractured skull and other injuries clearly indicated a ship impact.

Although Navy activities did not appear to be involved in any of the right whale deaths, the Navy nonetheless took swift action to increase assurance that

its activities would not adversely affect right whales. On 6 March, the Commander in Chief, U.S. Atlantic Fleet, issued a personal message directing Navy personnel to increase their vigilance for right whales in high-use right whale habitats and to develop further guidance on right whale protection needs.

After the 4 March meeting the Commission learned that the Navy planned to host a NATO exercise involving foreign military ships in mid-March off the southeastern United States. In light of these plans, as well as longer-term planning needs, the Commission wrote to the Navy on 8 March. In its letter, it urged that the Navy develop a comprehensive assessment, monitoring, and warning program to help determine which NATO activities would be acceptable and to ensure that a real-time warning system was in place to alert involved vessels of whale locations. With regard to long-term needs, the Commission suggested that the Navy (1) consider passive acoustic arrays as a possible way to detect right whales, and (2) initiate consultations with the National Marine Fisheries Service under section 7 of the Endangered Species Act on plans for future Navy training exercises, vessel activities, and use of ordnance.

The Navy replied on 13 March 1996, noting that it planned to initiate informal consultations with the Service on future gunnery and bombing exercises, and invited a Commission representative to participate as an observer. The Navy also noted that it was moving its gunnery range at least 50 nautical miles from shore and directing all Navy vessels entering and leaving area ports to watch for and avoid right whales. With respect to the NATO exercises, the Navy advised the Commission that it was moving a planned minesweeping exercise (which involved no active mines and very slow ship speeds) from a site in the right whale critical habitat to a site off South Carolina. It also noted that information on right whale protection was being incorporated into all plans for the NATO exercise. The Commission replied to the Navy on 17 March, noting that the steps outlined in the Navy's letter seemed helpful and sensible.

Concern about possible effects of Navy activities on right whales also was raised in a 19 March letter signed by 21 members of the U.S. House of Representatives. The letter noted that the right whale

deaths early in 1996, regardless of cause, underscored a need for extra precaution by all parties and recommended that the Navy consult with the National Marine Fisheries Service under section 7 of the Endangered Species Act on all Navy operations during the calving season.

On 20 March the Navy wrote to the National Marine Fisheries Service summarizing the actions it was taking to protect right whales. In addition to measures noted above, the letter noted that (1) ships entering and leaving port would follow an east-west course (*i.e.*, the shortest route) across designated right whale critical habitat, (2) most Navy ship operations use moderate speed (10-15 knots) in the designated critical habitat when no whales were near and slower speeds would be used when whales were near the ship, (3) lookout and bridge watch personnel for Navy ships were receiving special training in whale identification and ship officers had been directed to stay well clear of detected or reported whales, (4) the Navy was continuing to help fund and participate in the regional early warning system to locate whales, and (5) like the gunnery range, the aerial bombing range would be moved at least 50 nautical miles from shore.

The Navy sent to the Commission a copy of its letter, and on 22 March, the Commission wrote to commend the Navy for its actions to minimize risks to right whales. With respect to plans for the NATO minesweeping exercise in South Carolina, the Commission noted that night operations could pose a particular threat to right whales migrating north, and it recommended that related maneuvers not be carried out at night. Consistent with that recommendation, the exercises were limited to daylight hours.

### **Actions by the Navy To Prepare for the 1996-1997 Right Whale Calving Season**

As indicated above, representatives of the Navy and the National Marine Fisheries Service consulted pursuant to the Endangered Species Act on future Navy activities near the right whale calving grounds. The consultations began late in March, but progress on identifying protection measures proceeded slowly. Therefore, the Commission, in consultation with its Committee of Scientific Advisors, reviewed the

summary of actions prepared by the Navy in its 20 March letter to the National Marine Fisheries Service, and wrote to the Navy on 11 September 1996.

The Commission commended the Navy for all that had been done earlier in the year to rapidly relocate exercise areas and develop additional vessel management measures. It noted that many of the steps taken by the Navy exceeded those being taken by commercial and private vessels and that such steps were excellent examples of measures needed to improve management of the area's non-military vessel traffic. It also noted the possibility of strengthening those provisions for the coming calving season and suggested this be done in three areas: avoiding collisions between ships and whales, planning for exercises and maneuvers, and support for related research and monitoring. The Commission recommended that the Navy consider such measures through continued consultations with the National Marine Fisheries Service and the Commission. Further consultations were subsequently undertaken.

Expanding on its 11 September letter, the Commission wrote to the Navy on 6 November 1996 recommending measures for managing vessel traffic, planning exercises, and supporting related research during the coming whale season. With fewer than 10 births in three of the past four calving seasons and more than 50 percent of known right whale deaths due to human causes in that period, the Commission noted that it was essential to do everything possible to avoid any adverse human-related impacts.

With regard to vessel management, the Commission noted that some of the highest concentrations of right whale sightings during aerial surveys early in 1996 had occurred in a zone 5 nautical miles seaward of the eastern boundary of the critical habitat in the northern half of the calving area. Based on these data, it recommended that the Navy define the geographic area for its most restrictive protection measures as the right whale critical habitat, plus a 5-nautical-mile zone seaward of the critical habitat boundary north of St. Augustine, Florida. This would extend important protection measures in much of the northern part of the calving area from 15 nautical miles offshore (the eastern boundary of the designated critical habitat) out to 20 nautical miles.

Within that area, the Commission recommended several measures. It recommended that the Navy reinstitute provisions in effect at the end of the previous calving season for posting trained lookouts and requiring Navy ships to use an east-west route to and from port so that travel through known high-use right whale habitat would be the shortest distance possible. Noting that a Coast Guard vessel had struck what was thought to be a humpback whale on 9 October 1995 off Massachusetts while proceeding at 15 knots in daylight hours with a watch posted to look for whales, the Commission recommended that ships crossing the above-noted area in good sighting conditions (*e.g.*, daylight hours and good weather), limit their speed to 10 knots when no whales are known to be present. For periods of poor sighting conditions (*e.g.*, night or bad weather), it recommended that Navy ships proceed at their slowest safe speed (*e.g.*, 5-8 knots) to increase the chance that undetected whales could avoid oncoming vessels.

Consistent with the advice of the southeast right whale implementation team on safe operating procedures for ships crossing the calving grounds (see below), the Commission also recommended that Navy ships use slowest safe speeds when a right whale was seen from the ship or when there was a report of a right whale within 15 miles of a ship's position in the previous 24 hours. This measure was designed to account for whale movements over a 24-hour period and to allow time for a subsequent survey to determine whether the whale(s) had left the area. To ensure that whale sightings are relayed quickly, the Commission recommended that Navy officials responsible for communicating those reports to Navy ships meet with other personnel involved in the regional early warning network to review communication procedures.

Regarding planned exercises, the Commission recommended that the Navy reinstitute measures adopted at the end of the previous calving season to move gunnery and bombing ranges at least 50 nautical miles from shore. Given the explosive power of bombs used in air drop exercises and the limited information on the occurrence of whales beyond 50 nautical miles from shore, the Commission recommended that the Navy either (a) use inert ordnance or reduced charges that would provide training in hand-

ling live ordnance, (b) survey bombing ranges shortly before exercises with aircraft flying at altitudes and speeds appropriate for detecting whales, or (c) relocate the bombing range to another area where reconnaissance indicates no right whales occur.

Regarding research and monitoring needs, the Commission noted its understanding that the Navy planned to test alternative means, such as passive acoustic arrays and infrared detection equipment, to detect right whales in the calving area. The Commission noted that support for such work was well-placed, given the high costs and inherent limitations of aerial surveys, and commended the Navy for this initiative. Also noting the urgent need to retrieve all possible right whale carcasses, the Commission recommended that the Navy either assign one of its vessels responsibility to help recover floating carcasses or that it work with the National Marine Fisheries Service to establish a contingency fund for dispatching carcass recovery vessels.

With such measures, the Commission concluded the likelihood of Navy activities affecting right whales off Florida and Georgia would be substantially minimized.

Following the Commission's 6 November 1996 letter, the Navy and the National Marine Fisheries Service continued their consultations, and the Navy took preliminary steps to prepare for the coming calving season. As of the end of 1996 the consultations had not been concluded and measures, including those recommended by the Commission, were still under review. However, with regard to measures put into effect pending completion of those consultations, the Navy increased its efforts to track right whale sightings and relay them to Navy ships via a high-speed communications system. Responsibility for this task and for coordinating naval operations in and around right whale critical habitat was assigned to a single regional command — the Fleet Area Control and Surveillance Facility in Jacksonville, Florida. All Navy ships desiring to enter the critical habitat or conduct exercises in the area must first contact this facility to obtain the most recent right whale sighting data. In the event whales have been sighted in a desired exercise area, facility personnel will advise as to whether the exercises should be canceled or moved.

In addition, the Navy reinstated measures developed during the preceding calving season. Gunnery and bombing ranges were again moved at least 50 nautical miles from shore, inert ordnance was required for gunnery exercises, transits through the critical habitat were limited to an east-west track to and from port, posting dedicated whale lookouts was required when transiting the critical habitat, ships were required to use slow speed if within 5 nautical miles of a right whale sighting location less than 12 hours old, ships were prohibited from approaching closer than 500 yards to any right whale, and exercises within the critical habitat were restricted. As discussed below, the Navy also initiated new studies to test alternative technological means for detecting right whales in the calving area and to survey for right whales in offshore areas, particularly gunnery and bombing ranges, where information on their occurrence is limited.

### **Actions Taken by the Coast Guard To Protect Right Whales**

The U.S. Coast Guard is a key partner in the right whale recovery program because of its lead Federal agency role in managing commercial vessel traffic, enforcing wildlife protection laws, and operating its own fleet of patrol vessels in coastal waters where right whales occur.

The potential for collisions between vessels and whales is also indicated by the experience of Coast Guard vessel operators. Coast Guard vessels struck and killed two right whale calves, one on 6 July 1991 off New Jersey and the second on 5 January 1993 off Florida. As discussed below, the events prompted an environmental activist to file suit against the Coast Guard on 7 June 1994, alleging that it was not operating its vessels or fully utilizing its authorities consistent with legal obligations to protect right whales and other endangered species.

While these two deaths are the only documented deaths for which the involved vessels are known, it seems highly unlikely that they indicate that Coast Guard vessels or their operations are more hazardous to right whales than other vessel traffic. Rather, it is a credit to the Coast Guard and a reflection of its responsible approach to stewardship of marine re-

sources that it immediately reported the accidents to the National Marine Fisheries Service, assisted follow-up efforts to gather pertinent data, and most of all, as discussed below, took subsequent steps to modify its operational procedures and programs to reduce the likelihood that such accidents would recur. If anything, the actions of Coast Guard personnel reflect a recognition of the importance of reporting and tending to such accidents that most other mariners have failed to demonstrate. In doing so, they have helped bring the issue of ship strikes to the fore and provided information vital for developing management actions.

In this regard, the two deaths led the Coast Guard to reexamine the effects of its operations along the Atlantic coast on right whales and other endangered species and the steps it could take to reduce potential threats posed by other vessel traffic. The process followed by the Coast Guard in its reexamination included consultations with the National Marine Fisheries Service under the Endangered Species Act, development of an Atlantic coast endangered species initiative, and preparation of an environmental impact statement on its proposed course of action pursuant to the National Environmental Policy Act.

As noted in the previous annual report, the National Marine Fisheries Service provided the Coast Guard a biological opinion on 15 September 1995 pursuant to those consultations. Also, on 22 September 1995 the Coast Guard circulated an environmental assessment on additional measures it planned to take to protect endangered species along the U.S. Atlantic coast. On 24 October 1995, the Commission provided comments to the Coast Guard in support of the actions described in the assessment. To avoid collisions with whales, the Coast Guard indicated its vessels would use safe, slow speeds in marine sanctuaries and designated critical habitats in non-emergency situations, post lookouts on all vessels, and give wildlife a wide berth. To address impacts by other vessels, the Coast Guard indicated, in part, that it would notify vessels by radio and other means of reported right whale sightings, broadcast seasonal notices about the need for special caution in critical habitats, and, in consultation with other agencies, review permits for boat regattas in sensitive wildlife areas.

Soon after circulating the assessment, a Coast Guard cutter traveling at 15 knots accidentally struck what was thought to be a humpback whale about 160 miles east of Cape Cod. The 9 October 1995 collision occurred in the afternoon after several whales had been sighted and a whale lookout had been posted. Despite efforts to relocate the animal, it was not resighted and its fate is unknown. In light of this event, the Coast Guard reinitiated consultations with the Service and another biological opinion was provided to the Coast Guard on 22 July 1996.

The Service's second opinion recommended, in part, that in non-emergency situations, Coast Guard vessels proceed at slowest safe speed if a whale is seen from a ship or there is a report of a right whale within five miles of a ship's position in the previous 12 hours. Slowest safe speed is generally defined as the minimum speed needed to maintain safe steerage and control given prevailing weather and other conditions. The opinion also recommended additional measures for posting and training lookouts, avoiding head-on approaches to whales, and avoiding approaches closer than 500 yards to a right whale or 100 yards to other whales unless emergency situations or enforcement duties necessitate closer approaches.

Based on its internal review and consultations with the National Marine Fisheries Service, the Coast Guard expanded its proposed endangered species protection program into an Atlantic protected living marine resources initiative. Pursuant to National Environmental Policy Act provisions, the Coast Guard prepared a draft environmental impact statement on its initiative and distributed it for agency and public comment on 31 July 1996. The initiative proposed an internal program (*i.e.*, directives and procedures Coast Guard personnel would take to protect endangered species and reduce vessel-related impacts) and a conservation program (*i.e.*, cooperation with conservation efforts by other Federal and state agencies).

In letters on 11 September and 16 September 1996, the Commission, in consultation with its Committee of Scientific Advisors, wrote to the Coast Guard providing comments and recommendations on the draft environmental impact statement and actions needed to protect northern right whales.

In its first letter, the Commission noted the need to examine carefully existing legal and institutional provisions for managing vessel traffic hazardous to right whales. Citing constructive actions that the Navy and the Coast Guard had taken to minimize such risks, the Commission expressed its belief that similar actions were needed by commercial and private ships operating in areas such as the right whale calving grounds. Because a thorough analysis of potentially applicable legal and institutional authorities had not been done, the Commission recommended that, as part of the Coast Guard's conservation program, it should review domestic and international authorities that might be used to ensure that measures, like those the Navy and the Coast Guard were taking, are followed by commercial vessels to minimize right whale injuries and deaths in key habitats.

Given the urgent need to protect mature females and calves, the Commission also recommended that the Coast Guard add a specific task to its conservation program for improving or developing new vessel management measures for ships using ports adjacent to the right whale calving grounds. The Commission urged that, if at all possible, this task be undertaken by the 1997-1998 calving season. It also noted that the International Maritime Organization (the international organization responsible for developing standards for navigation) had recently adopted potentially relevant measures for vessel routing and reporting. As the Coast Guard represents the United States at meetings of the organization and its subsidiary bodies, the Commission offered to help draft an information paper for the organization's Safety and Navigation Committee and Marine Environment Protection Committee on the threats ships pose to right whales and on related management actions in U.S. waters.

In its letter of 16 September, the Commission commented on specific points in the Coast Guard's draft statement and proposed initiative. Noting that the initiative offers many constructive steps to improve the conservation of endangered species, the Commission recommended that, with certain modifications, the Coast Guard adopt and implement its proposed initiative as quickly as possible.

As additional measures, the Commission referenced the points made in its earlier letter, plus a need to

clarify what would be a "safe speed" for Coast Guard vessels in high-use right whale areas. The draft statement noted that Coast Guard vessels crossing high-use habitats in non-emergency situations would use a safe speed that allows lookouts a chance to see whales in a timely manner. In determining a "safe speed," the document noted that vessel operators must consider, among other things, the proximity to hazards, including whales. In this regard, the Commission noted that few mariners had struck whales or would be familiar with the speed needed for lookouts to see whales in a timely manner. Thus, without further advice and guidance, relying on the judgment of most vessel operators in this matter seemed questionable. Given that a Coast Guard cutter had struck a whale while proceeding at 15 knots with a whale lookout posted, the Commission recommended that the Coast Guard expand its guidance on "safe speed" to note that a safe speed for lookouts to detect whales in time to take evasive maneuvers would be less than 15 knots (*e.g.*, 10 knots).

On 31 October 1996 the Coast Guard released a final environmental impact statement on its Atlantic coast initiative, and on 9 December it issued a record of decision adopting the initiative described in the final statement. The Coast Guard responded to the Commission's comments in its final statement. Most of the Commission's recommendations were reflected in the endangered species initiative adopted by the Coast Guard. With regard to the operation of its vessels, the final statement identified strengthened procedures and directives that had been put in place and which would be continued to implement the above-noted recommendations by the National Marine Fisheries Service in its biological opinions.

The final statement also identified further steps that the Coast Guard planned to take or to consider under various domestic and international authorities and programs. Among other things, it noted that information would be added to its *Sailing Directions*, *Coast Pilot*, and marine license testing program to advise vessel operators about issues and precautions related to the protection of right whales and other endangered species. It also indicated that the Coast Guard would work with regional implementation teams (see below), the National Marine Fisheries Service, and others to determine how best to develop vessel management

measures in the calving ground and other high-use right whale habitats. In this regard, it expressed an intent to work with other agencies on proposals to the International Maritime Organization, including possible designation of critical habitats and high-use habitats as “particularly sensitive sea areas” and/or “areas to be avoided” under international law.

The Coast Guard did not adopt the Commission’s recommendation on expanding guidance on what would constitute a maximum safe speed for detecting whales in a timely manner to avoid hitting them. The Coast Guard’s final statement noted that under revised guidelines to its ship officers, they would be responsible for determining specific speeds necessary to detect whales given prevailing conditions and that, to avoid collisions with whales during the course of normal operations in critical habitats or other high-use right whale habitats, the Coast Guard was directing its vessel operators to use extreme caution, be alert, and reduce speeds as appropriate. If a right whale is sighted or reported within five miles of a Coast Guard vessel, additional speed reductions are to be considered.

### **Southeast U.S. Implementation Team for the Recovery of Right Whales**

In 1993 the National Marine Fisheries Service established the southeast implementation team to help identify and coordinate regional efforts to study and protect northern right whales on the winter calving grounds off Georgia and Florida. The team includes representatives of the Army Corps of Engineers, the Coast Guard, the Port of Fernandina Beach (Florida), the Florida Department of Environmental Protection, the Georgia Department of Natural Resources, the Georgia Ports Authority, the Glynn County Conservancy (Georgia), the Jacksonville Port Authority, the National Marine Fisheries Service, the Navy, the New England Aquarium, and the University of Georgia.

The team’s principal focus has been on preventing ship strikes. Efforts to meet this goal have involved improving information on right whale habitat-use patterns in the calving area, developing non-binding advice for vessel operators on ways to detect and avoid right whales, and providing mariners with real-

time data on the location of right whales during the calving season. A central feature of its work has been development of an “early warning system” of daily aerial surveys to monitor right whales throughout the 1 December to 31 March period of peak occurrence. In 1996 the team met twice.

At its first meeting on 18-19 April 1996 the team reviewed results of work in the 1995-1996 winter calving season and began planning for the next calving season. In addition to documenting an unprecedented number of right whales deaths early in 1996 (see above), work during the calving season produced an unusually large number of right whale sightings, a record number of observed calves (22), and, for the first time, numerous observations of right whales seaward of the 15-nautical-mile-wide critical habitat boundary off Georgia and northern Florida.

In studies using satellite telemetry to track the movement of whales, scientists with the New England Aquarium implanted tags on three right whales in February. One tag failed to transmit properly, but the other two, both attached to females with calves, documented a steady northward migration close to shore at a rate of approximately 20 to 40 miles per day. One animal, tagged early in February, began migrating northward in the second week of March and arrived in the Great South Channel feeding grounds east of Cape Cod, Massachusetts, early in April.

The team also examined details of its “early warning system.” The system involves daily aerial surveys by observers trained to locate and photograph right whales throughout the calving season. Whale locations are promptly relayed to ship operators through the Coast Guard’s NAVTEX communication system, direct radio contact by observer teams, and by Navy officials and port pilots. Early warning system surveys are funded by equal contributions from the Navy, the Coast Guard, and the Corps of Engineers. For the 1995-1996 calving season, observers flew daily (weather permitting) along a 70-mile stretch of coast from Brunswick, Georgia, to St. Augustine, Florida. Survey track lines run perpendicular from the shore out to a distance of 20 miles every three miles along the coast. Surveys were flown on 91 of 114 days, with complete surveys on nearly 60 percent of survey days.

Additional surveys supported by the National Marine Fisheries Service also were flown by the Georgia Department of Natural Resources and the Florida Department of Environmental Protection. Both agencies surveyed areas beyond 20 miles from shore to assess the presence of whales in areas that have been poorly studied. The two agencies flew additional surveys along track lines established for the early warning system and extended coverage north and south of the early warning survey area. The former extended the nearshore survey area from Brunswick, Georgia, north to Savannah, while the latter searched coastal waters from St. Augustine, Florida, south past Cape Canaveral. As part of its supplemental effort within the early warning system survey area, the Florida survey team flew replicate surveys following the early warning survey plane to assess sighting efficiency of aerial observers. Preliminary analyses of the replicate surveys indicate that about 60 percent of the whales present were sighted by survey teams and that a doubling of survey effort produced only a slight increase in the number of sightings.

On 7-8 November 1996 the team met to review plans for the 1996-1997 calving season. Early warning system survey flights were again funded by the three agencies noted above and the survey design was not changed. Also, the National Marine Fisheries Service again provided funds for supplemental aerial surveys by the Georgia Department of Natural Resources and the Florida Department of Environmental Protection. The designs for these surveys were similar; however, the Florida Department of Environmental Protection modified the track lines south of St. Augustine to include areas slightly farther offshore and farther south. In addition, the Navy contracted for a new two-year aerial survey effort to better determine the offshore extent of right whale distribution, particularly in gunnery and bombing ranges. The Navy-supported surveys will extend from Charleston, South Carolina, to Cape Canaveral, Florida, from October to April during the 1996-1997 and 1997-1998 calving seasons.

As noted above, the Navy provided support for new studies in the 1996-1997 calving season to test whether towed and fixed hydrophone arrays and infrared detection equipment could help detect right

whales. To ensure prompt response to any reports of dead right whales, the National Marine Fisheries Service established a contingency fund for retrieving and necropsying carcasses.

Team members also reconsidered advice to vessel operators. In particular, the Navy advised the team of its efforts to (1) reexamine the system of timely communications with its vessels; (2) reemphasize the need for vessel watches to report all right whale sightings; (3) provide the vessel lookouts and crew on each of its ships with a high-quality video describing the plight of right whales, how to identify them, and the procedures to follow when one is sighted; and (4) develop a geographic information system at the Fleet Area Control and Surveillance Facility in Jacksonville, Florida, to track all whale sightings by early warning survey teams, Navy vessel lookouts, and other reliable sources. All Navy aircraft and ship movements through the calving grounds must be cleared through this facility before they begin. The new system was developed to assure timely communication of right whale sighting data and cautionary advice to Navy vessels as they begin and carry out exercises in, or transit through, the calving area.

In addition, the implementation team scheduled further meetings with shipping agents and officials of shipping lines in area ports to increase the awareness of commercial vessel operators as to right whale protection needs. Unfortunately, these meetings were not well attended, and to increase participation at future meetings the team recommended that such meetings be organized by the National Marine Fisheries Service.

### **New England Whale Recovery Plan Implementation Team**

The northeast implementation team was established by the National Marine Fisheries Service in 1994 to help coordinate regional efforts to protect both right whales and humpback whales. Its members include representatives from regional offices of the Coast Guard, the Environmental Protection Agency, and the National Marine Fisheries Service, as well as officials from the Stellwagen Bank National Marine Sanctuary, the New England Fishery Management Council, the

Marine Mammal Commission, Canada's Department of Fisheries and Oceans, the Massachusetts Division of Fisheries and Wildlife, the Massachusetts Coastal Zone Management Office, and the Massachusetts Port Authority. Representatives of other groups, including the Center for Coastal Studies, the Cetacean Research Center, GreenWorld, the International Wildlife Coalition, and the New England Aquarium participate regularly at the team meetings. The team met three times in 1996.

The northeast team has focused most of its efforts on right whales, particularly with regard to entanglement in fishing gear and ship strikes. Following its last meeting in 1995, a new team leader was appointed, and in 1996 the team expanded its efforts and adopted a set of rules to govern its operations. Much of its work is now carried out through subcommittees composed of the representatives of involved agencies.

At its first meeting in 1996 on 28 May, the team completed a review of interactions between whales and commercial fisheries. Based on its review, it wrote to the National Marine Fisheries Service on 26 June 1996 recommending needed actions. The team noted that at least two right whales had died due to entanglement since 1970 and that more than 25 other right whales had been documented with attached rope or netting thought to be either gillnet or lobster gear. Some of those animals disappeared after they were seen entangled and probably died. The team also noted that, although right whales may become entangled anywhere in their range, it was reasonable to assume that reducing hazardous fishing gear in areas and times that whales occur in greatest numbers would be an important and appropriate step to reduce entanglement risks.

The team therefore recommended that the Service immediately proceed with rulemaking to restrict the use of fishing gear posing entanglement hazards to right whales in the Great South Channel. It also recommended that the Service consult with the southeast implementation team to determine if similar actions in the calving area should be taken simultaneously, and with the Commonwealth of Massachusetts to identify ways of reducing entanglement risks in Cape Cod Bay. The team also recommended that the Service examine gear modification alternatives to

minimize the number of vertical lines associated with fixed fishing gear.

The Marine Mammal Commission reviewed the team's letter, and on 11 October 1996 it wrote to the Service expressing strong support for the team's recommendations and urging that immediate action be taken to restrict hazardous gear in the Great South Channel before the 1997 whale season. The Commission also recommended that the Service contact appropriate Canadian officials to determine if similar actions might be taken in high-use right whale habitats in Canada.

By letter of 5 November 1996 the Service responded to the northeast implementation team, noting that the Service had reinitiated consultations under section 7 of the Endangered Species Act on all fisheries known to interact with right whales. It advised that the actions recommended by the team were being considered in those consultations and also by the Atlantic Large Whale Take Reduction Team (see below). The Commission also was advised of these efforts by Service representatives participating in the Commission's 12-14 November annual meeting. Although the take reduction team did not complete its deliberations before the end of 1996, on 13 December 1996, the Service issued two new biological opinions on the Atlantic lobster and sink gillnet groundfish fisheries (see below). The opinions recommend in part that closures for lobster and sink gillnet fisheries be established in the right whale critical habitat in the Great South Channel during the peak period of right whale occurrence in the area (*i.e.*, 1 April to 30 June). As of the end of 1996 the Service had not yet acted on recommendations in the opinions. In a related development, however, the Commonwealth of Massachusetts was directed by the U.S. District Court in the fall of 1996 to convene a working group to develop a plan for reducing fishing gear entanglement hazards to right whales in Cape Cod Bay (see below).

With regard to ship strikes, the northeast implementation team reviewed a cooperative pilot effort by the Service and the Coast Guard to survey right whales in the Great South Channel and Cape Cod Bay and relay sighting reports to area ship traffic. Based on this and other efforts, the team's ship-strike subcommittee developed a plan for implementing an

early warning system in the spring of 1997 in Cape Cod Bay and in a ship channel running through the Great South Channel.

The proposed system, similar to the southeast U.S. early warning system, would operate from March to June when right whales are most common in these waters. As in the calving grounds, right whale positions identified by aerial observers and other sources would be passed to ships by radio, NAVTEX, notices to mariners, the National Oceanic and Atmospheric Administration weather channel, and other communication means. Other elements of the subcommittee plan include possible proposals for designating high-use whale habitats as "particularly sensitive sea areas" under the International Maritime Organization, the potential use of remote sensing to detect right whales in vessel traffic lanes, and printing information about right whales on regional tide charts.

### **Assessments of Strategies To Mitigate Ship Collisions with Right Whales**

Efforts to reduce the risk of collisions between whales and ships began in 1993 with development of the early warning system for the species' calving grounds. In that area, three vessel-related right whale deaths (two off Florida and one off Georgia) have been documented since 1990. The problem, however, is not limited to the calving grounds. Since 1970 vessel-related deaths also have been observed in Nova Scotia (2), New Brunswick (1), Maine (1), Massachusetts (3), New York (1), New Jersey (2), Virginia (1), and Texas (1).

While an early warning system similar to that developed for the calving grounds is now being considered for right whale habitats off Massachusetts, a thorough review of alternative or supplemental actions has not been undertaken — despite its identification as a high-priority need during a 1994 review of right whale research needs convened by the National Marine Fisheries Service. Therefore, the New England Aquarium developed a proposal in 1996 to convene a workshop to review available information on vessel-related right whale deaths and to develop a strategic plan for mitigating the problem. The Commission was asked to help fund the workshop and, as

indicated in Chapter IX, it agreed to do so. At the end of 1996, funding also had been secured from the National Fish and Wildlife Foundation and the Exxon Corporation, and the workshop was being scheduled for April 1997. Participants in the workshop are expected to include representatives of the shipping industry, port authorities, the scientific community, the environmental community, the Navy, the Coast Guard, other Federal and state agencies, and the Canadian Government.

As a related matter, two groups within the National Academy of Sciences also expressed interest during 1996 in analyzing interactions between vessel traffic and whales. To assess the effects of ship noise on marine mammals, the Academy's Ocean Studies Board considered expanding an ongoing study of low-frequency sound effects on marine mammals from the Acoustic Thermometry of Ocean Climate experiment. Also, the Academy's Marine Board considered a study to develop a recommended national strategy for addressing interactions between ships and marine mammals. At the end of 1996 the two bodies were reviewing their related proposals and other planned activities, and decisions on proceeding with the possible studies had not yet been made.

### **Regulations on Approaches to Right Whales**

On 5 October 1994 the National Marine Fisheries Service was asked by GreenWorld, an environmental group, to develop rules prohibiting vessels from approaching closer than 500 yards to any right whale and closer than 100 yards to all other whales. In response, the Service published an advanced notice of proposed rulemaking on 27 December 1994 requesting public and agency comments on such a rule.

As noted in its previous annual report, the Commission, in consultation with its Committee of Scientific Advisors, responded to the Service on 27 March 1995. The Commission noted that measures reducing close approaches to right whales by vessels would be useful, but that it would not be reasonable to expect vessel-based observers to routinely detect and identify right whales at distances greater than 500 yards in all weather conditions or at night. It therefore suggested, among other things, that it would be more practical to prohibit deliberate approaches, diversions, or stopping

to observe right whales, to develop guidelines for whale avoidance maneuvers in cases where it is determined that a vessel is within or likely to come within 500 yards of a right whale, and to consider the rule in conjunction with other actions to identify right whale locations.

After considering the comments received, the Service developed proposed rules to protect right whales from vessel and aircraft approaches and published them in the *Federal Register* on 7 August 1996. With certain exceptions (*e.g.*, emergency situations and authorized activities such as permitted research), the proposed rules would prohibit vessels and aircraft from approaching closer than 500 yards to any right whale. The rules also would (a) restrict head-on approaches and other approaches that would intercept right whales within 500 yards, and (b) establish whale avoidance measures for moving away from whales if a moving vessel inadvertently comes within 500 yards of a right whale.

In the preamble to the proposed rule, the Service noted that the provisions would apply to unintentional, as well as intentional, approaches to right whales. In this regard, it noted that both the Marine Mammal Protection Act and the Endangered Species Act, under which authority the rules were to be promulgated, prohibit unintentional or incidental takings, as well as intentional takings. It also noted that similar approach rules for humpback whales in Hawaii apply to both intentional and unintentional approaches, and that they have worked well, with enforcement officials exercising discretion in deciding whether to bring enforcement action against someone who accidentally approaches a whale.

As of the end of 1996 it was the Commission's understanding that the Service intended to take action on the final approach rules for northern right whales early in 1997.

### **Interactions between Northern Right Whales and Fisheries**

The northern right whale recovery plan adopted by the National Marine Fisheries Service in 1991 calls for establishing seasonal restrictions on fishing gear

that might entangle right whales in certain high-use right whale habitats (*i.e.*, Cape Cod Bay, the Great South Channel, and the Florida-Georgia calving grounds). As noted in past annual reports, the Marine Mammal Commission recommended that the Service act on these provisions, but prior to 1996 little direct action was taken. In 1996 the Commission continued to address the issue.

On 19 April 1996 the Commission commented to the Service on an amendment (amendment 7) proposed by the New England Fishery Management Council to modify the Northeast Multispecies Fishery Management Plan under which sink gillnet fisheries in New England are managed. Among other things, the Commission recommended that the Service either expand the proposed amendment or take separate action under authority of the Endangered Species Act to prohibit gillnets in the Great South Channel right whale critical habitat by the spring 1997 right whale season. It recommended that gillnets be prohibited during the period April through June when right whales are most abundant in the area. It also recommended that the Service consult with the Commonwealth of Massachusetts to develop measures for regulating gillnets and other fishing gear that could entangle right whales in Cape Cod Bay during the period of peak right whale occurrence in that area (*i.e.*, February through May).

A response to these recommendations was included in the Service's 31 May 1996 *Federal Register* notice announcing final rules for the proposed amendment. With regard to the Great South Channel, the Service stated that it could not prohibit gillnet fishing by spring 1997 under the fishery management plan because the Council had not recommended the action to do so in its amendment. It noted, however, that the Service was considering regulatory options under authority of the Endangered Species Act. Regarding Cape Cod Bay, the Service noted that it hoped to begin discussions with the Commonwealth of Massachusetts on measures to protect right whales as soon as a pending cooperative agreement with the State was signed on efforts to protect endangered and threatened species.

Little direct action was taken by the Service on these matters in the following months, and similar

recommendations were again made to the Service in letters of 26 June 1996 from the northeast right whale and humpback whale implementation team, and 11 October 1996 from the Marine Mammal Commission.

While measures designed specifically to reduce entanglement hazards for right whales in important habitats had not been adopted as of the end of 1996, partial protection has been provided incidentally through gillnet fishing restrictions developed by the New England Fishery Management Council to protect haddock spawning in part of the Great South Channel during some of the time when right whales occur in peak numbers. Also, gillnets have been prohibited by the States of Florida and Georgia in those parts of the right whale calving ground under their jurisdiction (*i.e.*, within three miles of the coast).

As discussed below, prospects for additional measures also were increased in 1996 through other related developments prompted by requirements added to the Marine Mammal Protection Act in 1994, the increase in confirmed right whale deaths early in 1996, and complaints filed by an environmental group against the Commonwealth of Massachusetts and the National Marine Fisheries Service for authorizing fishing practices hazardous to right whales.

**Take Reduction Teams** — Amendments to the Marine Mammal Protection Act in 1994 direct the National Marine Fisheries Service to prepare stock assessments for all stocks of marine mammals in U.S. waters. Among other things, the assessments are to estimate the potential biological removal level (not including natural mortality) that will allow each stock to remain at or increase toward its optimum sustainable level, and to determine whether the stock should be designated as a strategic stock requiring special management attention. For strategic stocks subject to taking by fisheries in numbers exceeding the potential biological removal level, the Service is required to establish a take reduction team and prepare a take reduction plan.

The Service's August 1995 stock assessment for the western North Atlantic stock of northern right whales calculated a potential biological removal level of 0.4 right whale per year and determined that the stock is a strategic stock. To meet requirements for establish-

ing take reduction teams and preparing take reduction plans, two take reduction teams were established by the Service in 1996 to consider steps for reducing incidental takes of right whales and certain other marine mammals in fisheries. On 23 May the Service established an Atlantic Offshore Cetacean Take Reduction Team to address the incidental take of marine mammals in east coast pair trawl, driftnet, and long-line fisheries for swordfish, tuna, and sharks. Also, on 6 August, the Service constituted an Atlantic Large Whale Take Reduction Team to develop a plan for reducing the take of large whales, particularly right whales and humpback whales, incidental to coastal gillnet and lobster pot fisheries.

Each team included representatives from the respective fisheries, involved Federal and state agencies, the academic community, and environmental groups. The 1994 amendments to the Marine Mammal Protection Act direct take reduction teams to develop a recommended take reduction plan for submission to the Service within six months of their establishment. The plans must include measures to reduce incidental takes of marine mammals in the fisheries to levels below calculated potential biological removal levels within six months of their implementation. Upon receiving a plan, the Service must accept or modify the recommended provisions and take action to implement it no more than five months after it is received. If a team is unable to develop an agreed plan, the Service is required to prepare a take reduction plan. The Marine Mammal Commission was invited to be represented on both teams but, due to other staff commitments, it participated only on the Atlantic large whale team.

The offshore cetacean team met five times between May and November and, on 22 November 1996, it submitted a recommended take reduction plan to the Service reflecting a consensus view of all its members. At least one northern right whale, a juvenile caught in a pelagic drift net on Georges Bank in 1993, is known to have been seriously injured in the fisheries addressed by the team. The team also considered incidental takes by the fisheries from many other marine mammal stocks, including strategic stocks of humpback whales, sperm whales, beaked whales, pilot whales, white-sided dolphins, common dolphins, spotted dolphins, and offshore bottlenose dolphins.

With regard to right whales, the team recommended that pair trawl, driftnet, and longline fisheries be prohibited from designated right whale critical habitat in Cape Cod Bay, the Great South Channel, and the southeast U.S. calving grounds during periods of peak right whale occurrence. For the driftnet fishery, the team also set a goal of reducing interactions with strategic marine mammal stocks by 82 percent. To do so, it recommended, in part, that driftnet fishing from Hudson Canyon (off New Jersey) south be closed from December to May, that no new entrants be allowed into the fishery, and that studies be undertaken to assess the effectiveness of acoustic devices to deter interactions with marine mammals. While the latter measures were designed primarily to address interactions with species other than right whales, the recommended seasonal closure south of the Hudson Canyon also would increase protection of right whales migrating to and from the species' winter calving grounds. By the end of 1996 the Service had not yet circulated the team's plan for public comment.

The Atlantic large whale team met three times in 1996, but did not complete its deliberations before the end of 1996. Additional meetings were scheduled for January 1997 and results of its discussions are expected to be submitted to the Service in February 1997. Among other things, the team is considering gear modification alternatives for gillnets and lobster pots to make them less likely to cause serious injury or mortality, should a whale become entangled, and various time-area fishing closures.

**Other Fishery-Related Actions by the National Marine Fisheries Service** — In addition to forming take reduction teams to address entanglement hazards for right whales in 1996, the large number of confirmed right whale deaths early in the year prompted the Service to reinstate formal consultations under the Endangered Species Act on east coast fisheries whose gear might threaten northern right whales. On 25 September the Service's Office of Sustainable Fisheries asked the Office of Protected Resources to reinstate consultations on all east coast fisheries for swordfish, tuna, and sharks. On 7 October it requested similar action for the New England groundfish sink gillnet fishery and the Atlantic lobster fishery.

Consultations on the groundfish and lobster fisheries were completed late in 1996 and separate biological opinions, each dated 13 December 1996, were prepared on the fisheries. Given information on right whale deaths early in 1996 and the cumulative effects of all sources of right whale mortality, both opinions concluded that the respective fisheries, as managed under existing provisions, were likely to jeopardize the continued existence of right whales in the North Atlantic. To avoid such effects, the opinions identified reasonable and prudent alternatives.

The opinion for the Atlantic lobster fishery recommended, in part, that the designated right whale critical habitat in the Great South Channel be closed to lobster fishing from 1 April to 30 June unless gear or alternative fishing practices are developed that eliminate the likelihood of entanglement. It also recommended further efforts to compile and analyze data on the location of lobster fishing effort and whale distribution in order to assess other ways of minimizing the likelihood that right whales might encounter lobster gear.

The opinion for the groundfish fishery included similar recommendations. It recommended establishing a fishery closure of most, but not all, of the right whale critical habitat in the Great South Channel from 1 April to 30 June unless gear or alternative fishing practices are developed that eliminate the likelihood of entangling a right whale. Not included in the closed area was a narrow band about three to five miles wide along the western edge of the designated critical habitat. The area includes a preferred fishing area for gillnet fishermen on the upper portion of the ridge along the western edge of the Great South Channel. Noting that the shallower area was less likely to have concentrations of copepods on which right whales feed, the Service concluded that right whales would not be likely to occur in that area.

At the end of 1996 the Service was reviewing the opinion and had not yet acted on the recommended measures.

With regard to the swordfish, tuna, and shark fisheries, the Service had not completed its consultation process before the end of 1996. However, consistent with recommendations by the Atlantic

Offshore Cetacean Take Reduction Team and also in light of protection needs for sea turtles, the National Marine Fisheries Service announced an emergency rule on 5 December 1996 in the *Federal Register* closing the winter swordfish fishery in U.S. waters along the Atlantic coast and in Gulf of Mexico. The emergency rule, effective 1 December 1996 through the end of May 1997, prohibits driftnet fishing for swordfish or the possession of more than two swordfish on any vessel carrying a drift gillnet in those areas.

**Actions Concerning Cape Cod Bay** — As noted below, in response to a suit by an environmental activist, on 24 September 1996 the District Court for Massachusetts ordered the Commonwealth of Massachusetts to establish an endangered whale working group to develop a plan for minimizing the risk of right whales becoming entangled in gillnets and lobster gear in designated critical habitat in Cape Cod Bay. The State immediately formed a working group composed of representatives from affected fisheries, the scientific community, environmental groups, and state agencies. On 16 December 1996, on behalf of the group, the State submitted a report to the court providing recommended actions.

In part, the report recommends a combination of actions involving seasonal requirements for joining lobster traps in strings of at least four traps per marker buoy to reduce the number of vertical float lines, modifying fixed fishing gear, and developing a surveillance-based management system to close local fishing areas if right whales are observed. Although the report notes that no gillnet fishing currently occurs in late winter or early spring, it also recommends that such fishing be prohibited in Cape Cod Bay from January through 15 May to ensure that fishing effort does not increase in future years during periods when right whales are most abundant in the area.

With respect to gear modification, the plan recommends that between 1 January and 15 May fishermen connect lobster traps with sinking line that would lie on the bottom and thus pose less risk of entanglement to whales. For 1997 it recommends that all lines connecting marking buoys to fixed fishing gear incorporate weak links (150-lb. breaking strength) that would break easily when a whale comes in contact.

It further recommends that by 1998 buoy lines be made of light line that could easily be broken by a whale. It is not known if break-away links and weak lines will reduce the likelihood of whales becoming entangled or injured by fishing gear, but there is broad agreement that such measures should be tried. At the end of 1996 the court was reviewing the recommended plan to determine if it adequately addressed requirements for protecting right whales.

### Right Whale Litigation

Litigation alleging various violations of the Marine Mammal Protection Act, the Endangered Species Act, and other laws has been important in shaping actions by the National Marine Fisheries Service, the Coast Guard, and others to protect northern right whales. Three lawsuits, all filed by Richard Max Strahan, the national campaign director of GreenWorld, were active during 1996.

The first of these, *Strahan v. Linnon*, was filed in the U.S. District Court for the District of Massachusetts on 7 June 1994. The plaintiff alleged that the Coast Guard had violated provisions of the Endangered Species Act, the Marine Mammal Protection Act, the National Environmental Policy Act, and the Whaling Convention Act. In the previous four years, Coast Guard vessels had struck and killed two right whales. The plaintiff contended that these incidents constituted illegal takings, and unless enjoined, were likely to continue. The plaintiff also alleged that the Coast Guard was required to take action to prevent other vessels from striking right whales and other endangered whale species, because those vessels may not lawfully operate in U.S. waters without being licensed.

The court issued a ruling in this case on 2 May 1995. As a preliminary matter, the court ruled that the plaintiff only had standing to challenge Coast Guard activities in the First Coast Guard District, which includes the area between New Jersey and Maine. The court found that, until consultations under section 7 of the Endangered Species Act were complete, the Coast Guard would not be in full compliance with the Act. However, the Coast Guard did not need to consult on its inspection and documentation activities for other vessels because the Coast

Guard was statutorily required to issue vessel documents if specific criteria were met and, thus, did not have the discretion to withhold such documents because of potential risks to endangered whales. Noting efforts the Coast Guard had made to prevent its vessels from striking whales, the court found the question of whether additional whales might be struck to be a disputed material fact and deferred consideration of that issue until a section 7 consultation had been completed. The court noted, however, that an injunction may ultimately be needed to prevent further incidental taking of right whales by the Coast Guard.

With respect to the Marine Mammal Protection Act, the court found that the Coast Guard was required to apply for a small-take authorization if it anticipated that it would take a marine mammal at any time during the course of its operations. The court therefore ordered the Coast Guard to apply for a small-take authorization under the Marine Mammal Protection Act by 31 May 1995.

The court also found the Coast Guard to be in violation of the procedural requirements of the National Environmental Policy Act and ordered it to prepare a draft environmental assessment and to provide a schedule for completion of a final environmental assessment. The court ruled in favor of the Coast Guard on plaintiff's claims arising under the Whaling Convention Act. The court found that the Coast Guard activities did not constitute whaling, which is prohibited by the Act, even though "whaling" is defined to include the killing of whales.

Actions that have been taken to comply with the court's 2 May 1995 order are discussed above.

With the court's permission, the plaintiff filed an amended complaint on 21 June, stating several new claims and adding officials of the Commerce Department as defendants and the Fund for Animals as a plaintiff. Among the violations alleged in the amended complaint were that: (1) the biological opinion for Coast Guard activities issued under section 7 of the Endangered Species Act and the biological assessment upon which it was based were deficient; (2) the Coast Guard had violated the National Environmental Policy Act by failing to issue an environmental assessment evaluating its permitting and documentation program

and its operations in the Pacific Ocean and Gulf of Mexico; (3) the Coast Guard illegally takes right whales by allowing vessels that strike the whales to operate in U.S. waters; (4) the right whale recovery plan issued by the National Marine Fisheries Service is deficient in that it does not incorporate site-specific recovery actions and does not specify a realistic recovery goal; (5) the National Marine Fisheries Service had failed to establish take reduction teams or implement take reduction plans for right whales and other whale species within mandated time frames; (6) the National Marine Fisheries Service had improperly excluded the lobster fishery from category I in its list of fisheries; (7) the National Marine Fisheries Service had violated the Administrative Procedure Act by not issuing approach regulations for right and other whales as petitioned for by the plaintiff in 1994; (8) regulations governing consultations under section 7 of the Endangered Species Act improperly excluded non-discretionary Federal actions; and (9) the Endangered Species Act cooperative agreement between the National Marine Fisheries Service and Massachusetts fails to meet the statutory requirements in that the State does not have an adequate conservation program for right whales or other whale species.

The plaintiffs filed a motion on 30 August 1996 seeking a preliminary injunction to redress some, but not all, of the alleged violations. Specifically, the plaintiffs requested the court to direct the Department of Commerce to take all steps necessary to complete proposed final take reduction plans for right and humpback whales by 1 April 1997 and final plans by 15 July 1997, to make all meetings of the large whale take reduction team open to the public and accessible by public transportation, to tape record and document by minutes all take reduction team meetings, and to appoint either Mr. Strahan or one of other identified individuals as a member of the large whale take reduction team.

The Federal defendants filed their opposition to the motion on 23 September, claiming that the relevant issues were moot. The defendants noted that the take reduction team had been established and included one individual on the list proposed by plaintiffs. In addition, the National Marine Fisheries Service committed to holding open meetings in publicly accessible places and to finalize the take reduction

plan according to the proposed schedule. According to the defendants the only outstanding issue was whether take reduction team meetings would be taped. The court issued an order denying the preliminary injunction on 27 September 1996.

The National Marine Fisheries Service and Coast Guard also took several other actions during 1996 that addressed the issues raised by the plaintiffs in the amended complaint. The proposed list of fisheries published by the Service on 16 July included a proposal to move the lobster fishery to category I. The Service completed the reinitiated consultation on Coast Guard activities by issuing a revised biological opinion on 22 July. The reasonable and prudent alternatives identified included in the biological opinion were implemented by the Coast Guard in a record of decision issued on 9 December 1996. Proposed regulations to govern approaches to right whales were published on 7 August.

The second lawsuit, *Strahan v. Coxe*, was filed on 21 April 1995 alleging four separate violations of the Endangered Species Act and the Marine Mammal Protection Act by Massachusetts officials. Although Federal statutes are at issue, no Federal agencies are parties to that litigation. The plaintiff contended that Massachusetts' licensing and regulation of certain fishing activities in state waters results in the incidental taking of right and other whales in violation of the Endangered Species Act. Similarly, the plaintiff alleged that such taking and the licensing of fishing operations by the State that results in the taking violate the Marine Mammal Protection Act. The plaintiff also claimed that licensing the use of gillnets and lobster gear in areas designated as right whale critical habitat constitutes an impermissible modification of that habitat. Lastly, the plaintiff argued that Massachusetts' authorization and regulation of whale-watching activities results in the intentional pursuit of right whales in violation of the Endangered Species Act.

The U.S. District Court for the District of Massachusetts issued an order on 24 September 1996 partially granting the preliminary relief sought by the plaintiff. The court ruled that the plaintiff had demonstrated a sufficient likelihood that endangered whales are periodically taken through entanglements

with gillnets and lobster gear in waters regulated by the State and that no permit authorizing such incidental taking had been issued by the National Marine Fisheries Service. The court found that the State's continued licensing of these fishing operations was likely to continue to cause harm to endangered whales and violated the Endangered Species Act. In the court's view, it was irrelevant that the permitting of fishing gear by Massachusetts was only an indirect cause of whale entanglement. The court also found the claim of taking resulting from habitat modification brought about by state-authorized fishing operations to provide an alternative basis for granting preliminary relief under the Endangered Species Act.

The court dismissed the claim based on taking under the Marine Mammal Protection Act because, unlike the Endangered Species Act, it has no citizen's suit provision allowing the plaintiff to seek enforcement of the taking prohibition. While such claims could be (and have been) brought by the plaintiff against Federal officials under the Administrative Procedure Act, that Act does not apply to State officials.

The court also dismissed the claim based on State regulation of whale-watching activities. Because Massachusetts does not regulate the general activities of whale-watching vessels, the court restricted its review of this claim to State issuance of scientific research permits exempting vessels from the otherwise applicable 500-yard approach limit. Although the plaintiff contended that issuance of such a permit in 1989 had resulted in the death of a right whale calf, the State had not issued a permit since. In the court's view, the plaintiff had not demonstrated a sufficient likelihood that the State would issue such permits in the future to warrant issuance of an injunction.

Consistent with these rulings the court ordered the defendants to apply to the National Marine Fisheries Service for an incidental take permit for right whales under the Endangered Species Act by 18 October 1996. Even though the claim under the Marine Mammal Protection Act had been dismissed for lack of jurisdiction, the court directed the State to apply for a small-take permit under that statute as well. The court also ordered the State to develop and submit to the court by 16 December a proposal to restrict,

modify, or eliminate the use of fixed fishing gear in coastal waters of Massachusetts listed as right whale critical habitat. The defendants were also directed to convene an endangered whale working group to engage in discussion with the plaintiff and others with respect to modifications to fishing gear and other measures to be taken to minimize actual harm to right whales. The judge set forth procedures for nominating members to the working group and required that membership be subject to approval by the court.

The defendants appealed the ruling on 1 October 1996 and sought to stay the court's order pending consideration of its appeal. Among other things, the defendants claimed that (1) State licensure of gillnet and lobster pot fishing does not constitute a taking under the Endangered Species Act, (2) Massachusetts should not be required to restrict the use of this gear when its use is allowed by the National Marine Fisheries Service outside of State waters, (3) it should be left to the National Marine Fisheries Service, through its rulemaking authority, to determine whether certain fishing activities should be banned in critical habitat areas, (4) the court improperly granted relief under the Marine Mammal Protection Act after dismissing claims under that statute for lack of jurisdiction, and 5) the court order violates the Constitutional division of authority between Federal and state governments under the Tenth Amendment. The motion for a stay pending appeal was denied by the court of appeals on 17 October.

The plaintiff also appealed the district court ruling, apparently claiming that the order did not go far enough. As of the end of 1996, however, that appeal had yet to be served on the other parties. Nevertheless, the plaintiff's appeal has been consolidated with the defendant's appeal. Initial briefs in this case are to be filed in late January 1997.

The third lawsuit, *Strahan v. Kramek*, was filed against Coast Guard and Department of Commerce officials on 20 September 1996. The plaintiff sought a temporary restraining order and a preliminary injunction to compel the defendants to enforce applicable prohibitions on the taking of right whales as they pertain to entanglement of whales in fishing gear. The plaintiff contended that the two agencies had a non-discretionary duty to enforce the take prohibitions

of the Endangered Species Act and Marine Mammal Protection Act to "absolutely stop" any unpermitted taking of endangered marine mammals. The plaintiff therefore petitioned the court to order the defendants to prevent the deployment of gillnets and lobster gear in areas designated as right whale critical habitat until 1 December. As with the plaintiff's appeal in *Strahan v. Coxe*, the complaint in this case has yet to be served on the other parties.

The court denied the plaintiff's motion for a temporary restraining order on 27 September 1996, in part because the complaint had not been properly served. Subsequently, the court informed the plaintiff that, unless the complaint were served within the time limit set forth in applicable rules, the case would be dismissed. The plaintiff has indicated that, rather than serve the complaint, he might choose to refile in another venue (*e.g.*, the U.S. District Court for the District of Columbia).

### **Marine Mammal Commission Northern Right Whale Review**

In light of the critical status of northern right whales and the many actions taken in 1996 to protect the western North Atlantic population, the Marine Mammal Commission devoted a large part of its 12-14 November 1996 annual meeting to a review of right whale recovery efforts in the United States and Canada. At the meeting, representatives of the National Marine Fisheries Service and many of its key partners in the right whale recovery program provided information on their respective activities and plans. In addition to representatives of the Service, participants included officials from the Army Corps of Engineers, the Coast Guard, the Georgia Department of Natural Resources, the Florida Department of Environmental Protection, the Massachusetts Division of Fisheries and Wildlife, the Massachusetts Environmental Trust, the Navy, both regional recovery plan implementation teams, the scientific community, the environmental community, and the Canadian Department of Fisheries and Oceans.

Based on results of the 12-14 November review, the Commission, in consultation with its Committee of Scientific Advisors, wrote to the National Marine

Fisheries Service on 12 December 1996. It noted that during fiscal year 1996, the National Marine Fisheries Service spent approximately \$600,000 on right whale recovery work, including approximately \$470,000 for research projects, \$50,000 for management tasks, and \$80,000 for cooperative projects by state agencies under section 6 of the Endangered Species Act. Based on the review, it appeared that these funds have been used to address many critical needs and that the Service had made good efforts to identify research and management priorities.

The review also found, however, that the program did not request proposals to address specific project needs. Instead, funding choices are made from unsolicited proposals submitted to regional fisheries science centers by outside investigators or proposals developed by center staff members based on their expertise and interest. As a result, some high-priority needs identified in recent right whale research program reviews have received no funding despite their identified importance. To address this situation, the Commission recommended that the Service establish a directed right whale research program to solicit proposals meeting specific recovery needs. Given that other agencies, such as the Navy and the Coast Guard, also provide substantial funding for right whale work, the Commission noted that a more focused funding approach also could help ensure that support by other agencies meets priority needs in ways that better complement the overall recovery program.

The Commission concluded that, in the long term, a well-directed recovery program to secure the species' survival would require at least \$3 million per year for the next 10 to 20 years. Funding at that level is essential to continue ongoing work, to develop new management approaches for ship traffic and fisheries in areas not yet addressed, and to provide reliable site-specific data on right whale habitat-use patterns to implement those approaches. Recognizing that support at such levels was unlikely through the normal budgetary process, the Commission recommended that the National Marine Fisheries Service explore alternative ways to fund right whale recovery work, including the establishment of a right whale trust fund modeled after the manatee trust fund created by the Florida State Legislature.

Such a trust fund could be established by Congress as a separate account used to supplement and possibly replace normal budgetary support for right whale recovery work. As a separate account maintained by the Federal Government, withdrawals from the trust fund would provide a stable long-term funding source independent of the normal appropriations process with no funds drawn from the general treasury. To provide income for the fund, the Commission noted that vessel-related right whale deaths had been reported all along the U.S. Atlantic Coast, and it suggested that a modest fee (*e.g.*, \$100) might be charged to cargo-carrying vessels each time they enter a U.S. east coast port from a foreign country. Given that more than 16,000 cargo ships arrived at U.S. east coast ports from countries other than Canada during the last fiscal year, it noted that such a fee charged to such vessels could generate over \$1 million annually and place the financial burden for actions needed to prevent ship strikes on those posing the greatest threat.

As other possible sources of income for a trust fund, the Commission noted the possibility of charges to participants in east coast fisheries whose gear is known to entangle right whales, a surcharge for passengers on east coast whale-watching trips, or voluntary contributions from individuals, foundations, or an incorporated non-governmental "save the right whale" organization.

Pending the establishment of a right whale trust fund, the Commission noted that there was an immediate need to expand the right whale recovery program to meet urgent needs that are presently not being addressed. For this purpose, the Commission recommended that the Service either seek a supplemental budget request or in some other way lay claim to an additional \$650,000 for the coming year. As specific needs for which those funds should be used, the Commission recommended (1) hiring a full-time right whale recovery program coordinator; (2) initiating a long-term telemetry program to track 12 to 15 right whales per year over the next five to ten years; (3) initiating aerial surveys for right whales in the Great South Channel and Cape Cod Bay, and expanding right whale surveys in the Bay of Fundy and Roseway Basin in Canada; (4) investigating ways to modify gillnet and lobster fishing gear to reduce their likelihood of entangling right whales; (5) compiling

and analyzing data on vessel traffic in the right whale calving grounds using a geographic information system to evaluate vessel management strategies; and (6) developing a population model using available life-history data to improve understanding of northern right whale population trends.

To carry the program forward after 1997, the Commission recommended that the Service seek an annual right whale recovery budget of at least \$1.25 million — an amount equal to the 1996 funding level plus the recommended supplemental budget request — pending the establishment of a trust fund or other independent funding sources.

Although the Commission had not received a response to its letter as of the end of 1996, it understood that the Service was taking steps to fill a new coordinator position to oversee recovery activities for right whales and other endangered whales. Also, in December 1996 the Service convened a review of marine mammal research activities and priorities at its Southeast Fisheries Science Center. Representatives of the Commission participated in the review. A report of that review had not been completed as of the end of the year, but consideration was given at the meeting to increasing the Center's work respect to right whales.

### **Bowhead Whale** (*Balaena mysticetus*)

Bowhead whales occur only in the Arctic and sub-arctic where they are circumpolar in distribution and seasonally associated with sea ice. Historically, there were probably at least four separate bowhead whale populations. The largest surviving population is the western Arctic population (also known as the Bering-Chukchi-Beaufort Seas stock), which migrates seasonally between the Bering Sea and Chukchi and Beaufort Seas. There they spend much of the summer before returning to the Bering Sea in fall. Bowhead whales in this stock are an important subsistence resource for Alaska Natives who hunt them as they migrate along the coast of Alaska in both spring and fall.

Over-exploitation by commercial whalers between 1600 and 1900 reduced all populations to extremely low levels. Although all stocks were subject to intensive hunting, both the period of exploitation and the extent of the depletion differed for each. In the western Arctic, the population off Alaska, eastern Russia, and northwestern Canada was heavily exploited from 1848 to 1915. During that period, more than 19,000 whales were taken by commercial whalers.

All of the bowhead whale stocks have been slow to recover from commercial exploitation. The Spitzbergen population, once thought to have been extirpated by commercial whaling, now is believed to number only in the tens of individuals, while the Davis Strait and Hudson Bay stocks combined are estimated at 450 whales. A remnant stock exists in the Okhotsk Sea and adjacent waters and is believed to contain only a few hundred whales. The current estimate of abundance for the Bering-Chukchi-Beaufort Seas stock, as recognized by the International Whaling Commission, is 8,200.

Bowhead whales were listed as endangered in 1970 under the Endangered Species Conservation Act (the predecessor to the Endangered Species Act of 1973) and in 1977 were designated as depleted under the Marine Mammal Protection Act. All stocks of bowhead whales are classified as protected by the IWC. Therefore, commercial whaling quotas are set at zero. However, subsistence whaling provisions are made for aboriginal hunters, and limited catch quotas are recommended by the International Whaling Commission (IWC) for the western Arctic bowhead whale stock.

### **Eskimo Whaling**

As noted above, bowhead whales are hunted by Alaska Natives for subsistence and cultural purposes. Catch levels for subsistence whaling are established by the IWC based on the status of the stock and the demonstrated needs of Alaska Natives. Quotas are implemented under the terms of a cooperative agreement between the National Marine Fisheries Service and the Alaska Eskimo Whaling Commission. Assessment of the subsistence, cultural, and nutritional needs of Alaska Natives is derived from a quantitative procedure developed by the Department of the Interi-

or. Based on information available in 1988, the subsistence and cultural need for bowhead whales was estimated to be 41 whales.

On behalf of Alaska Natives, the United States requested in 1991 a quota of 54 strikes per year for the years 1992, 1993, and 1994 with not more than 41 whales to be landed in any one year. In response, the IWC adopted a three-year block quota allowing a total of 141 bowhead whales to be struck during 1992-1994. In addition, the IWC adopted a provision allowing 13 unused strikes from the 1989 through 1991 quota to be carried forward and added to the new quota. Thus, Alaska Native whalers received authorization for up to 154 strikes during 1992-1994. During any single year, however, the number of strikes could not exceed 54 and the number of whales landed could not exceed 41.

In 1994 revised bowhead whale abundance estimates were provided to the IWC along with new information from the United States on the cultural and subsistence needs of the Alaska Native population based on updated census data. In light of the information, the United States requested that the subsistence take quota be revised to 68 struck and 51 landed whales per year in 10 whaling villages. The IWC concluded that these numbers were within the estimated sustainable yield for the stock, and new take levels were established for the years 1995 to 1998. The revised authorization allows the landing of not more than 204 bowhead whales from the Bering-Chukchi-Beaufort Seas population during the four-year period.

In an effort to continue improving the efficiency of the hunt, the quota permits a decreasing number of strikes per year: 68, 67, 66, and 65 in 1995, 1996, 1997, and 1998, respectively. The IWC allowed any unused portion of the strike quota to be carried forward to subsequent years, provided that no more than 10 strikes are added to the strike quota for any one year. Unused strikes from 1995 brought the 1996 strike total to 77, but based on prior authorization, the total could not exceed 66. In 1996 Native whalers took 39 whales using 44 strikes for a catch efficiency of 89 percent, the highest rate recorded since record-keeping began more than two decades ago. Catch and strike totals of bowhead whales taken by Alaska Natives from 1973 to 1996 are shown in Table 8.

## Subsistence Whaling in Canada

In August 1991 the Government of Canada approved a license for the take of one bowhead whale by Aklavik, a Native community in the western Canadian Arctic. The Natives in that region subsequently took one whale from the Bering-Chukchi-Beaufort Seas stock of bowhead whales. As noted above, the IWC is the international organization responsible for determining catch limits for both commercial and aboriginal whaling (see Chapter IV). Nonetheless, Canada issued the license without consulting the IWC. As a result, the Marine Mammal Commission wrote to the Secretary of Commerce about the matter on 5 December 1991. In its letter, the Commission recommended that the Secretary certify Canada under the Pelly Amendment to the Fishermen's Protective Act as having diminished the effectiveness of the IWC's conservation program inasmuch as Canada, which withdrew from the IWC in 1982, had not sought or obtained a quota under which the take of a whale could be authorized.

The Secretary refrained from certifying Canada in that instance after the Canadian Ambassador indicated in a letter to the Secretary of Commerce that a committee of government officials had been formed to review issues arising out of the hunting of bowhead whales by Natives, including Canada's position on rejoining the IWC.

Although Canada issued licenses authorizing the taking of one bowhead whale from the western Canadian Arctic each year between 1993 and 1995, no whales were taken under those authorizations. However, a Canadian Native took one bowhead whale from the Hudson Bay stock in eastern Canada in fall 1994 without authorization to do so. No action was taken to certify Canada for this incident because the whale had been taken without Canadian Government approval.

Anticipating that Canada might license its Arctic Natives to take bowhead whales, the IWC's Scientific Committee expressed concern at its June 1996 meeting about the status of bowhead whale populations. Noting that the Davis Strait and Hudson Bay stocks are estimated to number about 450 whales and are among the world's most endangered large whale

stocks, the IWC passed a resolution urging Canada to reconsider any outstanding permits it had issued, to refrain from issuing any permits without obtaining IWC approval, and to rejoin the IWC if it continued to have a direct interest in whaling.

Despite the IWC's resolution, Canada issued two licenses in 1996, one authorizing the taking of a bowhead whale from the Bering-Chukchi-Beaufort Seas stock and the other authorizing the taking of a bowhead whale from the Davis Strait and Hudson Bay stocks. Pursuant to those licenses, Natives in the western Canadian Arctic community of Aklavik killed a bowhead whale in July 1996 from the Bering-Beaufort-Chukchi Seas stock. Natives in the eastern Canadian Arctic community of Repulse Bay killed a bowhead whale in August 1996 from the highly endangered Hudson Bay stock.

In a letter dated 8 October 1996 to the Administrator of the National Oceanic and Atmospheric Administration, the Marine Mammal Commission responded to the taking of the two bowhead whales under license, noting that the licenses had been issued by Canada without consultation with the IWC. The Commission recommended that the Secretary of Commerce certify to the President under the Pelly Amendment that the taking of these whales by Canadian nationals diminished the effectiveness of the IWC's conservation programs.

On 12 December 1996 the Secretary of Commerce did so. He also notified the Secretary of State of the certification and recommended that the Secretary notify the Government of Canada of the action. Upon certification by the Secretary of Commerce, the President may prohibit the importation into the United States of any products from the offending country. Within 60 days of certification, the President must notify Congress of any responsive action taken. In the event that no import prohibition is imposed, the President is required to inform Congress of the reason that no such action was taken. At the end of 1996 several agencies, including the Marine Mammal Commission, were working cooperatively to formulate a recommendation to the President as to whether, and if so what, sanctions would be appropriate in this instance.

**Table 8. Quotas and number of bowhead whales taken by Alaska Eskimos, 1973-1996<sup>1</sup>**

<u>Year</u>	<u>IWC Quotas<sup>2</sup> (Landed/ Struck)</u>	<u>No. Landed</u>	<u>Struck but not Landed</u>	<u>Total Struck</u>	<u>% Struck and Landed</u>
1973	--	39	20	59	66
1974	--	20	34	55	36
1975	--	15	28	43	35
1976	--	48	43	91	53
1977	--	29	82	111	26
1978	14/20	12	6	18	67
1979	18/27	12	15	27	44
1980	18/26	16	28	44	36
1981	17/27	17	11	28	61
1982	17/27	8	11	19	42
1983	17/27	9	9	18	50
1984 <sup>3</sup>	—/43	12	13	25	48
1985 <sup>3</sup>	—/26	11	6	17	65
1986 <sup>3</sup>	—/26	20	8	28	71
1987 <sup>3</sup>	—/32	22	9	31	71
1988 <sup>3</sup>	—/35	23	6	29	79
1989	41/44	18	8	26	69
1990	41/47	30	14	44	68
1991	41/44	28	19	47	60
1992	41/54	38	12	50	76
1993	41/54	41	11	52	79
1994	41/52	34	12	46	74
1995 <sup>3</sup>	—/68	43	14	57	75
1996 <sup>3</sup>	—/77	39	5	44	89

1 Cited quotas established by the International Whaling Commission; data on numbers of whales landed, struck but not landed, and total struck are from Suydam, R.S., R.P. Angliss, J.C. George, S.R. Braund, and D.P. DeMaster. 1995. Revised data on the subsistence harvest of bowhead whales (*Balaena mysticetus*) by Alaska Eskimos, 1973-1993. In: Forty-fifth report of the International Whaling Commission. 45:335-338. Information for the years 1994, 1995, and 1996 was provided by the National Marine Fisheries Service.

2 Whaling was to cease whenever the number of whales landed or the number of strikes made reached the specified number, whichever came first.

3 Quotas set for strikes only.

## **IWC Consideration of Bowhead Whale Taking by Russian Natives**

At the 1996 IWC meeting the Russian Federation presented a request to the IWC for an annual take of five bowhead whales to meet the subsistence needs of the indigenous people of Chukotski Autonomous region. The request was for the years 1996 to 1998. The United States supported the request, but a number of nations were critical of the request, particularly since Russia does not harvest all of its existing gray whale quota, which also is requested to meet subsistence needs of Chukotka Natives. Ultimately, the Russian delegation withdrew its proposal. Despite this action, in October Russia issued permits for two bowhead whale takes. As of the end of 1996, available information indicated that no bowhead whales were taken by Russian nationals.

## **Oil and Gas Exploration and Development in the Beaufort Sea**

As discussed in Chapter VIII, the Marine Mammal Commission responded to an announcement by the U.S. Army Engineer District, Alaska (Corps) of its intent to prepare an environmental impact statement for developing oil and gas resources offshore of Prudhoe Bay, Alaska, for oil extraction. The proposed development, known as the Northstar Project, is significant in that it is the first time that an oil company intends to go from the exploratory to the production phase of oil and gas development in Federal waters off Alaska. Unlike oil and gas exploratory activities, which have been conducted primarily in the summer months, oil production activities will be year-round.

In its letter dated 11 June 1996 responding to the request, the Commission indicated that, due to the distribution and habitat use patterns of the bowhead whale, it is among the marine mammal species of greatest concern. The Commission also noted that it is likely that the proposed activity would result in the taking of at least small numbers of marine mammals by harassment, including bowhead whales. If so, the taking would require authorization under the Marine Mammal Protection Act and, if bowhead whales could be taken, under the Endangered Species Act.

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, will continue to review matters related to bowhead whales and advise the involved agencies and organizations on actions that may be necessary to encourage the recovery of the bowhead whale populations.

## **Gray Whale (*Eschrichtius robustus*)**

The gray whale currently occurs only in the North Pacific Ocean, where it inhabits primarily coastal waters. Gray whales once occurred along the eastern and western coasts of the North Atlantic Ocean, and were found along the coast of North America as recently as the late 1600s. However, the North Atlantic population became extinct, probably around 1700.

There are two extant gray whale stocks: the western North Pacific (Korean) stock and the eastern North Pacific (California) stock. The eastern North Pacific stock migrates along the coast between winter calving and breeding areas off Baja California, Mexico, and summer feeding areas as far north as the Bering and Chukchi Seas. The western North Pacific stock migrates between summer feeding grounds in the Okhotsk Sea and winter breeding areas along the South China Coast.

Pacific gray whales were severely depleted by commercial whalers in the mid-1800s and again in the early 1900s. Along the eastern North Pacific, the species was probably reduced to no more than a few thousand individuals. It received protection from commercial whaling under international law in the 1930s. In 1970 additional protection was provided by the United States when the species was designated as endangered under the Endangered Species Conservation Act of 1969, the predecessor to the Endangered Species Act of 1973.

Protection from commercial whaling has enabled the eastern North Pacific gray whale stock to recover. Its current population size is estimated at about 23,000 individuals. This population is believed to be at or near pre-exploitation levels, and in June 1994 it was

removed from the List of Endangered and Threatened Wildlife. In contrast, the western North Pacific gray whale stock is severely depleted and has shown no signs of recovery. The stock is believed to contain only a few hundred animals. It remains listed as endangered under the Endangered Species Act.

Inasmuch as gray whales use nearshore waters and bays for migrating, feeding, calving, and breeding, they are vulnerable to the effects of various human activities. Gray whales are entangled occasionally in gillnets and also may be affected by offshore oil and gas development, coastal development, commercial shipping, recreational boating, whale-watching, military activities, and industrial activities in wintering lagoons. In addition, under subsistence whaling quotas set by the International Whaling Commission, gray whales have been taken by U.S. and Russian Natives although U.S. Natives are no longer authorized to take gray whales. The great majority have been taken in Russia, where catches between 1966 and 1991 averaged 177 animals per year. The current IWC subsistence quota for gray whales is 140 animals per year for 1995, 1996, and 1997. A total of 42 and 85 gray whales were taken in Russia in 1994 and 1995, respectively. In 1996 gray whales were taken by Russian nationals; however, as of the end of the year, the number taken had not yet been reported.

### **Five-Year Research and Monitoring Plan**

As noted above, the eastern North Pacific stock of gray whales was removed from the List of Endangered and Threatened Wildlife in June 1994. During the delisting process undertaken by the National Marine Fisheries Service, the Marine Mammal Commission commented to the Service on the proposal, noting among other things that habitat degradation was a significant threat to the stock's survival. The Commission recommended that downlisting the stock to threatened status was a more appropriate action than its removal from the list. However, the National Marine Fisheries Service and the Fish and Wildlife Service jointly amended the list by removing the eastern North Pacific gray whale stock.

The Endangered Species Act requires that if a species is delisted, a program must be implemented to monitor its status for at least five years. The National

Marine Fisheries Service prepared a draft five-year plan of research and monitoring of the eastern North Pacific gray whale stock, and forwarded the draft to the Commission for review.

The Commission provided comments to the Service on 29 July 1994 recommending, among other things, that the plan be revised to include identification and assessment of human activities that could affect the principal wintering lagoons in Baja California and feeding grounds in the Bering and Chukchi Seas. In this same regard, the Commission wrote to the Service on 31 July 1995 requesting to be advised about the status of the five-year plan and asking, in particular, what the Service was doing or contemplating doing to identify and prevent activities that may pose threats to essential gray whale habitats.

With regard to possible habitat degradation, the Commission made note of the proposed construction of a commercial salt operation in San Ignacio Lagoon, Baja California — an activity described more fully below. In its letter, the Commission recommended that the Service give highest priority, within its gray whale research program, to identifying and determining how to prevent or mitigate threats to essential gray whale habitats, particularly the calving and breeding lagoons of Baja California.

As of the end of 1996 the Service had yet to finalize the plan. It was the Commission's understanding that the plan would be completed and released in early or mid-1997. The Commission further understood that a considerable amount of work had been done under the plan even though it was still in draft form. For example, in 1996 the Service monitored both the northbound and southbound gray whale migrations and made estimates of total abundance and calf populations. Shore-based abundance surveys also were conducted from 1992 through 1995.

### **Potential Threats to Gray Whale Wintering Lagoons**

As noted above, gray whales are exposed to a variety of human activities because much of their lives are spent in nearshore waters, including the shallow, warm-water lagoons along the west coast of Baja

California, Mexico. A variety of development activities being proposed at the lagoons may adversely affect the whales and their wintering habitat.

To identify development activities that could adversely affect important gray whale wintering habitats and to identify ways to prevent adverse effects, in 1993 the Commission contracted for a study of ongoing and planned development in San Ignacio Lagoon and Magdalena Bay, two of the principal breeding lagoons along the west coast of the peninsula. As discussed in the previous annual report, the results of that study were published late in 1995 (see Appendix B, Dedina and Young 1995). The report describes potential threats to the lagoons and the whales, including whale-watching, ecotourism, coastal development, and industrial activities, and suggests actions that might be taken to avoid or mitigate potential adverse effects from human activities.

In an 18 January 1996 letter to the Administrator of the National Oceanic and Atmospheric Administration, the Marine Mammal Commission reiterated concerns identified in earlier letters from the Commission both to the Administrator and to the National Marine Fisheries Service about the impacts of human activities on gray whale breeding and calving lagoons along the Baja California peninsula. The Commission also provided copies of the above-mentioned contract report to the Administrator and to key scientists in the National Marine Fisheries Service. In addition, the Commission distributed copies of the report to individuals, scientists, organizations, and government agencies involved in gray whale conservation both in Mexico and the United States.

### **Proposed Salt Production Facility at San Ignacio Lagoon**

One of the greatest potential threats to the gray whale breeding lagoons in Mexico is the proposed construction of a new solar salt processing facility at San Ignacio Lagoon. The plan calls for the construction of conveyor belts and a deep-water pier for loading and transporting salt, and the development of approximately 20 square miles of evaporation ponds north and along the northern shore of the lagoon.

This construction would substantially alter the shoreline parts of the lagoon. The facility would be situated within the buffer zone of the El Vizcaino Biosphere Reserve, part of the United Nations Environment Programme's international biosphere reserve network, and could compromise efforts to maintain the reserve.

A proposal for the project and an environmental impact assessment were prepared by the owners of the salt production company and submitted in July 1994 to Mexico's National Ecology Institute. A permit for the project was rescinded by the Mexican Government in February 1995 on the grounds that the environmental impact assessment did not identify or adequately address all the possible environmental consequences. The determination also indicated that the assessment did not adequately consider the necessary prevention, mitigation, and control measures for the protection of the coastal habitat potentially affected by the project. The salt production company appealed the decision, but later withdrew its appeal, indicating that it intended to submit a new study that more appropriately considered the environmental issues and conservation of the natural resources in the biosphere reserve.

On a related matter, a Commission-sponsored review of the San Ignacio Lagoon salt works environmental impact assessment was provided in a report prepared by a biologist familiar with the situation. The report, which was completed late in 1995, provided a summary of the history and status of the project, and a comparison of the proposed operation to an existing salt processing plant at Guerrero Negro, a town adjacent to Laguna Ojo de Liebre. The latter is situated midway along the Pacific coast of the Baja California peninsula and is heavily used by gray whales. In an effort to provide a current and comprehensive review of the status and potential effects of the proposed project, the Commission sent a copy of the report to the Administrator of the National Oceanic and Atmospheric Administration with the above-mentioned 18 January 1996 letter.

### **Conservation Efforts within Mexico**

At the 1995 meeting of the International Whaling Commission, Mexico stated that it had decided to form a panel of international experts to review avail-

able information regarding the proposed San Ignacio Lagoon salt production operation. It asked the IWC to assist in forming the panel, and the IWC concurred.

The IWC provided assistance in the identification of scientists with expertise on gray whale biology to serve on the review panel. In February 1996 Mexico's Ministry for the Environment, Natural Resources and Fisheries established a seven-member scientific advisory committee, which included a member of the Marine Mammal Commission's Committee of Scientific Advisors. The objectives of the advisory committee were to (a) review all scientific data relevant to the project to identify the environmental concerns that need to be addressed in assessing the feasibility of the project; (b) propose specific terms of reference that will need to be addressed in preparation of a new environmental impact assessment; and (c) review any future impact assessment and advise the Government of Mexico on whether the new assessment adequately addresses the specific environmental concerns noted in the committee's terms of reference. Social, economic, and legal aspects of the project were not considered by the advisory committee, but were to be addressed by other advisors.

On 22 June 1996 the scientific advisory committee submitted to the Secretary of the Environment, Natural Resources and Fisheries specific terms of reference on the biological and ecological aspects of the San Ignacio project and the issues that should be addressed in any revised environmental impact assessment. The committee indicated that the assessment should identify and describe (1) baseline studies to document existing environmental conditions and to evaluate possible adverse environmental impacts; (2) studies to monitor construction and operational activities to ensure that environmental safeguards are followed; and (3) a long-term research and monitoring program to detect, mitigate, or reverse negative impacts, and maintain and restore the biological integrity of the affected ecosystems. The committee's terms of reference were distributed widely for public comment and were made available on the Internet.

As noted above, if a revised environmental impact assessment is submitted to the Ministry of the Environment, Natural Resources and Fisheries, it will be

forwarded to the scientific advisory committee to determine if it meets the criteria set forth in the terms of reference.

The Marine Mammal Commission wrote on 18 December 1996 to Mexico's Secretary of the Environment, Natural Resources and Fisheries, commending the Secretary on Mexico's decision to establish a panel of experts to examine critical issues related to the proposed salt works facility. In its letter, the Commission also commended the Secretary for adopting a process that provides opportunities for public review and comment on this and future proposals for similar developments in areas affecting gray whales.

It is the Marine Mammal Commission's understanding that a revised assessment had not been submitted by the end of 1996.

### **Development of Ecotourism at the Gray Whale Breeding Lagoons**

As noted earlier, another human activity that might inhibit gray whale use of Mexico's lagoons is the further development of whale-watching and other ecotourism activities at the lagoons. Mexico, too, has become concerned about the potential adverse effects of these activities on gray whales. As a result, research is underway at San Ignacio Lagoon and elsewhere along the coast of Baja California to quantify the level of boat traffic, including whale-watching vessels, in the lagoons, and to assess the possible effects of the boats and tourism-related activities on gray whales and other resources.

Recognizing the importance and quality of the work, the Commission wrote to the director of the El Vizcaino Biosphere Reserve on 13 December 1996 commending the director on the program of studies on potential impacts of boat traffic that he had implemented. The Commission asked to be kept advised of the progress and results of the studies.

### **Request for Subsistence Take of Gray Whales**

The International Whaling Commission (IWC) is the international organization responsible for setting catch limits for both commercial and aboriginal

whaling (see Chapter IV). In May 1995 the Makah Tribal Council of the Pacific Northwest wrote to the Departments of Commerce and State indicating that the Council intended to ask the agencies formally to seek approval by the IWC for an annual ceremonial and subsistence harvest of up to five gray whales. The Council indicated that whaling has been a traditional part of the tribe's way of life. Also, it contended that there were no legal impediments to the tribe's rights to take whales because the eastern North Pacific gray whale stock had been removed from the Endangered Species Act's list of endangered and threatened wildlife and because the enactment of the Marine Mammal Protection Act had not abrogated the rights under the 1855 Treaty of Neah Bay.

The Council indicated that it planned to ask the Departments of Commerce and State to present the proposal requesting authorization by the IWC to take five gray whales. The National Marine Fisheries Service and the Department of State reviewed the proposal and related information and decided to seek a quota in 1996 from the IWC on behalf of the Makah. However, at the 1996 IWC meeting the United States announced that, after consultation with the Makah representatives, it was withdrawing the proposal and asked the IWC to defer consideration until next year.

### **Vaquita** *(Phocoena sinus)*

The vaquita, or Gulf of California harbor porpoise, is one of the world's rarest and least understood marine mammals. It occurs only in the Gulf of California, Mexico, and has one of the most limited ranges of any marine cetacean. The historic size of the vaquita population is not known. However, recently revised population estimates, based on ship and aircraft surveys done between 1986 and 1993, are as low as 224 and as high as 885. Incidental mortality in a large-scale, mostly small-boat gillnet fishery has been and continues to be the greatest threat to the species. As described below, a number of measures have been taken to conserve the species; however, evidence suggests that incidental mortality continues,

productivity in the species is low, and, therefore, the small population shows no signs of recovery.

The results of recent studies further emphasize the gravity of the species' condition. For example, age and reproductive data from a sample of 56 vaquitas obtained between 1985 and 1993 suggest that the life history of the vaquita is similar to that of harbor porpoise populations found elsewhere. However, the potential rate of increase may be lower in the vaquita because the vaquita does not calve annually. The sample consisted mainly of young and old individuals, suggesting that there may be few adults of prime reproductive age. The analysis also revealed the presence of unusual ovarian pathologies in many of the females.

One positive note, however, is that anthropogenic contaminants probably are not an immediate threat to the species inasmuch as studies have showed that chlorinated hydrocarbons and polychlorinated biphenyls occur in low levels in the vaquita relative to small cetaceans in other parts of the world.

In 1979 the vaquita was listed on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora. That same year the International Union for the Conservation of Nature and Natural Resources (now IUCN-The World Conservation Union) listed the species as vulnerable in its Red Data Book. This classification was upgraded to endangered in 1991. In 1985 the vaquita was listed as endangered under the U.S. Endangered Species Act.

### **Incidental Mortality in Gillnets**

As noted above, the greatest threat to the vaquita is entanglement in fishing gear, particularly gillnets, the most widely used fishing gear in the northern Gulf of California. Although there is little information on historic levels of incidental mortality, the vaquita probably has been incidentally caught in gillnets since the mid-1920s.

The vaquita is known to have been caught incidentally since the mid-1940s in the commercial fishery for the totoaba — a highly prized fish that also occurs only in the Gulf of California. Due to a decline in totoaba catches from a peak of 2,261 tons in 1942 to

59 tons in 1975, the Mexican Government declared a permanent ban on fishing the species in 1975. The totoaba also was listed as endangered in 1979 under the U.S. Endangered Species Act, in part, to help stop the illegal sale of the fish in the United States. However, bans on this fishery have been difficult to enforce, and illegal fishing has continued in the northern Gulf of California.

In recent years, research efforts have been made to quantify vaquita mortality in fishing gear. At least 166 vaquitas are known to have been killed incidentally since the early 1970s, including 128 caught incidentally between 1985 and 1992. Most of these deaths occurred in gillnets illegally set for totoaba. The remainder were taken in nets set for sharks, rays, and mackerels. The deaths of 14 vaquitas were documented in gillnet fisheries in 1993 and 1994. Extrapolation of these data to the entire fleet yielded an estimate of 39 vaquita deaths per year in those two years.

Monitoring of fisheries has not included all fishing communities, and fishermen probably do not report all incidental takes. The total mortality, therefore, is almost certainly higher than that reported. Given the size of the vaquita population and its low potential rate of increase, it is likely that the population cannot sustain the current rate of fishery-related mortality.

### Efforts To Strengthen Import Restrictions

Some totoaba caught in Mexico may be illegally imported into the United States. After the fish has been filleted, it is impossible to distinguish totoaba from closely related species by visual inspection. To limit the illegal importation of totoaba into the United States, researchers at the National Marine Fisheries Service developed a biochemical test to identify totoaba fillets. The test was developed, at least in part, in response to recommendations provided to the Service by the Marine Mammal Commission in the early 1990s, in which the Commission urged the Service to develop the test to help halt the import of totoaba into the United States.

The National Marine Fisheries Service and the U.S. Customs Service worked intensively in 1993 to intercept illegally imported totoaba at eight border crossing sites. Officials seized ten fillets suspected of

being totoaba. Based on the results of biochemical test, however, none were totoaba. In 1994 and 1995 Service enforcement officers and Customs officials made spot checks for totoaba fillets and responded to any reports of suspected illegal fillets. During these activities, no totoaba were identified. Therefore, if some illegal totoaba meat is finding its way to U.S. markets, it would appear that the volume is not great.

### Conservation Efforts within Mexico

In June 1993 the Government of Mexico established the Upper Gulf of California and Colorado River Delta Biosphere Reserve. The goals of the reserve are to protect vaquitas and other unique species, such as totoaba, desert pupfish, and various bird species; to protect Sonoran Desert and upper Gulf of California ecosystems; and to promote scientific investigation and environmental education in the region. Within the reserve, certain activities, *e.g.*, tourism, research, fishing, and aquaculture, are managed within no-use, controlled-use, and active-use areas. However, gillnet fishing is still permitted within the areas of the reserves where vaquita sightings are most common.

A management plan for the reserve, released on 7 June 1996, describes the physical, biological, social, and economic environments of the area, and reviews activities underway to study and protect the unique resources in the reserve. Among the goals identified in the plan are reducing immediate threats to vaquitas and other protected species, and ensuring the managed and sustained use of the area's natural resources. Also in 1996 a reserve director and staff were appointed and work has been initiated to implement the management plan.

On a related point, Mexico's Instituto de la Pesca recently formed a scientific advisory group to advise Mexico on the studies and actions needed to recover the species. The group consists of experts from Mexico, the United States, and elsewhere, and is expected to meet for the first time in January 1997.

## International Efforts To Protect the Vaquita

At its 1991 meeting the International Whaling Commission's Scientific Committee recommended that actions be taken to fully enforce the totoaba fishery closure. The Committee also recommended that a management plan be developed that includes provisions for an evaluation of incidental take of vaquitas in fisheries and a program to monitor the status of the species. At its 1994 meeting the IWC's Scientific Committee commended the Mexican Government for its efforts to protect the vaquita, but concluded that the reported levels of incidental catch could result in extinction of the species. The Committee recommended that the incidental mortality of vaquita be monitored and that surveys be conducted to improve abundance estimates. In response to the Scientific Committee's findings, the IWC adopted a resolution in 1994 commending the Mexican Government for creating a biosphere reserve in the upper Gulf of California and encouraging it to develop a management plan for the reserve. At the 1995 meeting Mexico reported to the IWC on actions taken with regard to the reserve, including efforts to enforce existing regulations and improve measures to prevent environmental degradation.

At its June 1996 meeting the IWC's Scientific Committee reiterated its deep concern about the vulnerability of the species and again recommended that immediate action be taken to eliminate bycatches of vaquitas in all fisheries in the upper Gulf of California. The IWC adopted a resolution on small cetaceans which, among other things, congratulated the Mexican Government for developing the biosphere management plan and for its strategy for recovering the vaquita.

Given the rarity of the species and a level of incidental mortality that almost certainly cannot be sustained, concerted efforts are needed to recover the vaquita and protect its habitat. The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, will continue to track and, where appropriate, provide advice on activities related to the conservation of this species.

## Gulf of Maine/Bay of Fundy Harbor Porpoise (*Phocoena phocoena*)

Harbor porpoises are among the smallest and shortest-lived of all cetaceans. When fully grown they are less than two meters in length. Few harbor porpoises live longer than 10 years, and most attain sexual maturity by the age of four. The species occurs only in boreal and temperate regions of the Northern Hemisphere, and its habitat appears to be limited to coastal areas. Throughout their range, harbor porpoises occur in more or less discrete migratory stocks. They feed primarily on small schooling fish, such as herring, capelin, and silver hake.

Along the east coast of North America from Labrador to North Carolina, there appear to be several harbor porpoise stocks. The southernmost of these is the Gulf of Maine/Bay of Fundy harbor porpoise stock (hereafter called the Gulf of Maine harbor porpoise). In summer this stock is concentrated in the Bay of Fundy, Canada, and along the coast of New England in the Gulf of Maine. In winter it appears to be distributed more broadly over the continental shelf from the Bay of Fundy to North Carolina. Because information on the movements of harbor porpoises is limited, it is unclear whether the ranges of the different stocks overlap. However, for management purposes the Gulf of Maine harbor porpoise is considered a discrete group of animals.

Harbor porpoises are prone to becoming entangled in gillnets and, because their prey includes fish species either sought by gillnet fishermen or eaten by other fish sought by gillnet fishermen, areas exploited by harbor porpoises and gillnet fisheries often overlap. In some areas, this has led to significant declines in the size of regional harbor porpoise stocks.

Large numbers of Gulf of Maine harbor porpoises have been caught incidentally as bycatch in both Canadian and New England gillnet fisheries for groundfish (*e.g.*, cod, pollock, and flounder). An additional, although uncertain, level of bycatch also occurs in gillnet fisheries between New York and North Carolina.

## Research and Management Activities Prior to 1996

As an interim step for developing a more effective system to reduce the incidental take of marine mammals in commercial fisheries, Congress amended the Marine Mammal Protection Act in 1988. In part, it required the National Marine Fisheries Service to establish an observer program to better document marine mammal incidental-take levels in U.S. fisheries, and to improve information on the status of marine mammal stocks so that the impact of such taking could be better evaluated.

The National Marine Fisheries Service began an observer program for the New England sink gillnet fishery in 1990. By extrapolating bycatch rates from observed fishing trips to the entire fishery, the Service has been able to estimate annual harbor porpoise incidental-take levels for the New England gillnet fishery for the years 1990 to 1995. The Canadian Department of Fisheries and Oceans, also concerned about high bycatch levels of harbor porpoises, began a similar monitoring program for the gillnet fishery in the Bay of Fundy in 1993. Results of these efforts are shown in Table 9.

The timing and location of harbor porpoise bycatch shift seasonally as harbor porpoises migrate. Since observer efforts began, the largest bycatch has been in coastal waters from northern Massachusetts to southern Maine. The peak bycatch period has usually occurred as a several-week pulse between September and December, but the timing of the pulse has varied unpredictably from year-to-year. A topographic feature called Jeffreys Ledge at the southern end of the area has consistently been the focus of both the greatest fishing effort and the greatest bycatch. Lower, but significant bycatch levels also occur in this area in spring. Considering bycatch in both fall and spring fishing seasons, the area accounts for more than half of the total annual bycatch in the New England sink gillnet fishery. Bycatch levels comparable to the spring fishery in the above area also have occurred in waters off central and northern Maine in summer and early fall. Relatively low bycatch levels have occurred in Massachusetts Bay, and off the Rhode Island-southern Massachusetts coast in spring.

**Table 9. Estimates of harbor porpoise bycatch in the Gulf of Maine (U.S.) and Bay of Fundy (Canada) groundfish gillnet fisheries for the years 1990-1995<sup>1</sup>**

<u>Year</u>	<u>Gulf of Maine<sup>2</sup></u>	<u>Bay of Fundy<sup>3</sup></u>
1990	2,900 (1,500-5,500)	—
1991	2,000 (1,000-3,800)	—
1992	1,200 ( 800-1,700)	—
1993	1,400 (1,000-2,000)	424 (200-648)
1994	2,100 (1,400-2,900)	101 ( 80-122)
1995	1,400 ( 900-2,500)	87

<sup>1</sup> Numbers in parentheses are ranges of the 95 percent confidence interval where available.

<sup>2</sup> Bisack, K.D. In review. Harbor Porpoise Bycatch Estimates in the U.S. North Atlantic Sink Gillnet Fisheries, 1994 and 1995. Reports of the International Whaling Commission.

<sup>3</sup> Trippel, E.A. 1996. Harbor Porpoise Bycatch. DFO Maritimes Regional Fisheries Status Report 96/3E. Canadian Department of Fisheries and Oceans. Dartmouth, Nova Scotia.

Information on bycatch south of New England has come principally from harbor porpoise carcasses that wash ashore with net marks or attached fragments of net. In some years, the cause of death for as many as 25 stranded carcasses has been attributed to human causes thought to involve with gillnet fisheries. Most have been found during winter and early spring between New York and North Carolina. It is not yet clear which fisheries are involved or precisely how large the bycatch may be.

To improve estimates of the size of the Gulf of Maine harbor porpoise stock, the Service conducted summer surveys in the Gulf of Maine and the Bay of Fundy in 1991, 1992, and 1995. The results produced stock size estimates of 37,500 porpoises (95 percent confidence interval 26,700 to 86,000) from 1991 data, 67,500 porpoises (95 percent confidence interval 32,900 to 104,600) from 1992 data, and 74,000 (95 percent confidence interval 40,900 to 109,100) from 1995 data. Because harbor porpoises spend little time at the surface and because their distribution may vary from year to year depending on oceanographic conditions, they are very difficult to

survey. Confidence intervals for the stock size estimates are therefore very wide, and the estimates are not useful for assessing population trends between years. However, to develop a best estimate of abundance, Service scientists have pooled data from the three surveys and calculated a weighted stock size estimate of 54,300 harbor porpoises.

In light of developing information on the status of Gulf of Maine harbor porpoises and an absence of management measures to reduce the bycatch, the Sierra Club Legal Defense Fund petitioned the Service in September 1991 to list the stock as threatened under the Endangered Species Act. The Service concluded that the petition had merit and requested comments on the petition. After reviewing comments by the Commission and others, the Service published a proposed rule in the *Federal Register* on 7 January 1993 to list the stock as threatened. In doing so, the Service noted that at least 2,000 harbor porpoises per year were then being caught incidentally in regional gillnet fisheries, and it concluded that the bycatch level was exceeding sustainable levels. Further action on the petition, however, has been deferred pending related actions to reduce the take.

In October 1992 the Service asked the New England Fishery Management Council to develop measures to reduce harbor porpoise bycatch in the New England sink gillnet fishery. The Council agreed to do so under its northeast multispecies fishery management plan, which includes provisions for managing the New England sink gillnet fishery for groundfish. To help in this regard, the Service's Northeast Fisheries Science Center summarized information on the distribution of harbor porpoise bycatch. Based on that analysis, the Council began developing a system of time-area closures to be implemented as amendment 5 to its multispecies plan. Pending completion of that amendment, however, the Council proposed reducing bycatch to levels not more than two percent of the estimated size of the harbor porpoise population by phasing in monthly limits on fishing days. The Commission and others commented on the proposal late in 1993. The interim measures were adopted by the Service on 1 March 1994.

As the Service was adopting the interim measures, however, the Council was completing work on

amendment 5 which was to replace the interim rules. Among other things, Amendment 5 proposed a new goal which sought to reduce harbor porpoise bycatch by 20 percent per year over a four-year period. It also included measures for establishing a harbor porpoise review team, which was to meet annually and provide advice to the Council on needed changes to the bycatch reduction measures, and time-area fishing closures to reduce harbor porpoise bycatch. The proposed time-area closures for the first year were as follows (see also Figure 4): Massachusetts Bay, closed during the month of March; the mid-coast area, closed during the month of November, and a northeast area, closed between 15 August and 13 September. A fourth area, the Jeffreys Ledge band, was left open even though it had experienced some of the highest observed bycatch levels. The Council's recommendations were adopted by the Service and published as final rules in the *Federal Register* on 25 May 1994. The measures took effect in the 1994 summer fishing season in the northeast area.

In the fall of 1994 fishermen and scientists collaborated on a study to test the effectiveness of acoustic deterrents (pingers) attached to gillnets to divert approaching porpoises and thereby prevent entanglement. The study was carried out in the Jeffreys Ledge area. Active and inactive alarms were deployed on equal numbers of gillnets, and the incidental catch of harbor porpoise was recorded by independent observers. Neither fishermen nor observers knew whether nets were equipped with active or inactive alarms; during 421 sets with inactive alarms, 25 porpoises were incidentally caught, while during 423 sets with active alarms, only two porpoises were caught.

As noted in its previous annual report, the Commission reviewed results of the study in 1995 at the request of the New England Fishery Management Council. The Commission concluded that the results were very promising, but that several important questions remained unanswered. Among these are whether porpoises will habituate to alarm sounds over time, rendering alarms less effective, whether the effectiveness of the alarms differs in other parts of the species' range or at different times of the year, and whether alarm sound could cause harbor porpoises to abandon preferred habitat over time.

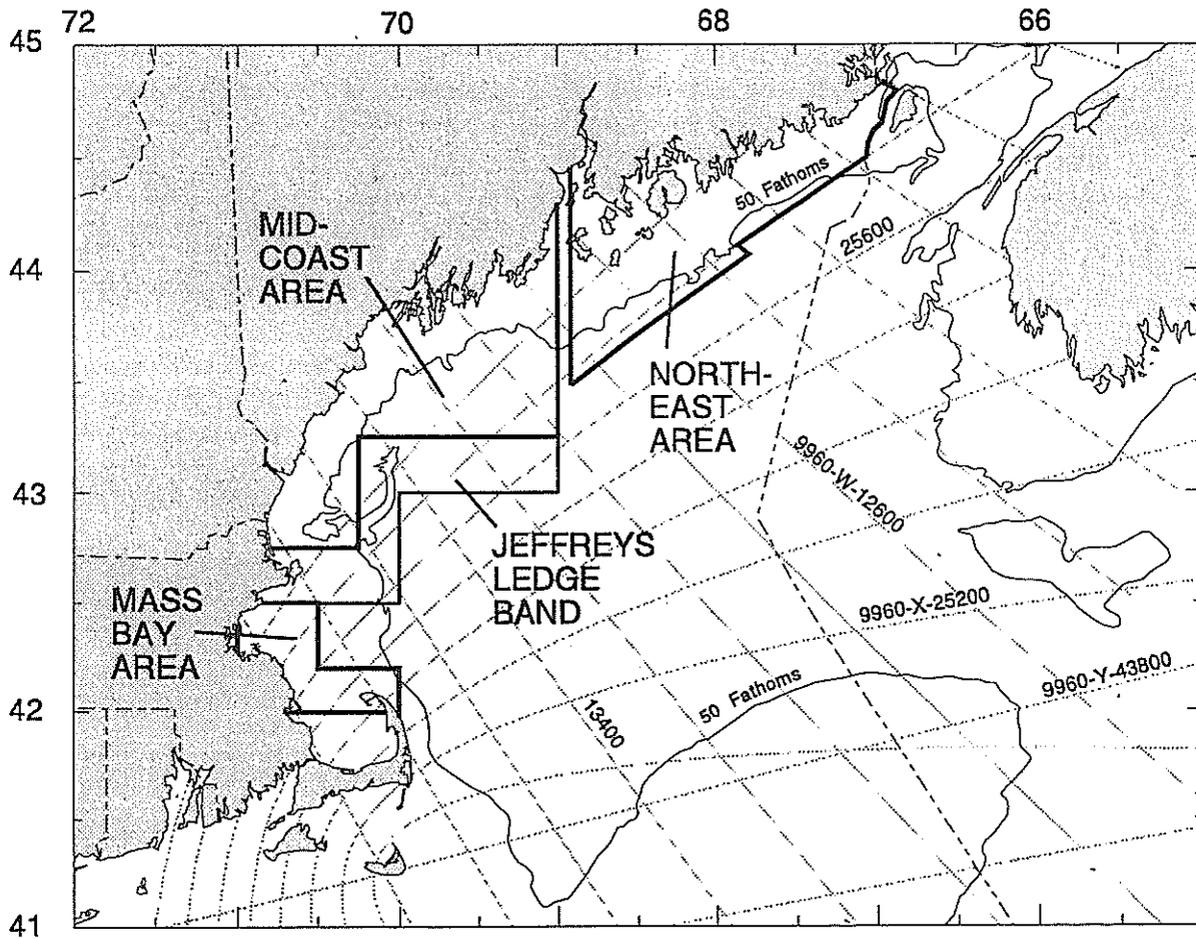


Figure 4. Harbor porpoise bycatch management areas

Also in the fall of 1994 Congress again amended the Marine Mammal Protection Act to establish a new regime for managing the incidental take of marine mammals in commercial fisheries (see Chapter III). In part, the amendments require the National Marine Fisheries Service to prepare stock assessment reports for each marine mammal stock in U.S. waters. The assessments are to calculate the potential biological removal level (other than natural mortality) that could be taken annually from the stock and still allow it to increase to or remain within its optimum sustainable population level. The Service also must determine if the stock is a "strategic" stock for which it must form a take reduction team and prepare a take reduction plan.

Pursuant to these amendments, the Service completed a stock assessment report for Gulf of Maine harbor porpoises in August 1995. It calculated a potential biological removal level of 403 harbor porpoises per year, well below the estimated bycatch rates, and determined that the stock was a strategic stock. Given these findings, the Service decided to establish a take reduction team to develop a take reduction plan, and late in 1995 it invited representatives of the fishing industry, the environmental community, and involved government agencies, including the Marine Mammal Commission, to participate on the team (see below).

The Council took no action to modify the time-area closures for year two of its four-year program

until information on the 1994 bycatch levels became available from the Service. In August 1995 the Service completed its preliminary analysis of 1994 bycatch data, which indicated the fall harbor porpoise bycatch rate in the Jeffreys Ledge area was three times greater than rates observed between 1991 to 1993. The analysis also indicated that the fall 1994 time-area closure had been too brief and too narrow geographically to reduce harbor porpoise bycatch. The area's peak bycatch in 1994 occurred in September and October, while the closure period was in November. Because bycatch in the Jeffreys Ledge area in fall constitutes a significant portion of total bycatch in the New England fishery, it was apparent that harbor porpoise bycatch had increased in 1994, rather than decreased, under the Council's recommended measures.

In September 1995 the Council convened a meeting of its Harbor Porpoise Review Team to consider the above information. By the time it was available, however, it was too late to revise rules for the beginning of the 1995 fall fishery in the Jeffreys Ledge area (*i. e.*, September or October). The team therefore recommended extending the November closure through December and expanding the boundary of the mid-coast area to include the Jeffreys Ledge band. The Council agreed and, based on its recommendation, the Service published a rule on 30 October 1995 revising the boundary of the mid-coast area to include the Jeffreys Ledge band and closing the area to gillnetting from 1 November to 30 December, the end of the area's fishing season. Given results of the 1994 study of acoustic deterrents at Jeffreys Ledge, the Council also recommended that fishing be permitted within the Jeffreys Ledge portion of the redefined closure area if gillnets were equipped with pingers. The purpose of this was to further test the effectiveness of pingers in reducing bycatch. The Service also agreed with this recommendation.

Also late in 1995 the Council began considering other changes in its harbor porpoise bycatch reduction program. Among other things, it asked its Harbor Porpoise Review Team, which includes a representative from the Marine Mammal Commission, to develop advice on modifying its time-area closures.

## Fisheries Management Actions in 1996

As discussed below, the National Marine Fisheries Service convened a Gulf of Maine harbor porpoise take reduction team in 1996 to develop a recommended take reduction plan for New England sink gillnet fisheries. Pending implementation of that plan, responsibility for developing measures to reduce harbor porpoise bycatch remains with the New England Fishery Management Council and the Service. According to schedules set by the Marine Mammal Protection Act, the Service is to implement the take reduction plan by mid-1997; however, as indicated below, the Service has not adhered to that schedule and, as of the end of 1996, it was uncertain when the final plan would be adopted and implemented.

As noted above, the Council and the Service late in 1995 expanded the size and time period of the fall mid-coast closure. The action was taken in response to information indicating that harbor porpoise bycatch levels actually increased in 1994 despite measures taken to address the problem. The Council and the Service therefore considered additional measures during 1996.

Early in 1996 the Council recommended two new closures to reduce harbor porpoise bycatch in the spring gillnet fishing season: one proposed closing the expanded mid-coast area (including the Jeffreys Ledge band) to gillnet fishing from 25 March and 25 April, and the other proposed closing an area not previously regulated off Rhode Island and southern Massachusetts during the month of March. The latter closure was developed to address new information that became available in 1995 indicating that a low, but perhaps increasing, level of take was occurring. Given the results from the 1994 experiment to reduce bycatch levels by attaching pingers to gillnets, the Council recommended that fishing be allowed in both areas during the closed periods if gillnets were equipped with pingers. The Service concurred with the Council's recommendations and, following an expedited rulemaking process, it published final rules in the *Federal Register* on 5 March 1996 implementing the measures.

On the same day, also at the Council's recommendation, the Service published proposed rules to

implement amendment 7 of the Council's northeast multispecies fisheries management plan. Amendment 7 was developed principally to address the need to reduce fishing effort to protect regional groundfish stocks that had been severely overfished. Among other things, it recommended closing the Jeffreys Ledge portion of the mid-coast area to all groundfish fishing during the month of May for groundfish conservation purposes. The amendment also addressed management needs to reduce harbor porpoise bycatch.

With regard to harbor porpoise, the Council's amendment proposed changing the plan's goal for reducing harbor porpoise bycatch levels to conform with the 1994 amendments to the Marine Mammal Protection Act. The new goal reflected the Act's new directive to reduce incidental-take levels below the calculated potential biological level by April 1997.

On 19 April 1996 the Commission commented to the Service on the proposed amendment. The Commission recommended that the proposed change in the plan's goal for reducing harbor porpoise be adopted. Noting that the new goal would require reducing harbor porpoise bycatch from a 1994 level of about 2,000 to a calculated biological removal level of 403 by April 1997 and that the measures adopted in 1994 had failed to reduce bycatch levels in 1994, the Commission expressed its belief that the network of time-area closures should be expanded. In this regard, it recommended that the Council's Harbor Porpoise Review Team be reconvened in time to make recommendations for the 1996 summer-fall fishing season off central and northern Maine.

To better reflect current data on the peak period of harbor porpoise bycatch in the mid-coast area, the Commission also recommended that the Council and the Service consider expanding effective dates for the mid-coast closure to cover the months of September through December and April through May. Given available information on the effectiveness of acoustic alarms, it also noted that allowing fishing with gillnets equipped with pingers during both mid-coast closure periods would be reasonable.

The Service published final rules implementing amendment 7 on 31 May 1996. No further changes were made at that time in the time-area closures;

however, the proposed change in the goal for reducing harbor porpoise bycatch was adopted, and steps were taken to solicit further advice from the Council's Harbor Porpoise Review Team. At the request of the Council, the team discussed further modifications to the time-area closures on 25 July 1996.

Based on its discussions, the team developed advice to (a) expand the time frame of the fall and spring mid-coast closure to cover the periods of September through December and April through mid-May, (b) modify the boundary of the northeast closure area to include an additional area where harbor porpoise bycatch had been observed in past years, (c) close a northern part of the Massachusetts Bay area that had experienced a fall harbor porpoise bycatch between September and December, and (d) continue the March closure for the area south of Cape Cod.

Citing the team's advice, the Council recommended that the Service change the mid-coast closure to cover the period of 15 September to 15 December. The Service adopted the recommendation and published a rule implementing the change in the *Federal Register* on 11 September 1996. No action was taken regarding other changes raised by the review team.

In other 1996 actions to conserve groundfish stocks, the Service, at the recommendation of the Council, closed the mid-coast area to all fishing, except fishing with gillnets equipped with pingers, for November and December. For 1997 it also closed part of the mid-coast area around Jeffreys Ledge for the month of May to all groundfish fishing. As these measures further reduced fishing effort in high bycatch areas and seasons, they incidentally supplemented protection measures adopted explicitly to address harbor porpoise conservation.

### **Estimates of Harbor Porpoise Bycatch**

As indicated above, data from the observer program have been analyzed to estimate a 1995 harbor porpoise bycatch for northeast gillnet fisheries of 1,400 porpoises. While the estimate is substantially lower than the estimate for 1994, it is the same as the level estimated for 1993 when no harbor porpoise bycatch reduction measures were in place. The

effectiveness of measures adopted through the end of 1995 therefore appears to have been minimal.

As of the end of 1996 the Service's Northeast Fisheries Science Center had not completed a final report on 1995 bycatch data; however, some information was available. High levels of bycatch apparently did not occur in the mid-coast area in September or October of 1995 as they had in 1994. Thus, the fall 1995 bycatch level for this area was much lower than the fall 1994 bycatch level even though the area remained open in September and October.

Some additional information also was available regarding the use of pingers. In November and December 1995, no harbor porpoises were caught in 225 observed hauls of gillnets equipped with pingers in the mid-coast area. These results are consistent with the encouraging findings from the fall 1994 experiment in the same area. Also, no porpoises were caught in 53 observed hauls of alarm-equipped gillnets in the spring south of Cape Cod. However, results were less encouraging for spring fisheries in Massachusetts Bay and the mid-coast area. In 171 observed hauls of gillnets with acoustic alarms in Massachusetts Bay, two porpoise were caught, and in 88 observed hauls in the mid-coast area, 9 harbor porpoises were caught. Bycatch rates from the latter observations are essentially the same as the spring bycatch rates in these areas when no pingers were used. Because of the limited number of observed hauls and reports of non-functioning pingers by fishermen, conclusions about the effectiveness of pingers in these areas are speculative, and the usefulness of pingers in all fishing areas and seasons remains uncertain.

As noted above, information on 1994 bycatch levels was not available for timely management decisions in 1995. In addition, because of changes instituted in 1994 in the way fishing effort data were collected, analyses of the spatial distribution of bycatch, which had provided the basis for defining area closure boundaries, were not possible. The Commission and others raised concern about these issues and, as noted in its past annual report, it wrote to the Service on 10 October 1995 offering the help of an expert statistician on its Committee of Scientific Advisors in undertaking a review of related data management and analysis issues. The offer was

accepted and a presentation of findings from the review was provided at the Commission's annual meeting on 12-14 November 1996.

Based on results of the review, the Commission wrote to the Service on 11 December 1996. The letter noted that the staff of the Northeast Fisheries Science Center had been inundated with many new data management and analysis tasks as a result of recent changes in the basis for estimating bycatch levels. The most important of these changes was the decision to eliminate a port interview system with fishermen and fish dealers to identify the location of fishing effort, in lieu of mandatory fishing trip logbooks. This necessitated creating new databases and entering logbook data. In addition, the staff had been assigned many new tasks due to the 1994 amendments to the Marine Mammal Protection Act (*e.g.*, preparation of marine mammal stock assessments and responding to data requests from take reduction teams). Despite its many new assignments, the Center has received no additional personnel. Given the importance of timely bycatch information for management purposes, the Commission recommended that the Service provide funding for additional personnel to assist with data entry and analysis tasks related to bycatch estimation.

The Commission's letter also noted a need to reassess plans for distributing fishery observers in the Center's sea sampling program. For example, it noted that existing designs for the sampling program may no longer be optimal for estimating bycatch levels, given changes in the patterns of fishing effort, management measures, and other factors. Also, it noted that observer data were a source of information for addressing other management needs, such as evaluating the effectiveness of pingers, and that an optimal program to address multiple needs also could alter plans for distributing observer coverage. To address these questions, the Commission recommended that the Service fund a post-doctoral fellow or an outside statistician to work with Center staff to design an observer program sampling strategy that would be optimal for meeting the most critical data needs.

Finally, the Commission noted the importance of accurate information on the location of fishing effort in fishing trip log books. Among other things, such

data are vital for assuring that the placement of observers is representative of fishing effort and for extrapolating bycatch rates from observer data. In this regard, the Commission noted that one means of obtaining an independent source of data on fishing vessel locations is to place sealed vessel-tracking devices on fishing vessels, as had been done with certain Hawaiian fisheries, and it recommended that the Service investigate the feasibility of placing such devices on New England gillnet fishing vessels, particularly those fishing in high-bycatch areas.

### **Gulf of Maine Harbor Porpoise Take Reduction Team**

As noted above, in response to provisions in the 1994 amendments to the Marine Mammal Protection Act, the National Marine Fisheries Service convened a take reduction team to develop a recommended plan for reducing the incidental take of Gulf of Maine harbor porpoises. Late in 1995 the Service sent letters of invitation for participation on the team to representatives of the affected fisheries, environmental groups, the scientific community, and concerned government agencies, including the Marine Mammal Commission. On 12 February 1996 the Service published a notice in the *Federal Register* announcing the team's formation. The team included 26 members, and a representative of the Canada Department of Fisheries and Oceans also participated as an observer. An independent facilitator was contracted by the Service to lead team discussions, and representatives of the Service's Northeast Fisheries Science Center provided bycatch and other data needed during the team's deliberations.

Pursuant to requirements in the Marine Mammal Protection Act, the team was charged with developing a plan that would include measures to reduce the incidental take of harbor porpoises in New England sink gillnet fisheries to levels below the potential biological removal level within six months of the plan's implementation. The Act requires that, within five years of enactment, measures be developed to reduce bycatch to low levels approaching zero.

As noted above, an assessment of the Gulf of Maine harbor porpoise stock prepared by the Service

in 1995 determined the potential biological removal level for this stock was 403 harbor porpoises per year. In 1996 the Service took steps to update that assessment to consider new information, including results of the 1995 Gulf of Maine harbor porpoise population survey. Although a new stock assessment was not completed in 1995, the Service advised the team that its calculated potential biological removal level would increase to 483 based on the new information.

For planning purposes, the team used this new level and sought to develop a consensus on appropriate measures to reduce the bycatch of harbor porpoises in New England gillnet fisheries such that the total bycatch, including takes in gillnet fisheries in the Bay of Fundy and south of New England, could be reduced below the new potential biological removal level. In this regard, the team assumed further efforts would be taken in these other areas, and was advised by the Service of steps being taken to form a separate take reduction team to address harbor porpoise bycatch issues south of New England. It also was advised by the representative of the Canadian Department of Fisheries and Oceans of efforts to reduce harbor porpoise bycatch in the Bay of Fundy.

During 1996 the team met five times and reached consensus on a recommended first-year plan for New England gillnet fisheries, which it forwarded to the Service on 7 August 1996. As its central component, the plan recommends a modified system of time-area management measures using the existing management areas established by the Council (*i.e.*, the northeast, mid-coast, Massachusetts Bay, and south Cape Cod areas). Fishing within those areas would be seasonally closed to all gillnet fishing or open only for fishing with gillnets equipped with pingers. Specifically, it recommends the following:

Northeast area: closed 15 August-13 September;  
 Mid-coast area (fall): open to gillnets with pingers 15 September to 31 October; closed 1 November to 31 January;  
 Mid-coast area (spring): closed 1 March-15 May except to test pinger effectiveness;  
 Massachusetts Bay: open to gillnets with pingers February and April, closed March;  
 South Cape Cod: open to gillnets with pingers February and April, closed March.

Based on past estimates of harbor porpoise bycatch in these areas and seasons, and assuming a reduction in bycatch if gillnets were equipped with pingers, the team projected a bycatch of 376 harbor porpoises per year by New England gillnet fisheries if the recommended management measures were implemented.

As indicated above, the plan recommends that the Service undertake an experiment to test the effectiveness of pingers in the mid-coast area in spring to determine if acoustic alarms are as effective in spring as they were in the fall 1994 experiment. Among other things, the plan also recommends research on the effects of pingers on harbor porpoises and other marine life, development of a mandatory outreach and training program for fishermen who intend to fish in areas and times open only to gillnets with pingers, and data collection and management tasks related to the estimation of harbor porpoise bycatch levels.

The 1994 amendments to the Marine Mammal Protection Act provide a 60-day period for the Service to review provisions of a recommended take reduction plan once it is submitted. At the end of that period, the plan, along with changes deemed warranted by the Service and proposed implementing regulations, is to be published in the *Federal Register* with a 90-day period for public review and comment. Within 60 days of the close of the comment period, the Service is to publish a final take reduction plan and final implementing regulations.

Under the established schedule, the Service should have completed its review of the team's recommended plan and requested public comments by early October. However, as of the end of 1996 the Service had not yet published a request for comments, and it was not clear when it planned to do so.

## **Polar Bear** (*Ursus maritimus*)

Polar bears are found throughout the Arctic region, both in international waters and within the national boundaries of the United States, Canada, Greenland, Norway, and Russia. The total population, estimated at 21,000 to 28,000 animals, is divided among six

relatively discrete populations. Parts of two of these populations occur in Alaska: the western Alaska (Chukchi/Bering Seas) population, which is shared with Russia; and the northern Alaska (Beaufort Sea) population, shared with Canada (see Figure 5). The total number of polar bears off Alaska is estimated at 3,000 to 5,000 animals.

Stock assessments published by the Fish and Wildlife Service in 1995 indicate that the Chukchi/Bering Seas stock has increased in size during the past 20 years and is now stable. However, population size could not be estimated reliably because of inadequate data. With respect to the Beaufort Sea polar bear stock, the Service's assessment set a minimum population estimate of 1,579 and noted that the stock appears to be growing at an annual rate of about 2.4 percent.

Until the middle of this century, polar bears were taken primarily by Natives for subsistence purposes and for the sale of hides. Beginning late in the 1940s a sport hunt developed that involved trophy hunters using professional guides to hunt animals, sometimes with the use of aircraft. As a result, hunting pressure on polar bear populations in Alaska and elsewhere increased substantially. Recognizing this, the State of Alaska adopted regulations in 1961 to restrict the sport hunting season and require hunters to present all polar bear skins for tagging and examination. At the same time, preference was provided to subsistence hunters and a prohibition was adopted on shooting cubs and females with cubs. Between 1961 and 1972 an average of 260 polar bears was taken annually in Alaska, 75 percent of which were males. In 1972 the State banned hunting with the use of aircraft.

Also in 1972, enactment of the Marine Mammal Protection Act established a moratorium on the take of polar bears and other marine mammals and transferred management responsibility from the states to the Federal Government. Under the Act, Alaska Natives are allowed to take polar bears and other marine mammals for subsistence purposes and for purposes of creating and selling traditional handicrafts and clothing. The Act does not restrict the number of animals that can be taken or prohibit the take of cubs or females with cubs by Alaska Natives, provided that the take is not wasteful and the population is not determined to be depleted.

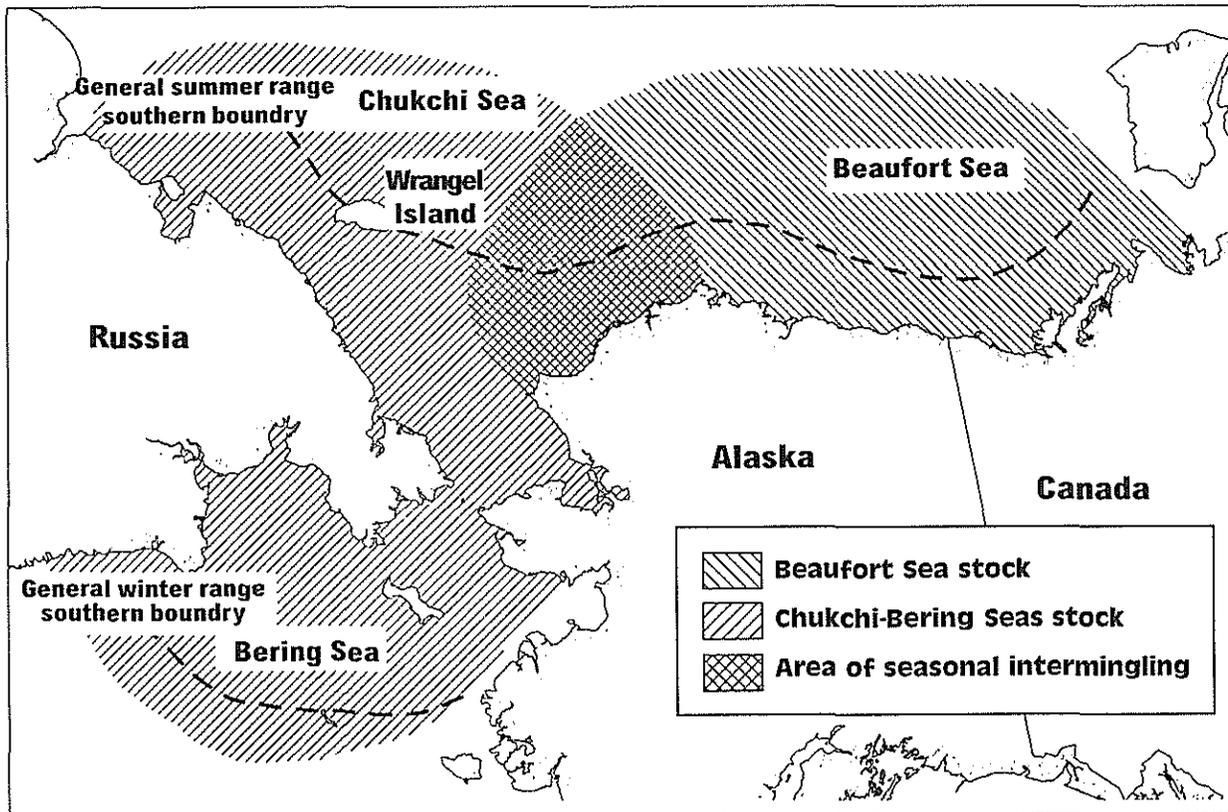


Figure 5. Range of the Beaufort Sea stock and the Chukchi-Bering Seas stock of polar bears

The Act also provides other exceptions to its taking prohibition, including a general waiver provision. While it is possible that sport hunters could seek a waiver for the moratorium for polar bears in Alaska, they have not done so. The taking of polar bears incidental to oil- and gas-related activities in the Beaufort and Chukchi Seas has been authorized by the Fish and Wildlife Service. These authorizations are discussed in Chapter VIII.

Because the range of many polar bear populations crosses national boundaries, efforts to protect and conserve polar bears require cooperation among the species' range states. Concern over the dramatic increase in the polar bear harvest levels in the 1950s and 1960s led to negotiation of the international Agreement on the Conservation of Polar Bears. The agreement was concluded in 1973 by the Governments

of Canada, Denmark (for Greenland), Norway, the Soviet Union, and the United States.

In 1994 Congress amended the Marine Mammal Protection Act, adding a number of measures related to polar bears. Among these was a provision allowing for the issuance of permits to import sport-hunted polar bear trophies legally taken by U.S. citizens in Canada. Efforts by the Fish and Wildlife Service to promulgate regulations for imports are discussed in Chapter V. The 1994 amendments also called on the Secretary of the Interior to initiate two reviews relative to the 1973 polar bear agreement. Activities in this regard are discussed in Chapter V, along with efforts related to other international agreements regarding polar bears. Chapter V also describes ongoing efforts to develop a cooperative U.S.-Russian research and management agreement for the shared polar bear population.

## **Polar Bear Conservation Plan**

In 1988 Congress amended the Marine Mammal Protection Act to direct the Secretaries of the Interior and Commerce to develop conservation plans for depleted and, when appropriate, non-depleted marine mammal species and populations. In January 1989 the Marine Mammal Commission recommended to the Fish and Wildlife Service that it prepare conservation plans for polar bears, walruses, and sea otters in Alaska. The Service agreed and, to help in this task, the Commission developed and provided preliminary draft conservation plans for the three species. The preliminary draft plan for polar bears was forwarded to the Service on 28 June 1992.

As discussed in previous annual reports, from 1992 through 1994 the Commission worked closely with the Service to ensure that the polar bear conservation plan accurately identified research and management actions necessary to maintain populations in Alaska within their optimum sustainable population range, as required by the Marine Mammal Protection Act. In September 1994 the Service forwarded to the Commission and others the final conservation plan for the polar bear in Alaska, as well as conservation plans for walruses and sea otters in Alaska. The Service noted that the plans would be reviewed annually and considered for rewriting and updating in three to five years.

## **Co-Management Agreements**

As discussed in Chapter V, the 1994 amendments to the Marine Mammal Protection Act included a new section 119, which authorized funding for and encouraged development of cooperative agreements between the Secretaries of Commerce and the Interior and Alaska Native organizations to conserve marine mammals. Under such agreements, the Secretary may make grants to Native organizations for collecting and analyzing data on marine mammal populations, monitoring the taking of marine mammals for subsistence purposes, participating in marine mammal research, and developing marine mammal co-management programs with Federal and state agencies.

During 1996 the Fish and Wildlife Service and the Alaska Nanuuq Commission made significant progress

toward completing a co-management agreement for polar bears. Under the pending agreement, in fiscal year 1997 the Service would transfer \$90,000 to the Nanuuq Commission to cover operational expenses and to support efforts to conclude bilateral agreements between the United States and Russia on conservation of polar bears in the Bering and Chukchi Seas. At the end of 1996, the co-management agreement had not been signed; this was expected to occur early in 1997.

## **Marking, Tagging and Reporting Program**

As noted above, the Marine Mammal Protection Act allows Alaska Natives to take marine mammals for purposes of subsistence and for making and selling traditional handicrafts. Under amendments to the Act adopted in 1981, the Fish and Wildlife Service and the National Marine Fisheries Service were provided specific authority to establish marking, tagging, and reporting programs to monitor the Native harvest of marine mammals. Pursuant to this authority, the Fish and Wildlife Service established such programs for sea otters, walruses, and polar bears. The purpose of the programs is to obtain biological data needed to manage the species and stocks and to help control illegal trade in products from those species.

Marking, tagging, and reporting regulations were issued by the Fish and Wildlife Service on 28 June 1988. They require that within 30 days of taking a polar bear, walrus, or sea otter, Native hunters must report the take to an authorized Service agent and present specified parts, including polar bear hides, to be marked and tagged. Since promulgating its regulations, the Service has worked closely with Native groups and the State of Alaska to implement the marking, tagging, and reporting program. Recorded data obtained from the program are maintained by the Service in a computerized database. During the harvest year running from 1 July 1995 to 30 June 1996, 32 polar bears were presented for marking and tagging by Alaska Natives. The number of polar bears tagged for the harvest years 1989-1990 through 1994-1995 were 99, 76, 59, 65, 120, and 88, respectively.

## Chapter III

### MARINE MAMMAL-FISHERIES INTERACTIONS

Marine mammals may be disturbed, harassed, injured, or killed either accidentally or deliberately during fishing operations. They also may take or damage bait and fish caught on lines, in traps, and in nets, damage or destroy fishing gear, or injure fishermen trying to remove them from fishing gear. Marine mammals also may compete with fishermen for the same fish and shellfish resources.

In 1994 the Marine Mammal Protection Act was amended to establish a new regime to govern the taking of marine mammals incidental to commercial fishing operations. As in the past, however, the incidental take of dolphins in the eastern tropical Pacific tuna fishery continues to be regulated under separate provisions of the Act. In 1996 the Magnuson-Stevens Fishery Conservation and Management Act, under which U.S. fisheries are managed, also was amended. Regulations under this Act also may include provisions to reduce fishery-marine mammal interactions.

Provisions of these Acts and actions to reduce incidental take are discussed below. This chapter also provides information on the establishment of pinniped-fishery interaction task forces, as required under the Marine Mammal Protection Act. Fishery interactions affecting Hawaiian monk seals, harbor porpoises, vaquitas, and right whales are discussed in Chapter II.

#### **Reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act**

The Magnuson-Stevens Fishery Conservation and Management Act (originally the Magnuson Fishery Conservation and Management Act) was enacted in 1976 in response to the growing exploitation of U.S. fishery resources by foreign fishermen in the late

1960s and early 1970s. The Act exerted sovereign rights over marine resources within a 200-nautical-mile Exclusive Economic Zone along the coasts of the United States and provided for a program of sound conservation and management practices with respect to fishery resources within that zone.

The Magnuson-Stevens Act established eight regional fishery management councils, comprised of Federal and state officials and representatives of affected fishermen and environmental groups, to develop fishery management plans for those fish stocks that require conservation and management. The councils may include a variety of management measures in these plans, including permitting requirements, time-area restrictions, gear and vessel limitations, and restrictions on the species, size, and number of fish that may be caught.

Fishery management plans and amendments to them are implemented by regulations that become effective only after the Secretary of Commerce determines that they are consistent with national standards set forth in the Act. The Secretary may also develop or amend a plan on his own initiative if the council with jurisdiction over a fishery fails to take necessary action within a certain period of time.

Prior to 1996 the Magnuson-Stevens Act was last reauthorized in 1990. That authorization for appropriations to carry out activities under the Act expired at the end of 1994. Although legislation to reauthorize the Act was considered in 1993 and 1994, no bill was passed. In 1995 two bills to reauthorize and amend the Act were introduced, S. 39 and H.R. 39. A compromise measure, incorporating features of each bill, was enacted on 11 October 1996 as the Sustainable Fisheries Act (Public Law 104-297). The Act amended several provisions of the Magnuson-Stevens Act and authorized appropriations for carrying out the provisions of that Act through fiscal year 1999.

The most significant amendments stem from two new findings that, to some degree, signal a shift in the policies underlying the Magnuson-Stevens Act. First, Congress found that —

[c]ertain stocks of fish have declined to the point where their survival is threatened, and other stocks of fish have been so substantially reduced in number that they could become similarly threatened as a consequence of...increased fishing pressure..., the inadequacy of fishery resource conservation and management practices and control..., or direct and indirect habitat losses which have resulted in a diminished capacity to support existing fishing levels.

The second new finding added to the Act was that —

[o]ne of the greatest long-term threats to the viability of commercial and recreational fisheries is the continuing loss of marine, estuarine, and other aquatic habitats. Habitat consideration should receive increased attention for the conservation and management of fishery resources of the United States.

In response to this concern, the amended Act now requires each fishery management plan to include a description of essential fish habitats for the fishery. The plan must also identify steps to minimize, to the extent practicable, adverse effects on such habitats caused by fishing. The National Marine Fisheries Service is to publish regulations by 11 April 1997 establishing guidelines to assist the councils in identifying and describing essential fish habitats. In addition, each Federal agency is required to consult with the Service regarding those activities that may adversely affect such habitats. If the Service determines that essential habitats would be adversely affected, it must recommend measures that can be taken to conserve the habitats.

With respect to overfishing, the amendments direct that fishery management plans specify “objective and measurable criteria” for identifying when the fishery to which the plan applies is overfished and contain conservation and management measures to prevent or end overfishing and rebuild the fishery. The National Marine Fisheries Service must report annually to

Congress and to the fishery management councils identifying those fisheries that are overfished or approaching that condition. Within a year of any such identification, the council is to prepare or amend any applicable fishery management plan to end or prevent overfishing and to rebuild stocks within a certain time (generally no more than 10 years). At the request of the council, the Service may establish a fishing capacity reduction program if necessary to prevent or end overfishing, rebuild the affected stocks, or achieve measurable improvement in the conservation and management of the fishery.

The amendments also reflect Congressional concern about the extent of bycatch of non-target species in some fisheries. A new national standard was added to the Magnuson-Stevens Act requiring that fishery management plans include measures to minimize bycatch to the extent practicable. Congress did not intend, however, that these measures ban certain types of fishing gear or practices or impose costs on fisherman and processors that cannot reasonably be met.

The Sustainable Fisheries Act also included several other more technical or fishery-specific amendments to the Magnuson-Stevens Act and other related laws. Some amendments, for example, tightened the conflict of interest standards applicable to members of fishery management councils and streamlined the process by which fishery management plans are reviewed and implemented.

Other amendments are more closely tied to the Marine Mammal Protection Act. One amendment requires the National Marine Fisheries Service by 11 October 1997 to publish for public comment a proposal for a standardized vessel registration and information management system that would integrate those systems currently implemented under the Magnuson-Stevens Act, the Marine Mammal Protection Act, and other laws. Another provision requires the Service to promulgate regulations to determine when vessels should not carry observers because of inadequate facilities or unsafe conditions and to specify actions to correct those conditions. While these regulations would be issued under the Magnuson-Stevens Act, they presumably would be applicable to decisions regarding the placement of observers under the Marine Mammal Protection Act as well. The Sustain-

able Fisheries Act also includes one minor amendment to the Marine Mammal Protection Act, a slight revision of the Act's definition of the term "waters under the jurisdiction of the United States."

### **Implementation of the New Incidental-Take Regime for Commercial Fisheries**

Since its enactment in 1972, the Marine Mammal Protection Act has contained provisions for authorizing the taking of marine mammals incidental to commercial fishing operations. The 1987 decision in a legal challenge of an incidental-take permit issued to Japanese salmon fishermen operating in U.S. waters (*Kokechik Fishermen's Association v. Secretary of Commerce*), however, threw into question whether incidental-take permits could continue to be issued to many other fisheries. In response, Congress created a five-year interim exemption to govern incidental taking, during which time a new long-term incidental-take regime would be developed.

As discussed in previous annual reports, the Marine Mammal Protection Act was reauthorized and amended in 1994. The most significant amendments established a new regime to govern the take of marine mammals incidental to commercial fishing operations. Three new sections were added to the Act to address interactions between commercial fisheries and marine mammals.

Section 117 requires the preparation of marine mammal stock assessments to provide a scientific basis for the new incidental-take regime. The assessments, among other things, are intended to identify strategic stocks for which take reduction plans must be prepared.

Section 118 sets forth requirements for the new incidental-take regime. It directs the National Marine Fisheries Service to publish a list of commercial fisheries classified according to the frequency with which they kill or seriously injure marine mammals. Certain requirements (*e.g.*, a registration requirement and a requirement to carry observers) are applicable, depending on a fishery's classification. The amend-

ments focus resources on the most pressing marine mammal-fishery interaction problems – those involving strategic stocks. A take reduction plan is to be developed for each strategic stock subject to frequent or occasional death or serious injury in a fishery.

Section 120 addresses interactions between pinnipeds and fishery resources. It provides a mechanism for states to apply to the National Marine Fisheries Service to obtain authorization for the intentional lethal taking of pinnipeds in certain instances. Section 120 also directs the Service to investigate the impacts of growing sea lion and harbor seal populations on the recovery of salmonid stocks and on coastal ecosystems in Washington, Oregon, and California and to establish a pinniped-fishery interaction task force to examine problems involving pinnipeds and aquaculture projects in the Gulf of Maine.

The new regime also includes a mechanism for authorizing a limited incidental take of marine mammals listed as endangered or threatened, something the original statute and the interim exemption did not allow. Such authorizations may be issued under section 101(a)(5)(E), provided the National Marine Fisheries Service (or the Fish and Wildlife Service for manatees) determines that (1) the incidental mortality and serious injury will have a negligible impact on the species or stock, (2) a recovery plan has been or is being developed under the Endangered Species Act, and (3) if required, a monitoring program for relevant fisheries has been established under section 118.

Actions involving the preparation of stock assessments and take reduction plans are discussed in this section and, as they relate to specific marine mammal stocks of concern, in Chapter II. Implementation of the other requirements of section 118 and provisions applicable to endangered and threatened species and deterring marine mammals from damaging gear or catch are also discussed in this section. Actions taken under section 120 are discussed in the sections on pinniped-fisheries interactions and aquaculture.

### **Stock Assessments**

Section 117 of the Marine Mammal Protection Act required the Secretaries of Commerce and the Interior to establish three regional scientific review groups to

help prepare assessments for each marine mammal stock that occurs in U.S. waters. These groups were established in 1994 for Alaska, the Pacific coast, including Hawaii, and the Atlantic coast, including the Gulf of Mexico. They included experts in marine mammal biology, commercial fishing technology and practices, and, in the case of Alaska, Native subsistence needs. Among other things, the regional groups were to advise the Secretaries on (1) the estimated size, status, and trends of marine mammal stocks, (2) uncertainties and research needs regarding stock separation, abundance, and trends, (3) research on modifications in fishing gear and practices to reduce the incidental mortality and serious injury of marine mammals, and (4) potential impacts of habitat destruction on marine mammals and, for strategic stocks, conservation measures to reduce such impacts.

Based on the advice of the regional groups and public comment on draft stock assessments, the Secretaries were to prepare a final assessment for each stock. The Act directed that each assessment —

- describe the geographic range of the stock;
- provide a minimum population estimate, the stock's current and maximum net productivity rates, and current population trend, including the basis for those findings;
- estimate the annual human-caused mortality and serious injury, by source, and, for stocks determined to be strategic stocks, describe other factors that may be causing a decline or impeding recovery;
- describe the commercial fisheries that interact with the stock, including estimates of fishery-specific mortality and serious injury levels and rates, a description of seasonal or area differences in incidental take, and an analysis of whether incidental-take levels are approaching a zero mortality and serious injury rate;
- assess whether the level of human-caused mortality and serious injury would cause the stock to be reduced below its optimum sustainable population or, alternatively, whether the stock should be categorized as a strategic stock; and
- estimate the potential biological removal level for the stock.

As defined in the Act, a stock's potential biological removal level is the maximum number of animals, not including natural mortality, that can be removed from the stock while allowing the stock to reach or remain at its optimum sustainable population level. The potential biological removal level is calculated by multiplying three variables — the minimum population estimate for the stock, one-half of the theoretical or estimated maximum net productivity rate of the stock at a small population size, and a recovery factor of between 0.1 and 1.0. Strategic stocks are those that (a) have a level of direct human-caused mortality exceeding the calculated potential biological removal level, (b) are designated as depleted under the Marine Mammal Protection Act, (c) are listed as endangered or threatened under the Endangered Species Act, or (d) are likely to be listed as endangered or threatened in the foreseeable future.

The National Marine Fisheries Service published a *Federal Register* notice on 25 August 1995 announcing the availability of the final stock assessments for species under its jurisdiction. The Service also published a separate report describing the guidelines used to identify stocks, determine minimum population sizes, estimate maximum net productivity rates, and select appropriate recovery factors.

Of the 145 stocks for which assessments were prepared, 23 were determined to be strategic stocks because the estimated annual mortality incidental to commercial fisheries exceeded the stock's potential biological removal level. Another 21 stocks were determined to be strategic stocks because they were listed as endangered or threatened under the Endangered Species Act or designated as depleted under the Marine Mammal Protection Act. The Service also designated 33 localized stocks of the bottlenose dolphin that inhabit bays, sounds, and estuaries in the Gulf of Mexico as strategic after concluding that the minimum abundance estimates were so low that the take of a single animal in most of those locations would exceed the stock's calculated potential biological removal level. One other stock, the short-finned pilot whale in the Gulf of Mexico, was determined to be a strategic stock because of a low minimum population estimate combined with a relatively high observed rate of fishery-related incidental mortality. While the low estimate may have been the result of

the abundance survey design, the Service nevertheless considered this stock to be strategic as a precautionary measure to reflect the uncertainty in the population data and a potentially high take rate. Two other stocks, the dwarf sperm whale and the pygmy sperm whale in the Gulf of Mexico, were designated as strategic because their potential biological removal levels could not be calculated and because the level of human-caused mortality (*e.g.*, from ingestion of debris and boat strikes) could not be determined.

The National Marine Fisheries Service chose not to calculate the potential biological removal level or make a strategic stock determination for Alaska marine mammals that met three criteria: (1) the stock is not listed as threatened, endangered, or depleted, (2) the stock is subject to taking by Alaska Natives for subsistence purposes, but fisheries-related mortality is absent or relatively minor, and (3) the total estimated human-caused mortality may not be sustainable on a long-term basis. The Service identified three stocks meeting these criteria — harbor seals in the Gulf of Alaska and the Cook Inlet and Norton Sound stocks of beluga whales. The Service believed that developing co-management agreements with Alaska Natives provided a more appropriate means to address removals from these stocks. Therefore, it deferred calculating potential biological removal levels and making status determinations pending development of those agreements.

On 4 October 1995 the Fish and Wildlife Service published assessments for the eight stocks of marine mammals under its jurisdiction. Three stocks, the Florida and Antillean stocks of the endangered West Indian manatee and the threatened California stock of sea otters, were determined to be strategic stocks.

Assessments for strategic stocks are to be reviewed at least annually. For other stocks, assessments must be reviewed at least once every three years. As a first step in reviewing the initial stock assessments, the National Marine Fisheries Service convened a workshop in April 1996 to evaluate the guidelines used to prepare the 1995 stock assessment reports. Several members of the Commission's Committee of Scientific Advisors participated in that workshop. Workshop participants concluded that substantive changes to the guidelines were not needed, but recommended several

clarifications, primarily aimed at ensuring that the default values for various parameters used to calculate potential biological removal levels were interpreted correctly.

At the Commission's November 1996 annual meeting, representatives of the National Marine Fisheries Service and the Fish and Wildlife Service described the status of efforts to review and update stock assessments. The National Marine Fisheries Service indicated that it expected to publish revised stock assessments early in 1997. The Service noted that the revised assessments would discuss habitat concerns for the various stocks, as recommended by the Commission in its comments on the original drafts. Also, the Service was reconsidering its decision to defer calculating potential biological removal levels and making strategic stock determinations for certain stocks taken by Alaska Natives for subsistence. Pending consultations with the Alaska Native community, the Service tentatively expressed its intent to include these elements in the revised stock assessments. It was anticipated that such a change would result in the Gulf of Alaska stock of harbor seals and the Cook Inlet stock of beluga whales being designated as strategic stocks because total human-caused mortality exceeds the calculated potential biological removal level. The Fish and Wildlife Service stated that it was in the process of revising four of its stock assessments, but was deferring revision of the assessments for stocks in Alaska. The Service noted that not much new information was available for the four Alaskan stocks, none of which had been identified as a strategic stock.

### **The Incidental-Take Regime**

Section 118 of the Marine Mammal Protection Act established the new regime governing the take of marine mammals incidental to commercial fishing operations. It requires the classification of fisheries according to the frequency with which marine mammals are taken, registration by fishermen participating in fisheries that frequently or occasionally take marine mammals, monitoring and reporting of incidental taking, and attainment of the goal of reducing incidental mortality and serious injury of marine mammals in commercial fisheries to insignificant levels approaching zero within seven years. Preparation of a take

reduction plan is required for each strategic stock subject to frequent or occasional mortality or serious injury in fishing operations. Each plan is to include recommended regulatory or voluntary measures to reduce incidental mortality and serious injury and to recommend dates for achieving specific objectives. The immediate goal of the plans is to reduce, within six months, incidental mortality and serious injury to levels less than the potential biological removal level calculated in the stock assessment. The long-term goal of the plans is to reduce incidental mortality and serious injury to insignificant levels approaching a zero rate within five years, taking into account the economics of the fishery, existing technology, and applicable state or regional fishery management plans.

**Implementing Regulations** — As discussed in the previous annual report, the National Marine Fisheries Service published regulations implementing section 118 on 30 August 1995. Among other things, the regulations included procedures for vessel owners to register for an authorization certificate, observer and reporting requirements, and criteria for classifying fisheries. Although the Service had proposed a definition to be used to determine when the zero mortality and serious injury rate goal of the Act had been achieved, it did not include that element in the final regulations. As such, this single issue remains outstanding.

During 1996 the Service continued to examine its proposal that the zero mortality and serious injury rate goal be equated with the criteria used to list fisheries in category III — that is, the goal would be considered to have been achieved when the mortality and serious injury of marine mammals from all fisheries combined is less than 10 percent of the potential biological removal levels of the affected stocks, or when mortality and serious injury in an individual fishery is less than one percent of the stocks' potential biological removal levels. The Service expects to publish a final definition or, if necessary, an amended proposal early in 1997. In either case, the Service intends to have a definition in place by April 1997 when it is to begin a review of the progress of fisheries in achieving the zero mortality and serious injury rate goal. A report to Congress on the success of efforts to meet that goal is required by 30 April 1998.

#### **Take of Endangered and Threatened Species** —

As noted above, the incidental-take regime enacted in 1994 included a provision to authorize the incidental taking of species listed as endangered or threatened, provided certain findings are made. In 1996 permits were issued to participants in Alaska fisheries, authorizing the incidental taking of North Pacific humpback whales and Steller sea lions.

Generally, the National Marine Fisheries Service reviews available information and makes determinations with respect to endangered and threatened species on its own initiative — fishermen need not apply for a permit or otherwise seek an authorization separate from the registration requirement for category I and II fisheries. However, in response to a lawsuit challenging the licensing and regulation of gillnets and lobster gear in state waters (discussed in the right whale section of Chapter II), Massachusetts on 17 October 1996 applied to the Service seeking authorization of a small-take of northern right whales. The Service published a notice of that request on 5 December, seeking comment on several issues, including whether it was appropriate to consider such a request at all. The Service also solicited comments on whether section 101(a)(5)(E) could be construed to require negligible impact findings to be based on all fisheries collectively, or whether such findings could be made for individual fisheries. Comments were also sought on whether this section could be used to authorize the taking of one endangered species apart from other endangered or threatened species that might also be taken and whether it could be used to authorize incidental taking by harassment from stocks from which mortalities or serious injuries could not be authorized. Based on preliminary determinations, the Service indicated in the *Federal Register* notice its intent to reject Massachusetts' request.

**List of Fisheries** — A key feature of the incidental-take regime is annual publication of a list of fisheries, which places each U.S. fishery into one of three categories based on the frequency with which marine mammals are killed or seriously injured. Vessel owners participating in category I or category II fisheries must register and are subject to certain other requirements. Those participating in category III fisheries need not register for an incidental-take authorization, but are required to report any marine

mammal mortality or injury that occurs incidental to their operations.

Under regulations published by the National Marine Fisheries Service, a category I fishery is one in which annual mortality and serious injury of any marine mammal stock is equal to or greater than 50 percent of the stock's potential biological removal level. A category II fishery is one in which annual mortality and serious injury of any stock is between 1 and 50 percent of the stock's potential biological removal level, provided that the total mortality and serious injury of the stock from all fisheries combined is greater than 10 percent of its potential biological removal level. All other fisheries (*i.e.*, those which, combined with other fisheries, do not take more than 10 percent of a stock's potential biological removal level or which individually take less than 1 percent of any stock's potential biological removal level) are placed in category III.

The Service published its final list of fisheries for 1996 on 28 December 1995. Because it had taken longer than expected to complete the list, the Service announced that the 1995 list would remain in effect until 1 March 1996. This extension was necessary to allow fishermen in reclassified fisheries time to register for an incidental-take authorization under the new section 118 requirements.

Proposed changes to the list were published on 16 July 1996. Among the changes proposed by the Service was reclassification of the Gulf of Maine/mid-Atlantic lobster fisheries from category III to category I, based on serious injuries and mortalities of right and humpback whales. Based on data indicating historical interactions between the California squid purse seine fishery and short-finned pilot whales, the Service also proposed upgrading this fishery from category III to category II. In addition, the Service proposed combining the category III bottom gillnet fishery for monkfish with other New England and mid-Atlantic gillnet fisheries and placing them collectively in category I or II, depending on where vessels intend to fish.

The final list of fisheries for 1997 was approved on 26 December 1996 and transmitted to the *Federal Register* for publication. It included the three pro-

posed changes noted above as well as several less significant, technical changes.

**Take Reduction Plans** — As noted above, section 118 requires the National Marine Fisheries Service to develop a take reduction plan for each strategic stock that interacts with a fishery that frequently or occasionally kills or seriously injures marine mammals (*i.e.*, a category I or category II fishery). The amendments direct the Service to establish take reduction teams to take the lead in developing take reduction plans. These teams are to include members representing Federal agencies, affected coastal states, appropriate fishery management councils, interstate fishery commissions, academic and scientific organizations, environmental groups, the commercial and recreational fishermen that incidentally take the species or stock, and any affected Alaska Native or Indian tribal organizations.

Where human-caused mortality and serious injury of a stock are believed to be equal to or greater than the stock's potential biological removal level, a take reduction team is to prepare and submit to the Service a draft take reduction plan within six months of the team's establishment. For other strategic stocks, draft take reduction plans are to be submitted within 11 months of the team's establishment. Within 60 days of receiving a draft take reduction plan, the Service is to publish the plan in the *Federal Register*, along with any proposed changes and proposed regulations to implement the plan, for public review and comment. After a public comment period of no more than 90 days, the Service has 60 days in which to publish a final take reduction plan and implementing regulations. After publication of the final plan, take reduction teams will continue to meet to monitor its implementation.

During 1996 the National Marine Fisheries Service established four take reduction teams. The first two teams, established in February, were the Gulf of Maine Take Reduction Team and the Pacific Offshore Fisheries Take Reduction Team. As discussed further in the harbor porpoise section of Chapter II, the focus of the Gulf of Maine team is reducing entanglement of harbor porpoises in the Gulf of Maine sink gillnet fishery. The Pacific Offshore Fisheries team was formed to address the taking of several strategic

stocks in the California/Oregon drift gillnet fishery for thresher shark and swordfish. The species of concern include beaked whales in the genus *Mesoplodon*, Baird's beaked whale, Cuvier's beaked whale, the sperm whale, the humpback whale, the pygmy sperm whale, and the short-finned pilot whale. These two teams submitted draft take reduction plans to the Service in August. At the end of 1996 these draft plans were being reviewed by the Service. They had not yet been circulated to the Commission or others for comment.

In May the Service formed the Atlantic Offshore Cetacean Take Reduction Team to develop a plan for reducing the take of three species of large whales (right, humpback, and sperm whales) and five stocks of small cetaceans (long-finned and short-finned pilot whales and common, spotted, and bottlenose dolphins) incidental to operation of pair trawl, longline, and drift gillnet fisheries. The pair trawl fishery had been operating as an experimental fishery. However, the applicable permit was not renewed for 1997. Nevertheless, representatives of the fishery were invited to remain on the take reduction team as observers. As discussed in the right whale section of Chapter II, the team submitted a draft take reduction plan to the Service in November.

The fourth team created by the Service was the Atlantic Large Whale Take Reduction Team. It was established in August to address the bycatch of northern right whales and humpback whales in coastal gillnet and lobster pot fisheries. As discussed in the right whale section of Chapter II, this team met three times in 1996, but did not complete a draft take reduction plan before the end of the year.

At the end of 1996 the Service was working to establish a Mid-Atlantic Coastal Gillnet Take Reduction Team to address the take of harbor porpoises in these fisheries. The Service was also considering whether a team is needed to address the incidental take of bottlenose dolphins in mid-Atlantic coastal fisheries. By letter of 31 December 1996, the Commission recommended that the Service defer establishment of this take reduction team pending development of a conservation plan for the bottlenose dolphin stock designated as depleted following the unusual mortality even in 1987-1988.

**Intentional Taking** — Unlike the interim exemption that governed incidental taking between 1988 and 1995, the regime established under section 118 prohibits intentional lethal taking of marine mammals in commercial fishing operations. The only exception is if lethal taking is "imminently necessary in self-defense or to save the life of another person in immediate danger."

Although intentional lethal take is not allowed, fishermen and others are allowed to take marine mammals by non-lethal means to deter them from damaging gear, catch, or other property. Section 101(a)(4) of the Marine Mammal Protection Act directs the National Marine Fisheries Service and the Fish and Wildlife Service to publish a list of guidelines to govern measures to be used in safely deterring marine mammals. In the case of marine mammals listed as endangered or threatened, the Services are to recommend specific measures that can be used to deter the animals non-lethally. The use of certain types of deterrence measures that have a significant adverse effect on marine mammals may be prohibited.

The National Marine Fisheries Service published proposed deterrence regulations on 5 May 1995. The Service offered guidance on passive, preventative, and reactive measures that could be taken to deter marine mammals. The Service set forth four general principles regarding acceptable deterrence measures. In addition to a statutory directive that such measures not result in the death or serious injury of the animal, the measures should not (1) result in the separation of a female marine mammal from its unweaned offspring, (2) break the skin of a marine mammal, (3) be directed at a marine mammal's head or eyes, or (4) be used to deter pinnipeds hauled out on unimproved private property. The Service also proposed to prohibit the use of any firearm or other device to propel an object that could injure a marine mammal, the use of any explosive device to deter cetaceans or the use of explosives more powerful than seal bombs to deter seals or sea lions, translocation of any marine mammal, or the use of tainted food or bait or any other substance intended for consumption by the marine mammal. Deterrence of marine mammals listed as endangered or threatened under the Endangered Species Act would not be authorized under the proposed regulations. Rather, measures for safely

detering listed species would be subject to separate rulemaking. The Commission's comments on the proposed regulations are discussed in the previous annual report.

As of the end of 1996 a final rule had not been published by the National Marine Fisheries Service. The Service explained at the Commission's November 1996 annual meeting that publication of a final rule had been delayed by the need to address higher-priority issues. Also, the Service was now considering whether any changes needed to be made to the proposed regulations based on the results of the acoustic deterrence workshop held in March 1996. (See further discussion in the section on noise in Chapter VII.) The Service expects to publish a final rule in 1997. The Fish and Wildlife Service has yet to publish guidelines or proposed regulations with respect to deterrence of marine mammals under its jurisdiction.

## The Tuna-Dolphin Issue

For reasons not fully understood, schools of large yellowfin tuna (those greater than 25 kilograms) tend to associate with dolphin schools in the eastern tropical Pacific Ocean. This area covers more than five million square miles stretching from southern California to Chile and westward to Hawaii. Late in the 1950s U.S. fishermen began to exploit this association by deploying large purse seine nets around dolphin schools to catch the tuna swimming below. Despite efforts by the fishermen to release the encircled dolphins unharmed, some become trapped in the nets and are killed or injured. Efforts to reduce the incidental mortality of dolphins in this fishery have been a primary focus of the Marine Mammal Protection Act since it was enacted in 1972.

### Background

The eastern tropical Pacific tuna fishery was dominated by U.S. vessels during the 1960s and early 1970s. In the late 1970s and early 1980s the U.S. fleet declined and the number of foreign vessels participating in the fishery grew. Along with these shifts in the fishery came changes in the associated

dolphin mortality. As reflected by mortality data presented in Table 10, progress made by the United States in reducing dolphin mortality under the Marine Mammal Protection Act was being offset by increasing mortality from foreign operations. This prompted Congress to amend the Marine Mammal Protection Act in 1984 and again in 1988 to establish comparability requirements for nations seeking to export tuna to the United States. Imports of yellowfin tuna caught in the eastern tropical Pacific were banned from countries that failed to adopt a tuna-dolphin program comparable to that of the United States or whose fleet exceeded the incidental-take rate of the U.S. fleet by a certain amount. In addition, imports of yellowfin tuna from intermediary nations that imported tuna from nations subject to a primary embargo were made subject to a secondary embargo. In an effort to reduce dolphin mortality further, additional requirements also were added to the general permit under which U.S. tuna fishermen operate.

The requirements enacted in 1988 and the threat of tuna embargoes resulted in substantially reduced dolphin mortality by foreign fleets. As shown in Table 11, there was more than a 95 percent reduction in dolphin mortality between the 1988-1989 fishing seasons and 1993. While there has been some decline in the number of sets made on dolphins since the high-mortality years of the late 1980s, reduced mortality has been due primarily to a reduction in the average number of dolphins killed per set. While the number of dolphin sets per year has declined by about 30 to 40 percent since the late 1980s, dolphin mortality per set has been reduced by more than 95 percent. These factors led to record low dolphin mortality in 1995, and again in 1996.

Subsequent to enactment of the 1988 amendments, some environmental organizations began to push for a consumer boycott of tuna caught by encircling dolphins. In response, the three largest U.S. tuna canners announced in April 1990 that they would no longer purchase tuna caught in association with dolphins. This announcement led to further shifts in the eastern tropical Pacific tuna fishery as more U.S. vessels relocated to the western Pacific. It also prompted Congress to pass the Dolphin Protection Consumer Information Act, which set standards for labeling tuna as being "dolphin-safe."

**Table 10. Estimated incidental kill of dolphins in the tuna purse seine fishery in the eastern tropical Pacific Ocean, 1972-1996<sup>1</sup>**

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	61,881
1989	12,643	84,403
1990	5,083	47,448
1991	1,002	26,290
1992	439	15,111
1993	115	3,601
1994	105	4,095
1995	0	3,274
1996	0	2,738 <sup>2</sup>

<sup>1</sup> These estimates, based on kill per set and fishing effort data, are provided by the National Marine Fisheries Service and the Inter-American Tropical Tuna Commission. They include some, but not all, seriously injured animals released alive.

<sup>2</sup> Preliminary estimate.

Efforts to reduce dolphin mortality began to take on a more international flavor beginning in 1990. At a special meeting of the Inter-American Tropical Tuna Commission, participants from all nations with a significant interest in the eastern tropical Pacific tuna fishery, whether or not members of the Commission, met and adopted a resolution calling for an expanded international dolphin conservation program. As discussed below, such a program was instituted under the 1992 "La Jolla Agreement."

In 1990 Mexico challenged the imposition of an embargo of its tuna under the Marine Mammal Protection Act as being inconsistent with U.S. obligations under the General Agreement on Tariffs and Trade (GATT). A second challenge was brought by the European Community and The Netherlands in 1992 claiming that the intermediary nation embargoes were not GATT-consistent. As discussed in previous annual reports, dispute resolution panels in those cases found the unilaterally imposed U.S. embargo provisions to be inconsistent with the GATT. The panels suggested, however, that such trade sanctions may be permissible if designed to ensure compliance with a multilateral agreement. The panels' decisions were never formally adopted by the GATT Council and do not have the force of final decisions.

The Marine Mammal Protection Act's tuna-dolphin provisions were amended further by the International Dolphin Conservation Act of 1992. The amendments were, in part, designed to address GATT concerns and focused on ways to eliminate, rather than merely reduce, incidental dolphin mortality. The amendments established a framework for a global moratorium on the practice of setting on dolphins to catch tuna. Although no fishing nation agreed to the moratorium and, as a result, certain provisions of the Act never became effective, other provisions were not contingent on a moratorium. Changes included (1) revising the quotas applicable to the U.S. fleet, (2) modifying the American Tunaboat Association's general permit to proscribe setting on eastern spinner or coastal spotted dolphins, and (3) prohibiting, as of 1 June 1994, the sale, purchase, transport, or shipment in the United States of any tuna that is not dolphin-safe.

At the same time that the International Dolphin Conservation Act of 1992 was being considered by Congress, an international agreement was concluded among the eastern tropical Pacific fishing nations at a special meeting of the Inter-American Tropical Tuna Commission in 1992. This non-binding agreement, called the La Jolla Agreement after the site of the negotiations, established the International Dolphin Conservation Program under the auspices of the Tuna Commission. The specifics of the agreement and actions taken to implement it are discussed below.

Table 11. Estimated U.S. and foreign dolphin mortality, kills per set, sets on dolphins, and percent observer coverage, 1988-1996<sup>1</sup>

	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996<sup>2</sup></u>
<b>Dolphin Mortality</b>									
U.S.	19,712	12,643	5,083	1,002	439	115	105	0	0
Foreign	61,881	84,403	47,448	26,290	15,111	3,487	3,990	3,274	2,738
Total <sup>3</sup>	78,927	96,979	52,531	27,292	15,539	3,601	4,095	3,274	2,738
<b>Kills per Set</b>									
U.S.	5.28	3.60	2.75	2.49	0.66	0.58	2.12	0	0
Foreign	9.17	9.34	5.41	2.90	1.56	0.52	0.51	0.45	0.34
Combined	7.51	7.71	4.97	2.88	1.50	0.52	0.52	0.45	0.34
<b>Sets on Dolphins</b>									
U.S.	3,766	3,435	1,801	430	654	201	50	0	0
Foreign	6,749	9,145	8,770	9,052	9,672	6,752	7,754	7,209	7,187
Total	10,515	12,580	10,571	9,482	10,326	6,953	7,804	7,209	7,187
<b>Observer Coverage<sup>4</sup></b>									
U.S.	53.2%	99.0%	100.0%	100.0%	100.0%	97.3%	100.0	100.0%	100.0%
Foreign	35.3%	35.5%	40.1%	56.4%	97.3%	100.0%	%	100.0%	100.0%
Combined	38.2%	49.2%	49.0%	61.9%	98.1%	99.8%	99.8%	100.0%	100.0%
<b>Number of Vessels<sup>5</sup></b>									
U.S.	39	29	28	13	8	8	6	5	7
Foreign	93	93	95	91	88	89	93	99	103
Combined	132	122	123	104	96	97	99	104	110

1 Data provided by the National Marine Fisheries Service and the Inter-American Tropical Tuna Commission.

2 1996 figures for the foreign fleet are preliminary estimates.

3 Estimates of total and foreign dolphin mortality are provided by the Inter-American Tropical Tuna Commission. It and the National Marine Fisheries Service use different methodologies to estimate dolphin mortalities and, as a result, estimated total mortality may not equal the sum of the estimated mortalities for the U.S. and foreign fleets.

4 Observer coverage levels are given for the percentage of trips observed. Figures provided include observers placed under the United States, the Inter-American Tropical Tuna Commission, and the Mexican national observer programs.

5 Includes all purse seine vessels with a carrying capacity of 400 short tons or greater.

As discussed in previous annual reports, a U.S. district court ruled in 1994 that the American Tuna-boat Association's general permit did not authorize U.S. fishermen to encircle any dolphins from a depleted stock, including the northeastern offshore spotted dolphin, which was declared depleted in 1993. Prohibited from making sets on this stock as well as on eastern spinner and coastal spotted dolphins, faced with a dolphin quota of 105, and foreclosed from marketing in the United States any tuna caught by setting on dolphins, none of the five U.S. vessels remaining in the eastern tropical Pacific fishery made any sets on dolphins in 1995. Further, inasmuch as the International Dolphin Conservation Act of 1992 requires that dolphin mortality under the general permit not exceed the number taken the previous year, no dolphin mortality by U.S. tuna vessels was authorized in 1996 or can be authorized in subsequent years. The general permit expires at the end of 1999.

### **The 1992 La Jolla Agreement**

As noted above, the governments of all nations participating in the eastern tropical Pacific tuna fishery adopted the La Jolla Agreement at a special meeting of the Inter-American Tropical Tuna Commission in 1992. The countries resolved to establish a multilateral program to reduce incidental dolphin mortality in the eastern tropical Pacific to levels approaching zero by setting annual limits. The annual limits on total incidental dolphin mortality established by that resolution were 19,500 in 1993, 15,500 in 1994, 12,000 in 1995, 9,000 in 1996, 7,500 in 1997, 6,500 in 1998, and less than 5,000 in 1999. Other aspects of the program adopted under the resolution were (1) the continuation of the international observer program with the additional requirement that at least 50 percent of the observers deployed by a nation each year be placed by the Tuna Commission; (2) the establishment of a review panel to monitor compliance by the international fleet with the annual dolphin mortality limits; (3) expansion of the existing research and education programs, including an increase in efforts to find methods of catching large yellowfin tuna that do not involve encircling dolphins; and (4) establishment of a scientific advisory board to assist the Tuna Commission in efforts to coordinate, facilitate, and guide research directed at reducing dolphin mortality.

The parties subsequently agreed to a system whereby each vessel participating in the fishery would be given an individual dolphin mortality limit. Under that agreement, any vessel that leaves the fishery or that does not use any of its quota by 1 June forfeits its quota for the remainder of the year. Unused quotas may be allocated to other vessels for the second half of the year. Any vessel that exceeds its dolphin limit will have the amount of the excess deducted from its limit for the following year.

As discussed in previous annual reports, dolphin mortality declined with unanticipated speed under the La Jolla Agreement. In each of the first two years under the International Dolphin Conservation Program, mortality was held below the level set to be achieved by 1999. This prompted parties to the La Jolla Agreement to adopt resolutions to reduce the overall dolphin mortality limits for 1994 and 1995. The limit was reduced to 9,300 for each year. The dolphin mortality limit for 1996, set at 9,000 under the 1992 Agreement, was not reduced. Similarly, the dolphin mortality limit for 1997 will remain at the originally adopted number, 7,500.

For 1996 the dolphin mortality limit for individual vessels was set at 96, and 94 vessels were originally issued a dolphin mortality limit in 1996. These included 37 vessels from Mexico, 20 from Venezuela, 14 from Vanuatu, 8 from Colombia, 7 from Ecuador, 3 from Panama, and 5 from the United States. The dolphin mortality limits for three of these vessels were less than the otherwise-allowed 96 dolphins because the vessels had exceeded their 1995 limits.

Under the International Dolphin Conservation Program, any dolphin mortality limit that has not been utilized by 1 June is forfeited. However, any vessel, including those that have forfeited their quotas, is allowed to apply for a dolphin mortality limit for the second half of the year. In 1996, 24 vessels requested second-half dolphin mortality limits, including 23 of the 34 vessels that had forfeited their initial quotas. The single vessel receiving a second-half limit that did not have one initially was from Costa Rica.

As noted above, none of the U.S. vessels used its dolphin mortality limits in 1996. Rather, they had requested the limits in anticipation that the Marine

Mammal Protection Act might be amended to allow the resumption of setting on dolphins by U.S. vessels under the International Dolphin Conservation Program. Legislation to amend the tuna-dolphin provisions of the Marine Mammal Protection Act considered by Congress in 1996 is described below.

For 1997, 42 vessels, including one from the United States, have been issued dolphin mortality limits. One of these received a reduced limit because it exceeded its 1996 limit. No Mexican vessel requested a dolphin mortality limit for 1997. As discussed below, Mexico opted out of some elements of the International Dolphin Conservation Program in protest to the failure of the United States to enact legislation to implement the Panama Agreement. Nevertheless, the individual dolphin mortality limit for 1997 was set at 94 dolphins per vessel to reflect the expected participation in the fishery by the Mexican fleet.

### **Declaration of Panama**

Under the comparability requirements of the Marine Mammal Protection Act, imports of yellowfin tuna caught in the eastern tropical Pacific from countries whose vessels continue to set on dolphins have been precluded since 1994. At the 13-15 June 1995 meeting of the Inter-American Tropical Tuna Commission, six parties to the La Jolla Agreement issued a joint statement urging the United States to lift those embargoes and the intermediary nation embargoes then in effect. Those nations — Colombia, Costa Rica, Ecuador, Mexico, Panama, and Venezuela — reiterated their commitment to conserve the living marine resources of the eastern tropical Pacific under the La Jolla Agreement. In their view, catching tuna in compliance with the International Dolphin Conservation Program was environmentally sound and should not be the basis for an embargo. The statement contended that increased use of dolphin-safe fishing methods would harm biodiversity by increasing the discard of juvenile tuna and the bycatch of non-target species other than dolphins. The nations therefore endorsed fishing for tuna by setting on dolphins as the most effective method for protecting the tuna stocks and other resources of the eastern tropical Pacific. The six nations believed that U.S. embargoes of all but dolphin-safe tuna were contrary

to international law, lacked a scientific basis, were counterproductive to broader conservation goals, and were incompatible with the United States having signed the La Jolla Agreement. Expressing concern that the current situation was endangering the continued viability of the La Jolla Agreement, the tuna-fishing nations called on the United States to allow importation of tuna caught in association with dolphins, and to redefine the term dolphin-safe to include all tuna caught in compliance with the regulatory measures adopted pursuant to the La Jolla Agreement.

In response, the Subcommittee on Fisheries, Wildlife, and Oceans of the U.S. House of Representatives Committee on Resources convened an oversight hearing on 21 June 1995 to examine the effectiveness of the provisions of the International Dolphin Conservation Act of 1992 and to consider the need to change the Marine Mammal Protection Act's tuna embargo provisions. Participants at the hearing included representatives of the Department of State, the Inter-American Tropical Tuna Commission, U.S. tuna fishermen, and environmental groups.

The State Department noted that the tuna embargoes had been useful tools in reducing dolphin mortality and had brought about the creation of a responsible international dolphin protection program, but further stated that the embargoes had outlived their usefulness. In fact, the State Department argued that the embargoes had become counterproductive and were pushing some countries to consider abandoning the international program. As such, it advocated amendments to lift U.S. embargoes for tuna caught in compliance with the international program. The State Department also supported amendments to allow U.S. fishermen to participate in the eastern tropical Pacific tuna fishery on an equal basis with foreign fishermen.

These sentiments were echoed by witnesses representing the Inter-American Tropical Tuna Commission and the U.S. tuna industry. In support of its position, the Tuna Commission noted that (1) considerable progress had been made under the international program, (2) the threat by some nations to withdraw from the program was serious, (3) the number of sets on dolphins in the eastern tropical Pacific had not declined appreciably despite the U.S. embargoes, and (4) abandoning the practice of setting on dolphins

would have adverse effects on tuna stocks and other living marine resources. The Tuna Commission presented data supporting its contention that switching to school sets and log sets, the two principal alternatives to setting on dolphins, would result in greatly increased bycatch of immature tuna and other species, including billfish, sharks, mahimahi, and sea turtles. The Tuna Commission estimated that, if there were a large-scale switch to dolphin-safe fishing practices, between 10 to 25 million undersized yellowfin tuna with no commercial value would be caught and discarded each year.

Some environmental groups had a decidedly different view. Earth Island Institute and the groups it represented remained committed to a complete elimination of dolphin mortality and to the establishment of a global moratorium on the practice of encircling dolphins. These groups believed that the embargo provisions were working and should be retained. They also asserted that, even if no encircled dolphins are killed directly in purse seine nets, repeated chase and encirclement likely causes considerable stress and numerous physiological problems.

Another sector of the environmental community, represented by the Center for Marine Conservation, took a more moderate position. These groups believed that there were problems with the existing legislation that needed to be addressed. They also questioned the durability of the unilateral approach to dolphin conservation embodied in the Marine Mammal Protection Act, and recognized that some evidence suggested that a widespread shift to dolphin-safe fishing practices may in fact create other bycatch problems. Rather than supporting immediate amendment of the Act, however, these groups suggested that the relevant issues be addressed through a multilateral process that would result in adoption of a binding international agreement.

The tuna-fishing nations were heartened by what had transpired at the Congressional oversight hearing. At a 14 July 1995 meeting of the tuna-fishing nations, they nevertheless expressed concern that the U.S. Administration and most other witnesses had not called for amending the definition of dolphin-safe tuna. They issued a joint declaration that lifting the tuna embargoes without also addressing the dolphin-

safe definition would not be acceptable. They reiterated their position that the continued viability of the La Jolla Agreement was in jeopardy unless the United States enacted legislation lifting the primary and secondary tuna embargoes, codifying the La Jolla Agreement, and redefining dolphin-safe to include all tuna and tuna products harvested in accordance with the regulatory measures adopted under the International Dolphin Conservation Program.

Dissatisfied with the pace at which international negotiations concerning the tuna-dolphin issue were being pursued by the United States and concerned that an opportunity to consolidate the gains made under the La Jolla Agreement was slipping away, the Center for Marine Conservation, the Environmental Defense Fund, Greenpeace, the National Wildlife Federation, and the World Wildlife Fund undertook discussions in September 1995 with representatives of Mexico to explore the possibility of reaching a multilateral agreement among the tuna-fishing nations that would provide a framework for strengthening the international conservation program and lifting U.S. tuna embargoes. These discussions led to a compromise approach supported by the tuna-fishing nations, this segment of the environmental community, and the U.S. Administration.

The compromise developed by Mexico and the five environmental organizations ultimately formed the basis for the Declaration of Panama, signed by representatives of 12 nations on 4 October 1995. Signatories to the declaration included Belize, Colombia, Costa Rica, Ecuador, France, Honduras, Mexico, Panama, Spain, the United States, Vanuatu, and Venezuela. These nations reaffirmed their commitment to reducing dolphin mortality in the eastern tropical Pacific tuna fishery to levels approaching zero through the setting of annual mortality limits, with the goal of eliminating dolphin mortality by seeking a means of capturing large yellowfin tuna not in association with dolphins. Moreover, the nations declared their intention, contingent on the enactment of changes in U.S. law, to formalize by 31 January 1996 the La Jolla Agreement as a binding Inter-American Tropical Tuna Commission resolution or other binding legal instrument. The envisioned changes to U.S. law included (1) lifting the primary and secondary embargoes for tuna caught in compliance with the La Jolla

Agreement, as it would be modified under the Declaration of Panama, (2) allowing access to the U.S. market for all tuna, whether dolphin-safe or not, caught in compliance with the agreement by nations that are members of the Inter-American Tropical Tuna Commission or that have initiated steps to become members, and (3) redefining the term dolphin-safe to include any tuna caught in the eastern tropical Pacific by a purse seine vessel in a set in which no dolphin mortality was observed.

The signatories to the Declaration of Panama specified several provisions that would be included in the binding international instrument once the requisite changes to U.S. law had been enacted. These included commitments to (1) adopt conservation and management measures that ensure the long-term sustainability of tuna stocks and other living marine resources in the eastern tropical Pacific, (2) assess the catch and bycatch of juvenile yellowfin tuna and other living marine resources of the eastern tropical Pacific and adopt measures to reduce or eliminate such bycatch, (3) implement the international agreement through enactment of domestic legislation and/or adoption of regulations, (4) enhance existing mechanisms for reviewing compliance with the international program, (5) establish annual stock-specific quotas on dolphin mortality based on minimum population estimates, (6) limit overall dolphin mortality to no more than 5,000 per year, (7) establish a system that provides incentives to vessel captains to continue to reduce dolphin mortality, and (8) establish or strengthen national scientific advisory committees to advise their respective governments on research needs.

As provided for in the Declaration of Panama, until the year 2001 an annual quota for each stock would be set at between 0.1 and 0.2 percent of the minimum population estimate for the stock. Beginning in the year 2001, the annual per-stock quota would be set at 0.1 percent of the stock's minimum population estimate. If the annual quota for any stock were exceeded, all sets on that stock and any mixed schools containing individuals from that stock would cease for the remainder of the year. In addition, should the annual mortality for the eastern spinner or the northeastern spotted dolphin exceed 0.1 percent of the minimum population estimate, the governments

would conduct a scientific review to consider whether further action to reduce mortality is needed.

### Proposed Legislation

As discussed in the previous annual report, four bills to amend the tuna-dolphin provisions of the Marine Mammal Protection Act were introduced in Congress during 1995. H.R. 2179, which had been introduced prior to negotiation of the Declaration of Panama, did not receive further consideration. The three other bills, and an additional bill introduced early in 1996, were considered during the 1996 Congressional session. These bills, in essence, represented two decidedly different responses to the Declaration of Panama.

S. 1420 and H.R. 2823 were designed to institute the changes to U.S. law required to trigger implementation of the Declaration of Panama. While embargoes would have been lifted to allow imports of all tuna harvested in compliance with the La Jolla Agreement, as it would be modified under the Declaration, countries would need to show that the tuna was not banned from import by a pre-existing embargo (*e.g.*, by showing that the tuna was harvested after the effective date of the amendment). Under these bills, tuna caught in the eastern tropical Pacific could be labeled as dolphin-safe if no dolphins were killed during the set in which the tuna was caught. Regulations to be issued by the National Marine Fisheries Service would include provisions addressing weight calculations and well location of a vessel's catch as a means of tracking what tuna is dolphin-safe. These bills also would have allowed U.S. fishermen to resume setting on dolphins under the proposed international quota. S. 1420 and H.R. 2823 also would have directed the Service, in cooperation with other nations participating in the international program, to undertake research aimed at reducing dolphin mortality and developing cost-effective methods of catching large yellowfin tuna without setting on dolphins. Research also would have been required on the status of dolphin stocks and on the effects of chase and encirclement of dolphins.

Two additional bills, S. 1460 and H.R. 2856, tracked the other two bills in several respects. There were, however, several key differences. The most

significant concerned what tuna may be imported into the United States and how that tuna may be labeled. These bills would have retained the statutory provisions that prevent the import of tuna that is not dolphin-safe. They also would have preserved the existing definition of dolphin-safe tuna as tuna harvested on a trip during which no dolphins sets were made. However, the 20 to 30 percent of yellowfin tuna caught in the eastern tropical Pacific using dolphin-safe fishing techniques, which currently is subject to embargoes, would have been allowed into the U.S. market. Thus, these bills would have offered only limited relief to nations currently subject to embargoes. In addition, these bills took a more aggressive approach to pursuing the zero mortality rate goal of the Marine Mammal Protection Act than did the Declaration of Panama. While a mortality cap of 5,000 dolphins would have been adopted for 1996, there was an accompanying requirement that the quota be reduced by a statistically significant amount in each successive year until the goal of zero mortality is reached. These bills also would have limited the annual stock-specific quotas for depleted dolphins to the levels achieved in 1994.

S. 1460 and H.R. 2856, like the other bills, tried to put U.S. and foreign tuna fishermen operating in the eastern tropical Pacific on an equal footing. The prohibition on encircling dolphins would have been lifted and U.S. fishermen would have been allowed to operate under the International Dolphin Conservation Program, subject to an assigned vessel dolphin mortality limit. However, U.S. fishermen would have been subject to the same import limitations as would foreign fishermen. Any tuna they caught during a trip on which dolphins were encircled would have remained excluded from the U.S. market. These bills also would not have lifted the prohibition that prevents U.S. tuna fishermen from setting on depleted dolphin stocks, including northeastern offshore spotted dolphins, the most commonly encircled stock in the northern part of the fishery.

Debate on the best approach to conserve dolphins and other resources in the eastern tropical Pacific continued throughout much of the first half of the 1996 Congressional session. By 31 July, when H.R. 2823 reached the floor of the House of Representatives for consideration, the debate had crystallized

around the issue of the dolphin-safe labeling standard. The sole amendment offered by opponents at that time would have defined dolphin-safe tuna as that caught without killing, chasing, harassing, injuring, or encircling dolphins. In the end, however, H.R. 2823, as reported by the Resources Committee, passed the House without amendment by a comfortable margin.

Passage of H.R. 2823 by the Senate proved to be more difficult. Senator Boxer of California and Senator Biden of Delaware, the sponsors of S. 1460, vowed to filibuster any attempt to consider the bill. As the 1996 session of Congress came to a close, there was an attempt to pass the legislation by unanimous consent. However, Senators Boxer and Biden blocked this move.

Although legislation to implement the Declaration of Panama was not enacted in 1996, the matter is expected to be taken up again during the 1997 session of the new Congress. Senator Stevens of Alaska and Senator Breaux of Louisiana, two sponsors of S. 1420, in statements made on the final day of the 1996 session, committed to continuing to pursue enactment of similar legislation during the forthcoming session. Also, President Clinton, in a 7 October 1996 letter to Mexican President Zedillo, indicated his intention to have proposed legislation to implement the Declaration of Panama considered at the earliest opportunity by the 105th Congress.

Parties to the La Jolla Agreement at their 21-23 October 1996 meeting expressed considerable displeasure with the failure by the United States to pass the legislation called for under the Declaration of Panama. Mexico issued a statement expressing indignation at the U.S. process, which in its view, had allowed certain narrowly focused interest groups to scuttle a multilateral approach to ecosystem conservation that had taken years to forge. The Mexican Government announced that it therefore was immediately suspending its active participation in the La Jolla Agreement. Although Mexican vessels would no longer seek dolphin mortality limits or be bound by quotas established under the La Jolla Agreement, Mexico, in the interest of maintaining the transparency of its operations, indicated that, at least for the time being, it would continue to carry Tuna Commission observers on its vessels. Mexico, however, cautioned that,

should the United States not enact legislation to implement the Declaration early in 1997, it may withdraw from the La Jolla Agreement altogether.

Mexico also called on the other parties to the La Jolla Agreement to follow its lead and to consider other venues for managing and protecting eastern tropical Pacific resources. Those countries, however, were less willing to take action that might threaten the viability of the La Jolla Agreement. A joint statement issued by representatives of Colombia, Costa Rica, Ecuador, Panama, Vanuatu, and Venezuela expressed an understanding of, and respect for, Mexico's decision, but indicated a concern that Mexico's action might affect the continuity of the International Dolphin Conservation Program.

### **Pinniped-Fishery Interactions**

The 1994 amendments to the Marine Mammal Protection Act added a new section (section 120) specifically addressing interactions between pinnipeds and fishery resources. The most significant feature of the new section was its provision allowing the Secretary of Commerce to authorize states to lethally remove individual pinnipeds identified as affecting certain salmonid stocks without obtaining a waiver of the Act's moratorium on taking, provided certain conditions are met. A separate provision of section 120 directs the Secretary of Commerce to investigate and to submit a report by 1 October 1995 indicating whether California sea lions and Pacific harbor seals are having a significant negative impact on the recovery of salmonid fishery stocks or other components of the coastal ecosystems of Washington, Oregon, and California. A third provision directs the Secretary of Commerce to establish a pinniped-fishery interaction task force to provide advice on possible measures for minimizing interactions between pinnipeds and aquaculture operations in the Gulf of Maine.

Actions in response to the first two provisions are described below. Actions related to interactions between pinnipeds and aquaculture operations in the Gulf of Maine are discussed in the following section.

### **Request from the Washington Department of Fish and Wildlife for Lethal Taking Authority**

The number of winter-run steelhead trout returning through the Chittenden, or Ballard, Locks in Seattle to spawn in streams emptying into Lake Washington declined from nearly 3,000 in the early 1980s to fewer than 100 in the 1993-1994 run. During this time, there was a substantial increase in the number of California sea lions congregating near the locks and preying on steelhead. As described in the Commission's previous annual reports, measures taken by the National Marine Fisheries Service and the Washington Department of Fish and Wildlife to reduce sea lion depredation of the winter-run steelhead have been largely ineffective (see Appendix B, Fraker 1994, for a more complete description of the problem).

As noted above, under the 1994 Marine Mammal Protection Act amendments, states may request authority to lethally take individually identifiable pinnipeds that "are having a significant negative impact on the decline or recovery" of certain salmonid stocks. On 30 June 1994 the Washington Department of Fish and Wildlife applied to the National Marine Fisheries Service for authority to lethally take individually identifiable California sea lions preying on winter-run steelhead migrating through the Ballard Locks. The application also asked that a pinniped-fishery interaction task force be established as required under section 120(c).

In September 1994 the National Marine Fisheries Service established the Ballard Locks Pinniped-Fishery Interaction Task Force. Members included representatives of the National Marine Fisheries Service, the State of Washington, concerned Indian tribes, the academic community, recreational fishermen, and public interest groups. As discussed in previous annual reports, the task force met several times in October and November 1994 and on 22 November forwarded its recommendations to the Service. Among other things, it recommended that sea lions preying on steelhead in the vicinity of Ballard Locks be removed, preferably by non-lethal means. It recommended that lethal removal be authorized if facilities were not available to hold depredating sea lions and if predation exceeded 10 percent of the

returning steelhead in any consecutive seven-day period. The task force also recommended that the Service and the Washington Department of Fish and Wildlife further investigate the possible benefits of using acoustic deterrence devices to keep sea lions away from the lock area.

Based on the task force recommendations and comments received from the Marine Mammal Commission and others, the Service on 4 January 1995 authorized the Washington Department of Fish and Wildlife to lethally remove individually identifiable California sea lions observed preying on winter-run steelhead migrating through the Lake Washington ship canal in the vicinity of the locks. The authorization specified that (1) only "predatory" sea lions could be lethally removed, (2) prior to any lethal removals, non-lethal deterrents had to be tried and found ineffective, and (3) lethal removals could not be undertaken unless the sea lion predation rate exceeded 10 percent of the steelhead migrating through the ship canal in any seven-day period after 1 January 1995.

The authorization, valid until 31 June 1997, also specified that the State of Washington must submit a report on its authorized activities by 1 September each year. In its 4 January 1995 letter transmitting the authorization to the State, the National Marine Fisheries Service also requested that the State take the lead in responding to recommendations by the task force regarding changes in the locks and lock operations to improve fish passage, assessing the feasibility of constructing sea lion barriers and/or refugia where steelhead can escape from sea lions, and developing a comprehensive winter-run steelhead recovery plan.

The Washington Department of Fish and Wildlife submitted its first report to the National Marine Fisheries Service on 31 August 1995 describing actions taken to reduce California sea lion predation on the 1994-1995 winter run of steelhead in the Lake Washington ship canal. The report indicated that no sea lions had been killed during the run; that a large male sea lion, which had been observed eating steelhead in the vicinity of the locks in preceding years, as well as during the 1994-1995 winter run, had been captured on 25 January 1995 and held until 8 June, when it was released in the Strait of Juan de Fuca west of Port Angeles; and that two additional sea lions

observed preying on steelhead in the vicinity of the locks had been captured, marked, transported, and released in the Strait of Juan de Fuca.

The State's report was provided to the Ballard Locks Pinniped-Fishery Interaction Task Force, which met in Seattle on 6-8 September 1995 to review the report and provide advice on follow-up actions to the National Marine Fisheries Service. The task force report, dated 8 November 1995, concluded that the problem statement included in its 1994 report remained valid; *i.e.*, that "Lake Washington wild steelhead are near extinction for a number of reasons, one of which is their vulnerability to predation by sea lions at the Ballard Locks."

To avoid a "significant negative impact" to the steelhead population, the task force recommended that any individually identifiable sea lion that has been observed killing salmon or steelhead in 1995 or previous years should be removed at the earliest opportunity after being observed in the Puget Sound area between Everett and Shilshole Bay. The task force recommended that such animals be permanently removed, either to captivity or lethally. The task force further recommended that animals that are observed in the act of predation for the first time after 1 October 1995 should be removed to captive holding for the remainder of the run or be lethally removed if funding for captive holding facilities has not been made available. The task force recommended that animals observed merely foraging in the area on three or more days should be removed to captivity but not lethally removed.

Based on the task force recommendations, the National Marine Fisheries Service modified the conditions for lethal removal of sea lions at the Ballard Locks, and by *Federal Register* notice of 26 March 1996 announced the revision of its 4 January 1995 letter of authorization to the Washington Department of Fish and Wildlife. The Service also announced the availability of an environmental assessment examining the consequences of alternatives for modifying the conditions for lethal removals.

The Service's modifications established a new definition for "predatory" sea lions, eliminating the predation rate "trigger" that had been incorporated

into the original letter of authorization. Under the new definition, a predatory sea lion is one that (1) is an individually identified animal bearing a brand mark, dart tag, flipper tag, or distinguishable natural marks; (2) has been observed by biologists to have preyed on returning steelhead in the inner bay area of the Lake Washington Ship Canal; (3) has penetrated the acoustic barrier and has been observed foraging in the ensonified zone during the steelhead run after 1 January 1994; and (4) was or is observed foraging in the inner bay area during the current steelhead run between 1 January and 31 May 1996. The modifications also removed the requirement for captive holding of "predatory" sea lions.

In order to better identify individual sea lions in the area, an additional 64 animals lions were captured and marked in Shilshole Bay during 1995/1996 steelhead run. This brought the total number of animals marked to 321 as of the end of June 1996. Acoustic deterrence devices were again used in the locks area, and sea lions, particularly unmarked and presumably naive animals, spent less time in the ensonified area during the 1995/1996 season than the 1994/1995 season. No sea lions were lethally removed from the Ballard Locks area during the 1996 winter steelhead run; however, three animals thought to be the primary cause of the predation were captured and removed to permanent captivity at Sea World in Orlando, Florida. One of the animals subsequently died.

The Ballard Locks task force met on 16-17 September 1996 to review information on the 1996 winter steelhead run and evaluate the effectiveness of permitted intentional lethal taking of individually identified sea lions. A report of the meeting was submitted to the Service on 29 October 1996. Based on information from the State and the Service, the task force concluded that, because of the long-term nature of fish stock recovery, it could not evaluate the effectiveness of actions taken to date and saw no reason to change its previous recommendations. It suggested that efforts to recover Lake Washington steelhead continue until (1) the Service's escapement goal of 1,600 fish is reached or (2) it becomes clear that the process is unlikely to achieve the stated goal. The task force recommended, among other things, that (a) if requested, the Service should extend the authorization to the Washington Department of Fish and Wildlife to

lethally take sea lions at Ballard Locks; (b) further research should be undertaken to evaluate sea lion-steelhead interactions and develop further recommendations; and (3) long-term funding should be secured to implement task force recommendations and continue work on the issue. Further, the task force concluded that it saw little need for further deliberation until substantive new information and analyses, which might alter its recommendations, is available.

### **Investigation of Possible Pinniped Impacts on Endangered West Coast Salmonid Stocks**

The 1994 Marine Mammal Protection Act amendments directed the Secretary of Commerce to investigate whether California sea lions and Pacific harbor seals are having significant negative impacts on the recovery of salmonid stocks that are listed or are candidates for listing under the Endangered Species Act. In addition, the Secretary is to determine whether these pinnipeds are having broad adverse impacts on the coastal ecosystems of Washington, Oregon, and California. A report on the results of the investigation was to be completed by 1 October 1995.

As a first step, the Service constituted a working group to compile and evaluate existing data. At the end of 1996 it was the Commission's understanding that the working group had prepared a draft report, but that the report would not be completed until sometime early in 1997.

### **Acoustic Deterrence**

For years scientists and fishermen have been experimenting with acoustic devices, both to reduce the bycatch of marine mammals in fishing gear and to reduce depredation by marine mammals on fish caught in gear, confined in aquaculture enclosures, or otherwise aggregated. However, most experiments have failed to demonstrate conclusively that the devices work and have no harmful side effects. To identify and address these uncertainties, the Marine Mammal Commission, at the request of and with support from the National Marine Fisheries Service, convened a workshop in March 1996 on Acoustic Deterrence of Harmful Marine Mammal-Fishery Interactions. The results of the workshop are discussed in Chapter VII.

## Gulf of Maine Task Force on Aquaculture-Pinniped Interactions

Both the salmon aquaculture industry and populations of harbor seals and gray seals in the northeastern United States have grown substantially in recent years. Seals can kill and eat many salmon if they are able to get into the salmon pens. Seals also can kill and injure penned salmon by biting through the netting. If nets are torn, the penned salmon may escape, causing substantial economic loss and possible threats to the genetic integrity of local wild salmon stocks.

The 1994 amendments to the Marine Mammal Protection Act directed the Secretary of Commerce to establish a task force to assess possible means for minimizing the impacts of the pinniped populations on the salmon aquaculture industry in the Gulf of Maine. The amendments directed the Secretary to report to Congress no later than 30 April 1996 describing recommended alternatives for mitigating damaging interactions. The task force's report and recommendations are discussed in the following section.

## Development of Aquaculture

As discussed above, the Magnuson-Stevens Fishery Conservation and Management Act was reauthorized during 1996. Among the amendments enacted was the addition of a finding that certain stocks of fish have declined to the point where their survival is threatened and that other stocks have been reduced by increased fishing pressure, inadequate fishery conservation and management practices, and habitat loss. As a result of such declines in wild fish stocks, interest in aquaculture has grown in recent years. Although there is no agreed upon definition of aquaculture, the National Marine Fisheries Service has proposed a tentative definition that would include the production of fishery resources for immediate entry into markets (*e.g.*, fish farming), but exclude the production of such resources for release to the wild for the rebuilding of stocks or later harvest (*e.g.*, hatchery release programs).

As aquaculture activities increase, so do the risks of adverse environmental effects from those opera-

tions. Such effects may include displacement of wild fish, marine mammals, and other marine organisms from previously occupied habitats, entanglement of marine mammals and other species in pens and lines used to contain or retrieve aquaculture resources, and habitat degradation resulting from the release of wastes or other pollutants.

To fulfill the mandates of the Government Performance and Results Act, which directs Federal agencies to prepare plans setting forth mission statements and the goals it expects to achieve over a period of no less than five years, the National Oceanic and Atmospheric Administration prepared a draft fisheries strategic plan. One of the objectives noted in the draft plan circulated for comment was to "advance environmentally sound aquaculture." At a series of "stakeholders' meetings" held to discuss the strategic planning process, one of the objectives that sparked considerable comment and controversy was that concerning aquaculture. To explore the issue further, the National Marine Fisheries Service convened follow-up meetings focused solely on aquaculture. Based on the discussions at those meetings, the Service intends to develop additional recommendations on aquaculture for inclusion in its strategic plan.

The Commission believes that, while expansion of aquaculture operations is inevitable, sufficient safeguards are needed to ensure that aquaculture does not have significant adverse effects on other components of marine ecosystems. Of particular concern are the possible effects on highly endangered species such as the northern right whale, which occupies areas where substantial growth of aquaculture is anticipated.

Commission representatives participated in the meetings at the which the National Oceanic and Atmospheric Administration's strategic plan and the aquaculture components of that plan were discussed. The Commission anticipates providing recommendations to the National Marine Fisheries Service on matters related to aquaculture in 1997.

**Aquaculture-Pinniped Interactions** — As recognized by the 1994 amendments to the Marine Mammal Protection Act, marine mammals may also adversely affect aquaculture operations. One area of particular concern is the northeastern United States, where both

the salmon aquaculture industry and local populations of harbor seals and gray seals have increased. To address this potential problem, the 1994 amendments added a new section 120(h) to the Act, directing the Secretary of Commerce to establish a task force to examine issues and problems regarding "pinnipeds interacting in a dangerous or damaging manner with aquaculture resources in the Gulf of Maine." As noted above, the Secretary was directed to report to Congress no later than 30 April 1996 recommending measures to mitigate the interactions.

After consultation with the Marine Mammal Commission and others, the National Marine Fisheries Service established a seven-member task force that included representatives of industry, state government, the scientific community, and conservation organizations. During 1995 the task force convened several meetings, visited aquaculture facilities, met with salmon producers, and conducted a public hearing on the issue. On 7 February 1996 it submitted to the Service a report on its findings along with recommended actions to mitigate the problem of predation by pinnipeds on pen-raised salmon in New England.

With regard to the lethal taking of predatory seals, the task force did not endorse culling (*i.e.*, large-scale lethal removal of animals) as a means of reducing potential interactions between seals and aquaculture. Task force members did not reach consensus on the issue of lethal removal of individual animals alleged to be attacking penned salmon. However, there was general agreement among members that three criteria must be met to justify the lethal taking of individual seals: (1) the consequences of the depredation must be severe and demonstrable; (2) the lethal measures being considered must have been proven to be an effective means of solving the problem; and (3) no non-lethal alternatives are available. However, task force members again did not reach consensus on whether the current situation met these criteria.

Recommendations in the task force report addressed regulatory, technological, and financial issues relative to pinniped-fishery interactions in the Gulf of Maine. Among other things, the report noted that in some cases Federal and state regulations may be restricting efforts to reduce interactions or be stifling innovation. It therefore recommended that the Na-

tional Marine Fisheries Service and the Maine Department of Marine Resources review existing regulations and restrictions and revisit those measures that may be limiting the ability of aquaculture operators to control seal predation through non-lethal measures.

The task force report also noted concern that U.S. aquaculture operators may face unfair competition from imports of inexpensive foreign salmon whose producers may be using predation control measures not permitted in the United States. The report recommended that the National Marine Fisheries Service investigate seal predation control measures in use in other salmon-producing countries, examine the applicability of section 102(c)(3) of the Marine Mammal Protection Act to those situations, and halt the import of salmon from nations that allow the use of lethal measures to control predation at salmon pens.

With respect to technological aspects of the problem, the task force recommended that the State of Maine survey pen and predator net designs currently in use and compare salmon loss rates for various designs. It further recommended that the National Marine Fisheries Service and the Maine Department of Marine Resources initiate and support studies of new materials and net designs and, as appropriate, develop measures or netting to obscure or camouflage penned fish. The report also called on the Service to support research on the effects of acoustic deterrence devices, and to sponsor workshops to review the best available information on such devices and foster communication between the industry and experts in acoustics and animal behavior.

In considering financial issues, the task force focused on the need to quantify the extent of seal predation on salmon aquaculture operations. It recommended that the industry carefully collect data on direct and indirect impacts. The task force further recommended that the National Marine Fisheries Service establish a voluntary, non-profit insurance program that would cover damage caused by seals.

On 20 February 1996 the National Marine Fisheries Service convened a public hearing to solicit comment on the task force report. As required under section 120(h), the Service is expected to submit its report to Congress early in 1997.

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## Chapter IV

# INTERNATIONAL ASPECTS OF MARINE MAMMAL PROTECTION AND CONSERVATION

Section 108 of the Marine Mammal Protection Act directs the Departments of Commerce, the Interior, and State, in consultation with the Marine Mammal Commission, to take such actions as may be appropriate or necessary to protect and conserve marine mammals under existing international agreements. It also directs them to negotiate additional agreements required to achieve the purposes of the Act. In addition, section 202 of the Act directs that the Marine Mammal Commission recommend to the Secretary of State and other Federal officials appropriate policies regarding international arrangements for protecting and conserving marine mammals.

During 1996 the Commission took steps to update the compendium of international treaties and agreements bearing on the conservation of marine wildlife. The Commission also continued to devote attention to providing advice on the International Whaling Commission, conservation of marine mammals and marine ecosystems in the Southern Ocean, and regulation of international trade in marine mammals under the Convention on International Trade in Endangered Species of Wild Fauna and Flora. These activities are discussed below.

### **The Compendium of Treaties and International Agreements**

In 1994 the Marine Mammal Commission published *The Compendium of Selected Treaties, International Agreements, and other Relevant Documents on Marine Resources, Wildlife, and the Environment*. The three-volume, 3,500-page *Compendium*, current through 1992, contains the complete texts of more than 400 international agreements, including more than 100 multilateral and 90 bilateral treaties, agreements, accords, and memoranda of understanding.

Also included are numerous amendments and protocols to these documents, several non-binding international documents, and a number of significant documents to which the United States is not a party.

The *Compendium* is divided into two sections comprising multilateral and bilateral documents, many of which are available for the first time. Subject areas include Antarctica, environment and natural resources, fisheries, marine mammals, marine pollution, marine science and exploration, and others. The *Compendium* also contains background information for each document, including primary source citations, the depositary nation or organization, the city in which the document was concluded, the date it was concluded, and, where applicable, the date it entered into force.

In 1995 the Commission began work to update the *Compendium* by adding multilateral and bilateral documents concluded between 1 January 1993 and 31 December 1995, as well as a number of older documents not included in the original *Compendium*. The revised edition will contain more than 25 additional multilateral and 50 additional bilateral documents in the above subject areas, many of which will be available publicly for the first time. At the end of 1996 the revised *Compendium* was in final production. Publication is expected by mid-1997.

### **International Whaling Commission**

The failure of the International Whaling Commission (IWC) to regulate commercial whaling effectively prior to the 1970s allowed many whale stocks to be reduced to levels approaching biological extinction. This was one of the factors leading to passage of the Marine Mammal Protection Act and establishment of

the Marine Mammal Commission. Since it was established, the Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, has continued to provide advice to the Department of Commerce and the Department of State on measures necessary to restore depleted whale stocks and to ensure that commercial and aboriginal subsistence whaling does not cause any whale stock to be reduced or maintained below its optimum sustainable level. Activities related to the 1996 annual meeting of the IWC are described below.

### Preparations for the 1996 IWC Meeting

Among the principal issues facing the IWC and its Scientific Committee at their June 1996 meetings were the following:

- a request by Japan for a catch limit of 50 North Pacific minke whales to be taken by coastal community-based whalers;
- development of surveillance and control measures under which commercial whaling could resume;
- requests for aboriginal subsistence whaling catch quotas by the United States on behalf of the Makah Indian Tribe to take 5 gray whales off of Washington State, and by Russia on behalf of Chukotka Natives to take 5 bowhead whales off the Chukotka Peninsula;
- development of a new management regime for aboriginal subsistence whaling;
- the killing of minke whales for purposes of research by Japan in the Southern Ocean and the North Pacific Ocean;
- abundance estimates for eastern North Atlantic minke whales subject to commercial whaling by Norwegian whalers under an objection to the moratorium on commercial whaling;
- comprehensive assessments of stocks of North Pacific Bryde's whales and other whale stocks; and
- the effects of climate change on whale stocks.

The Undersecretary of Commerce for Oceans and Atmosphere presently serves as the U.S. Commissioner to the IWC. The Commissioner has lead responsibility for developing and negotiating U.S. positions on all matters related to the IWC. To assist in formulating policies that are both scientifically sound and supported by the American public, the National

Oceanic and Atmospheric Administration holds a series of public/interagency meetings each year to seek the views of government agencies, members of the public, and non-governmental organizations.

Meetings of the public/interagency committee were held on 21 March and 16 May 1996 to review U.S. positions for the 1996 meeting of the IWC. Representatives of the Marine Mammal Commission attended both meetings and worked with officials of the National Oceanic and Atmospheric Administration and the Department of State to develop agreed positions.

**Intersessional Meetings** — In December 1991 and June 1992 the Marine Mammal Commission wrote to the U.S. IWC Commissioner noting, among other things, that whale stocks throughout the world may be affected by environmental pollution and a variety of other factors in addition to commercial exploitation. The IWC recognized this possibility and at its 1992 meeting asked its Scientific Committee to undertake a continuing review of the possible impacts of environmental change on whale stocks.

In 1994 the Scientific Committee advised the IWC that whale stocks could be affected directly and indirectly by many factors, including global warming, ozone depletion, chemical, metal, and noise pollution, entanglement in fishing gear, and over-harvesting of key prey species. To examine some these factors, the Committee proposed holding two intersessional workshops, one in 1995 on possible effects of pollution, and the second in 1996 on possible effects of global climate change. The IWC endorsed the proposals and a workshop on the effects of chemical pollution on cetaceans was held in Bergen, Norway, on 27-29 March 1995. The workshop on the effects of climate change, hosted by U.S. scientists, was held in Kahuku, Hawaii, on 25-30 March 1996.

Several working groups and subcommittees also met between the 1995 and 1996 IWC meetings. A Working Group on Northeast Atlantic Minke Whales held two intersessional meetings to examine abundance estimates for the eastern North Atlantic stock of minke whales subject to commercial whaling by Norway. During its first meeting, the working group identified alternative procedures for estimating stock abundance. At its second meeting, it examined

estimates developed using the agreed procedures. A working group on North Pacific minke whales also met shortly before the Scientific Committee meeting to assess the effect of different catch levels on the status of the North Pacific minke whale stock.

Other intersessional meetings that were held included the following: the Working Group on Supervision and Control met to narrow differing views on appropriate measures to monitor and enforce any whaling activity that might be allowed in the future under the IWC's Revised Management Scheme; the Working Group on Abundance Surveys and Implementation of the Revised Management Scheme met to evaluate guidelines for the collection and analysis of whale survey data used to calculate whaling quotas and the reporting of baleen and other large whale bycatch in commercial fisheries; and the Working Group on Aboriginal Subsistence Whaling Management Procedure met to continue work on developing a new procedure for determining appropriate aboriginal whaling catch limits.

Representatives of the United States participated in all of these meetings, the reports of which were considered during the 1996 IWC meeting.

### **The 1996 Meetings of the IWC and its Scientific Committee**

The 48th annual meeting of the IWC and its Scientific Committee was held in Aberdeen, Scotland. The Scientific Committee met on 5-17 June 1996 and the Commission met on 24-28 June 1996. The principal issues considered were noted earlier. The results are summarized below.

**The Moratorium on Commercial Whaling** — In 1982 the IWC adopted a moratorium on commercial whaling that entered into effect during the 1985 pelagic and 1986 coastal whaling seasons. While several nations filed formal objections to the moratorium provision, only Norway continues to maintain its objection. Under terms of the International Convention for the Regulation of Whaling, nations that file objections within a specified period after a measure is approved are not obligated to comply with that measure. Although the IWC continued to work on the

Revised Management Scheme (discussed below), which is expected to provide a framework under which the moratorium might be lifted, it took no action at its 1996 meeting to lift the moratorium.

As indicated above, Japan submitted a proposal to the IWC requesting a quota of 50 minke whales for its small-type coastal community-based whaling, which it views as being distinct from commercial whaling. Similar proposals made by Japan at past IWC meetings were not adopted, and at the 1996 IWC meeting Japan's proposal again was not adopted. However, the IWC agreed to hold a workshop before its next annual meeting to consider community-based whaling in Japan. The purpose of the workshop is to assess the commercial aspects of whaling in the coastal communities and to identify socioeconomic and cultural needs related to the proposed whaling.

As noted in past reports, Norway resumed commercial whaling for minke whales in the eastern North Atlantic in 1993 under its objection to the moratorium. In response to that action, the IWC adopted non-binding resolutions at its recent meetings calling on Norway to refrain from further whaling, but Norway has not done so. In 1996, Norway again announced plans to authorize commercial whaling. At its 1996 meeting, the IWC again adopted a resolution calling on Norway to halt all whaling under its jurisdiction.

**The Revised Management Scheme** — Prior to adoption of the moratorium, excessive catch quotas authorized by the IWC contributed to the overexploitation and depletion of whale stocks. Therefore, at its 1986 meeting, the IWC asked its Scientific Committee to develop a scientifically based method for determining commercial whaling catch quotas that would have a low probability of adversely affecting harvested whale stocks. The Committee subsequently did so and its recommended procedure was accepted at the 1994 IWC meeting as part of a Revised Management Scheme to regulate commercial whaling. Determining catch limits with a low probability of adversely affecting exploited stocks, however, is only a part of an effective management program. Therefore, to help develop other essential components of its Revised Management Scheme, the IWC established two working groups: the Working Group on Abundance Surveys and Implementation of the Revised Manage-

ment Scheme, and the Working Group on Supervision and Control.

The Working Group on Abundance Surveys and Implementation of the Revised Management Scheme was charged with developing advice to ensure that data used in calculating catch limits are reliable. Specifically, the group was asked to (1) expand an existing set of guidelines on methods for conducting surveys and analyzing data so as to ensure adequate levels of international collaboration and confidence in survey results, and (2) identify arrangements to ensure that all human-induced whale mortalities are considered when calculating allowable catch limits. The Working Group also was asked to consider requirements for IWC Scientific Committee oversight of whale surveys undertaken by its members to develop abundance estimates.

The Working Group on Supervision and Control was established in response to concerns expressed by the United States and most other members about past failures to accurately report the species and number of whales taken or to adequately enforce adopted conservation measures. Both were important factors that led to past overexploitation of whale stocks and many nations, including the United States, have taken the position that conditions for lifting the moratorium on commercial whaling should include not only agreed procedures for developing conservative catch quotas, but also an effective system for compliance monitoring and enforcement.

During its meeting prior to the 1996 IWC meeting, the Working Group on Abundance Surveys and Implementation of the Revised Management Scheme completed work on a set of revised guidelines setting forth requirements related to the calculation of catch limits and providing further guidance as to appropriate methods for designing whale surveys and analyzing resulting data. The Scientific Committee subsequently agreed with the revision and recommended that it be accepted by the IWC. To address oversight needs with regard to survey work, the Committee urged that the IWC identify individuals who could participate directly in proposed surveys and report on their conduct to the Scientific Committee. It urged that those individuals be identified based on their scientific expertise and experience, and not on their nationality.

As noted in last year's annual report, the Working Group on Supervision and Control met prior to the 1995 IWC meeting to examine ways of ensuring compliance with adopted catch limits. Although it was widely accepted that mechanisms are needed to ensure compliance with adopted management measures, there were widely differing views on how to meet this need. For example, there were differing opinions about who should pay for observer programs, whether IWC observers should have boarding preference over national inspectors when there is room aboard a whaling vessel for only one observer, and the role of observers with respect to enforcement. There also were differing views on whether whaling vessels should be required to carry automated vessel tracking devices to monitor their movements, and whether means for monitoring or regulating trade in whale products should be part of the supervision and control system.

This Working Group met again before the 1996 IWC meeting in an attempt to resolve such differences. The working group found little common ground on the fundamental issues, and during the 1996 IWC meeting, the working group chair advised the Commission that it was unlikely the group could make any further progress.

In light of the results of the two working groups' efforts, the IWC adopted a resolution on provisions for completing its revised management scheme. In its resolution, the IWC accepted the revised guidelines on the collection and analysis of survey data for calculating catch limits, and reaffirmed its view that stock abundance estimates not accepted by its Scientific Committee should not be used to calculate IWC catch limits. To ensure adequate oversight of whale surveys, the resolution called on its members to nominate qualified scientists, through the IWC Secretariat, who would be placed on survey ships (subject to acceptance by the member nation conducting the survey) to participate in the survey and report to the Scientific Committee on their conduct.

Finally, to complete work expeditiously on remaining elements of the Revised Management Scheme, the resolution called for combining the Working Groups on Supervision and Control, and Abundance Surveys and Implementation of the Revised Management

Scheme. The new working group was charged with recommending measures needed to complete remaining elements of the Revised Management Scheme, including matters related to inspection and observation schemes, arrangements to ensure that catch levels over time remain within limits set under the Revised Management Scheme, and other needs.

**Aboriginal Subsistence Whaling** — The IWC Schedule of Regulations includes catch limits for aboriginal subsistence whaling. During its 1996 meeting, the IWC reviewed new information on two stocks for which subsistence whaling catch limits currently exist, and considered new requests for catch limits from three other stocks. It also reviewed progress on efforts begun in 1995 to develop a new aboriginal subsistence whaling management scheme.

As noted in the previous report, the IWC amended its schedule in 1994 to allow Alaska Natives to land up to 51 bowhead whales per year from the Bering-Chukchi-Beaufort Seas stock of bowhead whales in 1995-1998. New information on the stock was reviewed but required no action to change the current quota. The next major review for this bowhead whale stock was scheduled for 1998. As noted in Chapter II, Canada, which withdrew from the IWC in 1992, has recently issued licenses to Native whalers to take bowhead whales for subsistence purposes. One of the licenses issued in 1996 authorized the take of a bowhead whale from the Davis Strait and Hudson Bay stocks in northeast Canada. These stocks are conservatively estimated to number about 450 whales and are among the most endangered of all large whale stocks. In light of this information, the IWC adopted a resolution expressing concern about whaling on the Davis Strait and Hudson Bay stocks and called upon the Government of Canada to reconsider any current licenses and to refrain from issuing any further licenses without IWC approval.

New information also was reviewed on the eastern North Pacific stock of gray whales. A current catch limit of 140 whales per year from this stock was approved by the IWC in 1995 for the years 1995-1997 to meet Russian Native subsistence needs. No action was taken to change that quota at the 1996 meeting. The next major review of this gray whale stock was scheduled for the 1997 IWC meeting.

With respect to requests for new aboriginal subsistence quotas, the United States asked for a catch limit of five gray whales from the eastern North Pacific stock on behalf of the Makah Tribe of Washington State (see Chapter II). Active whaling by the Makah Tribe was last undertaken in 1926. The request was prompted by the tribe's desire to renew its whaling tradition. After considerable discussion, the United States, in consultation with Makah representatives, withdrew its proposal asking that consideration be deferred until next year's meeting when the catch limit for this whale stock was scheduled to be reexamined.

Russia presented a request to catch five bowhead whales from the Beaufort-Chukchi-Bering Seas stock on behalf of the Chukotka Native community. After considerable discussion, some nations expressed strong reservations about the request and two nations (Mexico and Australia) indicated that they could not support it. Although not required, Russia has taken the position that aboriginal subsistence catch limits should be adopted by consensus. As consensus could not be reached, it declined to request a vote on its proposal and no action was taken. There also was no request to consider the matter at the next IWC meeting (see also Chapter II).

The third request for an aboriginal subsistence catch limit was made by St Vincent and the Grenadines to catch two North Atlantic humpback whales. The request was made to extend a catch limit that had expired since the previous IWC meeting. After considering the request, the IWC approved a catch limit of two humpback whales per year for each of the 1996-1997 and 1997-1998 whaling seasons.

As noted above, the Working Group on Aboriginal Subsistence Whaling Management Procedures met prior to the 1996 IWC meeting. During its meeting, a recommended set of objectives was developed to provide a basis for considering new procedures to determine catch limits. As the highest priority, the group identified the need to ensure that the risk of extinction for any whale stock is not seriously increased. Other objectives included the need to enable harvesting at appropriate levels in perpetuity, and to ensure that stocks are not reduced or maintained below their optimum levels. The IWC accepted the recommended objectives, approved plans to reconvene

the working group to consider procedures for developing future aboriginal catch limits, and urged that the group obtain input from Native hunters in developing those procedures.

**Research Whaling** — The International Convention for the Regulation of Whaling allows member nations to issue permits to its citizens to kill whales for scientific research purposes, provided that research plans are submitted to the IWC's Scientific Committee for review and comment before the permits are issued. Since 1982, Japan has issued permits for research whaling with questionable scientific merit. As a result, the IWC has adopted a series of non-binding resolutions calling on Japan to refrain from issuing permits to take whales.

During its 1996 meeting the IWC considered Japan's proposals to continue two research programs involving the killing of whales. One involves the catch up to 440 minke whales in the Southern Hemisphere and the other involves the catch of 100 minke whales in the western North Pacific. In response, the IWC again adopted a resolution calling on Japan to refrain from issuing permits to take those whales. In addition, at the recommendation of the Scientific Committee, the IWC approved plans for a workshop to evaluate the effectiveness of the Japanese Antarctic whale research program in meeting its stated goals. The workshop is planned to be held in May 1997.

**Assessments of Whale Stocks** — As noted above, Norway has continued to authorize the commercial catch of minke whales in the eastern North Atlantic Ocean under its objection to the moratorium. In determining its catch limits for this activity, Norway has indicated that it uses IWC accepted abundance estimates. For that reason, an assessment of the status of this stock has been given close scrutiny by the IWC in recent years. At its 1995 meeting the Scientific Committee concluded that its 1992 (and most recent) abundance estimate was flawed and no longer valid. As noted above, intersessional meetings were held prior to the 1996 IWC meeting to review alternative procedures for estimating the abundance of this stock and to consider derived stock size estimates. Based on results of those efforts, the Scientific Committee agreed that a best estimate of stock size was 67,000 whales in 1988 and 118,000 whales in 1995.

The Scientific Committee also completed an assessment of stock abundance for North Pacific Bryde's whales. It estimated that the stock's present abundance is 25,640 whales (coefficient of variation = 0.20) and that this was approximately 51% of its pre-exploitation stock size.

**Environmental Effects** — During its 1996 meeting, the IWC reviewed a report of the March 1996 workshop on the effects of climate change on cetacean populations. The workshop report included a list of cetacean species suitable for conducting studies on the effects of climate change and provided advice regarding the need for a long-term interdisciplinary approach to research on detecting possible effects. The need for cooperation among relevant international organizations was underscored.

Considering the results of the workshop on effects of climate change and the earlier workshop on effects of chemical pollution on cetaceans, the IWC adopted a resolution endorsing the establishment of a standing working group on effects of environmental change under its Scientific Committee. It directed the committee to take actions as may be appropriate on recommendations developed at the two workshops and also to consider environmental effects of other factors such as the impacts of noise, direct and indirect effects of commercial fishing, and environmental degradation due to human causes.

## **Conservation of Marine Mammals and their Habitat in the Southern Ocean**

Many species of seals, whales, dolphins, and porpoises inhabit or occur seasonally in the Southern Ocean (the seas surrounding Antarctica). Populations of humpback, blue, fin, sei, and sperm whales in the Southern Ocean were severely depleted and, in some cases, brought to near-extinction by commercial hunting that began in the early 1900s and escalated after World War II. For example, the blue whale population in the Southern Ocean is estimated to have been reduced from more than 150,000 to fewer than 1,000 individuals. Two of the six resident seal species — the southern elephant seal and the Antarctic

fur seal — also were severely depleted by commercial hunting, mostly during the 18th and 19th centuries.

There has been no commercial sealing in Antarctica or the Southern Ocean since the 1950s. As noted in previous Commission reports, the Antarctic Treaty Consultative Parties, concerned that commercial sealing would be resumed, negotiated the Convention for the Conservation of Antarctic Seals. This Convention, which entered into force in 1977, provides a mechanism for regulating commercial sealing in the Antarctic Treaty Area, should it ever be resumed.

As also noted in previous Marine Mammal Commission reports, the International Whaling Commission established a moratorium on commercial whaling effective in 1986. The International Whaling Commission also has designated much of the Southern Ocean as a whale sanctuary. Further, when it enters into force, the Antarctic Treaty Protocol on Environmental Protection (discussed below) will prohibit oil and gas exploration and development, and other mineral resource activities, in Antarctica for at least 50 years. Consequently, commercial sealing, commercial whaling, and mineral exploration and development do not currently pose threats to populations of seals and whales in the Southern Ocean. However, commercial sealing and whaling could be resumed, and mineral exploration and development could be permitted in the future.

If not regulated effectively, such activities could adversely affect populations and habitats of seals and whales in the Southern Ocean. Also, expansion of fisheries, particularly the fishery for Antarctic krill (*Euphasia superba*), could adversely affect seals, whales, and other species dependent upon krill and fish as their primary food source. In some areas, increasing numbers of tourists and construction and operation of scientific stations also could have adverse effects on seals, whales, and other components of the Southern Ocean ecosystem.

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, conducts a continuing review of activities that could directly or indirectly affect marine mammals in the Southern Ocean. It has made numerous recommendations to the Department of State, the

National Science Foundation, the National Oceanic and Atmospheric Administration, and the National Marine Fisheries Service on the need for research and international agreements to effectively regulate sealing, whaling, fisheries, mineral development, and other activities that could directly or indirectly affect marine mammals in the Southern Ocean.

Commission representatives participate in inter-agency meetings to develop U.S. policies regarding activities in Antarctica and the Southern Ocean. Commission representatives have served as advisors on U.S. delegations to many regular and special Antarctic Treaty Consultative Meetings, and meetings of the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources.

Activities and background information concerning activities carried out in 1996 are described below.

### **The Antarctic Treaty**

The Antarctic Treaty, which was concluded in Washington, D.C., in 1959 and entered into force in 1961, provides the international framework for governing human activities in Antarctica. The principal objective of the Treaty, which applies to the area south of 60° south latitude, is to ensure that Antarctica is used for peaceful purposes only and that it does not become the scene or object of international discord.

The Treaty prohibits military activities, nuclear explosions, and disposal of radioactive wastes, and guarantees freedom of scientific investigation in Antarctica. It requires that the contracting parties provide advanced notice of all expeditions to and within Antarctica, and calls upon them to promote international cooperation in scientific investigations by, among other things, annually exchanging information regarding plans for, and the results of, their research programs in Antarctica. Further, it provides that all areas of Antarctica, including all stations, installations, and equipment within those areas, and all ships and aircraft at points of discharging or embarking cargoes or personnel in Antarctica, shall be open at all times to inspection by any observer designated by a Consultative Party.

To achieve these purposes, the Treaty had to deal with the fact that seven countries — Argentina, Australia, Chile, France, New Zealand, Norway, and the United Kingdom — had asserted claims to territorial sovereignty over parts of Antarctica. It also had to deal with the fact that other countries active in the area did not recognize the claims and that two countries — the United States and the former Soviet Union — maintained the basis for claims. It did so by setting aside or freezing the claims issue as long as the Treaty remains in effect. This imaginative formulation, set forth in Article IV of the Treaty, allows the parties to agree to disagree over the sovereignty issue and thus establishes the basis for international cooperation in Antarctica.

The Treaty was negotiated by the 12 countries that carried out research programs in Antarctica during the 1957-1958 International Geophysical Year. These were the nine countries noted earlier, plus Belgium, Japan, and South Africa. Any nation that is a member of the United Nations, or that is invited to do so by the Consultative Parties, may accede to the Treaty. The 12 original signatories, plus acceding parties that demonstrate particular interest in Antarctica by conducting substantial research there, are entitled to participate in the taking of decisions pursuant to the Treaty and are referred to as Consultative Parties.

At present, there are 26 Consultative Parties and 16 non-Consultative Parties (nations that have acceded to the Treaty but have not established or maintained research programs in Antarctica). The Consultative Parties include the twelve original signatory states noted earlier, plus Brazil, China, Ecuador, Finland, Germany, India, Italy, the Republic of Korea, the Netherlands, Peru, Poland, Spain, Sweden, and Uruguay. The 16 non-Consultative Parties are Austria, Bulgaria, Canada, Colombia, Cuba, the Czech Republic, Denmark, Greece, Guatemala, Hungary, the Democratic Peoples' Republic of Korea, Papua New Guinea, Romania, Slovakia, Switzerland, and Ukraine.

The Treaty requires that representatives of the Consultative Parties meet periodically to consider and recommend to their governments measures necessary to give effect to the principles and objectives of the Treaty, including measures necessary to preserve and

conserve living resources in Antarctica. Measures recommended by the Consultative Party representatives become effective when approved by all Consultative Parties.

Since the Treaty came into effect in 1961, there have been 20 regular consultative meetings and 11 special consultative meetings. Until 1985 only representatives of the Consultative Parties were able to attend Treaty meetings. Beginning with the XIIIth Consultative Meeting in 1985, the non-Consultative Parties and certain intergovernmental and nongovernmental organizations have been invited by the Consultative Parties to attend Treaty meetings. Before 1994 consultative meetings generally were held every other year. Since 1994 regular consultative meetings have been held annually, anticipating entry into force of the Protocol to the Antarctic Treaty on Environmental Protection discussed below. Special consultative meetings have been held to consider information submitted by states seeking Consultative Party status and to conclude separate agreements, such as the Convention for the Conservation of Antarctic Seals, to govern certain activities in the Treaty Area and adjacent areas not covered by the Treaty. The Antarctic Treaty and the independent agreements negotiated under the auspices of the Treaty are known collectively as the Antarctic Treaty System.

*[Each party to the Antarctic Treaty is to designate a national contact point where information concerning the Treaty System can be obtained. The U.S. contact point is the Director, Office of Oceans Affairs, Room 5801, U.S. Department of State, Washington, DC 20520.]*

### **Protocol on Environmental Protection to the Antarctic Treaty**

The Antarctic Treaty contains no provisions for collectively governing exploitation of either living or non-living resources in Antarctica. As noted previously, the possibility that commercial sealing might be resumed led the Consultative Parties to negotiate the Convention for the Conservation of Antarctic Seals. As discussed below, concern regarding the possible impacts of developing fisheries, particularly the fishery for Antarctic krill, led the Consultative Parties

to negotiate the Convention for the Conservation of Antarctic Marine Living Resources.

Following conclusion of the Convention for the Conservation of Antarctic Marine Living Resources in 1980, the Consultative Parties initiated negotiation of a convention to govern possible exploration for, and development of, non-living resources in Antarctica. These negotiations led to the Convention on the Regulation of Antarctic Mineral Resource Activities, adopted at the final session of the IVth Special Antarctic Treaty Consultative Meeting in Wellington, New Zealand, in June 1988. As noted in previous Marine Mammal Commission reports, several Consultative Parties subsequently advised the other parties that they were opposed to any mineral exploration and development in Antarctica and that they therefore would not ratify the Convention. They proposed instead that consideration be given to the development of a regime to prohibit mineral exploration and development, and to afford added protection to the unique features and values of Antarctica.

The Convention on the Regulation of Antarctic Mineral Resource Activities will not enter into force unless it is ratified by all 26 of the Antarctic Treaty Consultative Parties. Recognizing this, the Consultative Parties agreed at the XVth Consultative Meeting held in October 1989 that a special consultative meeting should be held in 1990 to consider various proposals for protection of the Antarctic environment. This, the XIth Special Consultative Meeting, led to conclusion in October 1991 of the Protocol on Environmental Protection.

The basic intent of the Protocol is to improve the effectiveness of the Antarctic Treaty as a mechanism for protecting the Antarctic environment and for ensuring that Antarctica does not become the scene or object of international discord. The Protocol includes five annexes. These annexes specify requirements regarding (1) assessment in the planning stages of the possible environmental impacts of both government and nongovernment activities conducted in the Antarctic Treaty Area, (2) conservation of Antarctic fauna and flora, (3) waste disposal and management, (4) prevention of marine pollution, and (5) protection and management of areas of particular historic, scientific, or environmental importance.

The Protocol will enter into force when it has been ratified by all 26 of the current Antarctic Treaty Consultative Parties. It will establish general principles and legally binding obligations to protect the Antarctic environment. It will prohibit any activities relating to mineral exploration and development for at least 50 years.

By the end of 1996 all but three of the 26 Consultative Parties had ratified the Protocol. The United States, Japan, and the Russian Federation are the three Consultative Parties that have not yet done so.

The United States Congress passed, and the President signed, implementing legislation in October 1996. Among other things, this legislation — the Antarctic Science, Tourism, and Conservation Act of 1996 (Public Law 104-227) — requires that the Environmental Protection Agency, the Coast Guard, and the National Science Foundation promulgate regulations to implement certain provisions of the Act. The Department of State has concluded that the United States would be unable to meet its obligations under the Protocol until regulations are promulgated to provide for (1) environmental impact assessment of nongovernmental activities, including tourism; and (2) establishment of contingency plans for responding to incidents, such as grounding of ships and subsequent release of oil, that could have adverse effects on the Antarctic environment or on dependent and associated ecosystems. Therefore, the United States will not deposit its ratification until the required regulations have been promulgated.

If the United States, Japan, and Russia ratify the Protocol before the next Antarctic Treaty Consultative Meeting, to be held in New Zealand on 19-30 May 1997, steps could be taken at that meeting to begin implementing the Protocol. For example, an organizational meeting of the Committee on Environmental Protection, which will be established when the Protocol enters into force, could be held during the meeting. U.S. ratification before the next consultative meeting could encourage Japan and Russia to expedite their ratification and thus ensure that the Protocol enters into force.

The Environmental Protection Agency is responsible for promulgating regulations to provide for “(1)

the environmental impact assessment of nongovernmental activities, including tourism, for which the United States is required to give advance notice under paragraph 5 of Article VII of the Antarctic Treaty, and (2) coordination of the review of information regarding environmental impact assessment received from other parties under the Protocol.” Recognizing the importance of promulgating the required regulations as soon as possible, the agency established an interagency working group in November 1996 to help draft the regulations. The goal is to promulgate interim regulations in time to allow the United States to ratify the Protocol before the consultative meeting in May 1997.

The interim regulations will apply only to the 1997-1998 and the 1998-1999 Antarctic field seasons. Final regulations will be promulgated within two years as required by the Antarctic Science, Tourism, and Conservation Act.

The Marine Mammal Commission has been invited to be a member of the interagency working group established by the Environmental Protection Agency. The Commission representative has provided informal comments to the agency on factors that should be considered in formulating both the interim and final regulations. Among other things, the Commission representative has pointed out that (1) at the 1994 Consultative Meeting, the representatives of the Antarctic Treaty Parties developed and recommended that their governments adopt guidelines for tourism and other nongovernmental activities in Antarctica; and (2) if these guidelines are followed, those activities are unlikely to have significant adverse effects on the Antarctic environment, at least in the short term.

At the end of 1996 the Coast Guard was considering, but had not yet begun the process of promulgating, regulations necessary to establish contingency plans and other measures required to ensure prompt and effective response to environmental emergencies in Antarctica. In 1997 the Commission will continue to work with the Environmental Protection Agency and other U.S. government agencies to facilitate U.S. ratification and effective implementation of the Environmental Protocol.

## **Antarctic Treaty Consultative Meetings XX and XXI**

The XXth Antarctic Treaty Consultative Meeting was held in Utrecht, the Netherlands, from 29 April to 10 May 1996. The XXIst Consultative Meeting will be held in Christchurch, New Zealand, from 19-30 May 1997. A Commission representative was a member of the U.S. delegation to the XXth meeting and expects to be asked by the Department of State to be a member of the U.S. delegation to the XXIst meeting.

The XXth Consultative Meeting was attended by representatives of all 26 Consultative Parties and 11 of the 16 non-Consultative Parties. Representatives of a variety of intergovernmental and nongovernmental organizations also attended the meeting. They included the Commission for the Conservation of Antarctic Marine Living Resources, the Scientific Committee on Antarctic Research, the Council of Managers of National Antarctic Programs, the United Nations Environment Programme, the World Meteorological Organization, the Intergovernmental Oceanographic Commission, the International Union for the Conservation of Nature and Natural Resources, the Antarctic and Southern Ocean Coalition, and the International Association of Antarctica Tour Operators.

During the XXth Consultative Meeting, participants considered a broad range of issues. They included possible establishment of a small secretariat to facilitate information exchange and organization of consultative meetings; actions that might be taken to facilitate prompt and effective implementation of the Environmental Protocol; development of an annex to the Protocol to establish procedures for determining damage and liability for damage to the Antarctic environment and dependent and associated ecosystems; means for assessing and minimizing the possible adverse impacts of tourism and other nongovernmental activities; inspections carried out under Article 7 of the Antarctic Treaty; improving access to environmental and other data regarding Antarctica; and updating management plans for existing specially protected areas and establishing additional specially protected areas.

**Establishment of a Secretariat** — Antarctic Treaty Consultative Meetings are organized and hosted by the Consultative Parties on a rotating basis. Information concerning member states' activities in Antarctica is shared through an annual information exchange. The number of Treaty Parties and the level of international interest in Antarctica have both increased substantially since the Treaty was concluded in 1959.

Organization of consultative meetings, exchange of information, and implementation of the Protocol on Environmental Protection could be enhanced by establishment of a small, permanent secretariat. Agreement was reached in principle at the XVIIth Consultative Meeting in 1992 on the need for and the general functions of a small secretariat. Argentina subsequently proposed that the secretariat be located in Buenos Aires. The United Kingdom objected and, at the 1996 Consultative Meeting, continued to object to locating the secretariat in Buenos Aires. This has created an impasse blocking the consensus required to take such decisions under the Antarctic Treaty.

The matter will be considered again at the 1997 Consultative Meeting.

**Implementation of the Environmental Protocol** — Article 11 of the Protocol provides for the establishment of a group of scientific and technical experts — the Committee for Environmental Protection — to provide advice to the Treaty Parties on measures necessary to effectively implement the various provisions of the Protocol and its annexes. During the Consultative Meeting in 1994, a working group was established to consider agenda items likely to be referred to the Committee once the Protocol enters into force. Similar working groups, referred to collectively as the Transitional Environmental Working Group, were established and met during the consultative meetings in 1995 and 1996.

Points raised during the 1996 meeting of this working group indicated that there are differing views concerning the purpose of environmental impact assessments that will be required and the functions of the Committee on Environmental Protection that will be established when the Environmental Protocol enters into force. Some Treaty Parties, particularly those

without well-established domestic environmental impact assessment procedures, and some international and nongovernmental organizations that attend consultative meetings, appear to believe that the Protocol will prohibit activities that could have more than minor or transitory environmental impacts and that the purpose of environmental impact assessment is to allow the Treaty Parties to collectively decide whether particular activities should be allowed. Some Parties and observers also appear to believe that the Committee on Environmental Protection, and, pending establishment of the committee, the Transitional Environmental Working Group, should review and judge the adequacy of both initial and comprehensive environmental evaluations done pursuant to Article 8 and Annex I of the Protocol.

The U.S. representatives pointed out that such views were contrary to the intent and provisions of the Protocol and, if accepted, would constitute *de facto* amendment of the Protocol. They also pointed out that the environmental impact assessment process, as set forth in the Protocol, is intended to ensure that the possible environmental impacts of planned and possible alternative actions are identified and considered before an action is undertaken, not to identify and prohibit activities that may have more than a minor or transitory environmental impact. In this regard, the U.S. representatives noted that collective decision-making and prohibiting any activities that might have more than minor or transitory impacts would seriously limit the science and other peaceful activities that could be conducted in Antarctica, and would be inconsistent with the freedom of access guaranteed by the Antarctic Treaty.

From the discussions, it also was clear that there is not a common understanding of what would constitute a minor or transitory environmental impact, or when initial and comprehensive environmental evaluations should be done. In this context, the U.S. representatives pointed out that the nature and significance of possible environmental impacts could be affected by a broad array of variables in addition to the activity in question, including the scale and location as well as the nature of the activity; the time of year that the activity is to take place; the experience of the organization or the individuals who will conduct the activity; and other activities that have been or are being

conducted in or near the area where the activity in question is to be conducted.

It was agreed that interested parties should correspond informally before the next consultative meeting with a view to developing mutual understanding of the environmental impact assessment process and the term "minor or transitory." New Zealand, the host of the next consultative meeting, is to coordinate this inter-sessional work.

Prior assessment of the possible environmental impacts of both government and nongovernment activities in Antarctica is essential to maintaining the unique biological, scientific, and aesthetic values of Antarctica. However, if the environmental impact assessment requirements of the Environmental Protocol are misinterpreted and not implemented properly, they could prevent or impede scientific investigations and other peaceful uses of Antarctica. Therefore, the Marine Mammal Commission will continue to work with the Department of State, the Environmental Protection Agency, the National Oceanic and Atmospheric Administration, the National Science Foundation, and the National Academy of Sciences' Polar Research Board to facilitate appropriate interpretation and implementation of the Protocol requirements concerning environmental impact assessment.

**Liability for Damage to the Antarctic Environment** — Article 16 of the Environmental Protocol calls upon the parties to elaborate rules and procedures for assigning liability for damage to the Antarctic environment and dependent or associated ecosystems arising from activities in the Antarctic Treaty Area. Toward this end, a group of legal experts met during the XXth Consultative Meeting to discuss and attempt to reach consensus on (1) what should be viewed as damage to the Antarctic environment or dependent and associated ecosystems; (2) the types of damage for which parties should be liable; (3) whether there should be any defenses or limits to liability; and (4) the mechanisms that might be used to determine damage and liability for damage.

Some Consultative Parties and members of the legal experts group believe that the environmental impact assessment process might be used to define the types of environmental damage for which parties

should be liable. For example, parties might be made liable for any environmental impacts that are not minor or transitory and that are not identified in an appropriate environmental impact assessment or, alternatively, that parties would not be liable for any damages identified beforehand in an appropriate environmental impact assessment. Such an approach would require that the Consultative Parties collectively approve both environmental impact assessments and the activities for which the assessments are done. Uncertainty or concern regarding possible environmental impacts expressed by a single party could be viewed as establishing a basis for liability if the activity in question is conducted. This in turn could cause countries not to conduct or support certain kinds of research, even when the scientific benefits clearly outweigh the environmental risks. Although well intentioned, such collective decision-making could in effect allow any party to veto, on environmental grounds, any scientific program or other activity they oppose for any reason. It could be used to control access to and limit freedom of scientific investigation in Antarctica.

Recognizing that there are broadly differing views and little likelihood of reaching consensus on all the related issues any time in the foreseeable future, the United States proposed focusing efforts initially on the development of an annex specifying liability and procedures for determining liability for environmental damages resulting from failure to meet the obligations, set forth in Article 15 of the Protocol, to provide prompt and effective response to environmental emergencies (*e.g.*, oil spills) that occur as a result of scientific research, tourism, or other activities for which a party or parties are responsible. Although some progress was made, the legal experts group was unable to reach consensus on whether to focus the discussions as the U.S. proposed or to continue to try to reach consensus on the full range of related issues. The group met again in Cambridge, England, from 7-11 October 1996. Again, while some progress was made, no consensus was reached on how to proceed. The group will meet again during the XXIst Consultative Meeting in May 1997.

**Tourism and Other Nongovernmental Activities** — Until 1966 nearly all expeditions to Antarctica were for scientific purposes and were either organized

or sponsored by one or more of the Antarctic Treaty Consultative Parties. In 1966 the first commercially organized tourist expedition occurred. Since then there has been a steady increase in tourism and other nongovernmental activities (*e.g.*, yachting and mountain climbing). In recent years the number of tourists and adventurers visiting Antarctica has been greater than the number of scientists and support personnel working there.

Tourism and other nongovernmental activities can interfere with scientific research and, like other activities, can have adverse environmental impacts. The Antarctic Treaty Consultative Parties have recognized this and have adopted a number of measures to govern tourism and nongovernmental activities, as well as governmental activities, in the Antarctic Treaty Area. As noted in the Commission's report for calendar year 1994, the XVIIIth Antarctic Treaty Consultative Meeting developed and adopted a recommendation calling on the Treaty Parties to implement agreed Guidance for Visitors to the Antarctic and Guidance for Those Organizing and Conducting Tourism and Non-governmental Activities in Antarctica.

Available information and monitoring programs generally are insufficient to predict or detect the effects of tourist expeditions, and other activities on the Antarctic environment. Recognizing this, the Commission, in cooperation with the Department of State, contracted in 1994 for a field study to determine whether the Antarctic tourist industry was aware of, and complying with, the previously noted guidelines formulated at the XVIIIth Consultative Meeting. Also in 1994, the National Science Foundation provided funds for a study to (1) characterize the physical and biological features of representative sites in the Antarctic Peninsula typically visited by tourist expeditions, and (2) assess whether periodic visits by trained observers aboard tour ships could be used to cost-effectively monitor and detect possible visitor-caused changes in areas frequently visited by tourists. Subsequently, both the Environmental Protection Agency and the United Kingdom provided funds to continue this feasibility study.

The United States and the United Kingdom provided progress reports on this ongoing feasibility study at

the XXth Consultative Meeting. The meeting participants encouraged other parties to consider supporting this program or to initiate similar programs. The participants also stressed the importance of self-regulation by the tourist industry and, toward this end, urged the International Association of Antarctica Tour Operators to encourage all tour companies operating in Antarctica to become members of the association and to ensure that its members are aware of, and conform fully with, the previously noted guidelines and the relevant provisions of the Environmental Protocol.

The participants also agreed to adopt for a one-year trial period forms proposed by New Zealand for standardizing advance notification and post-season reporting of Antarctic tourist operations. The International Association of Antarctica Tour Operators agreed to provide an evaluation of the forms at the 1997 Consultative Meeting.

The Council of Managers of National Antarctic Programs presented a paper expressing its concerns regarding the safety of tour operations, contingency planning, and medical screening of prospective tourists. The International Association of Antarctica Tour Operators advised those attending the meeting of steps that its members have taken to improve medical screening of tourists and to ensure that both staff members and tourists are aware of, and comply with, the guidelines for visitors and tour operators developed at the XVIIIth Consultative Meeting.

As noted previously, the Marine Mammal Commission believes that tourism in Antarctica is unlikely to have adverse impacts on marine mammals and other biota, at least in the short term, if the tour industry and individual visitors comply with the guidelines developed at the XVIIIth Consultative Meeting and with the relevant provisions of the Environmental Protocol. The Commission will continue to work with the Department of State, the National Science Foundation, the Environmental Protection Agency, and the International Association of Antarctica Tour Operators to encourage full compliance with the guidelines and the relevant provisions of the Protocol.

**Inspections Under the Antarctic Treaty** — Article 7 of the Antarctic Treaty provides that all

areas of Antarctica, including all stations, installations, and equipment within those areas and all ships and aircraft at points of discharging or embarking cargoes or personnel in Antarctica, shall be open at all times to inspections by observers designated by any Consultative Party. Since the Treaty entered into force in 1961, the United States has periodically inspected research stations and support facilities of other nations in Antarctica. In 1995 the United States carried out inspections of eight stations: Dumont d'Urville (France); Mirniy (Russia); Davis (Australia); Zhongshan (China); Syowa (Japan); Newmeyer (Germany); Signey (United Kingdom); and Orcadas (Argentina).

A draft report on these inspections was presented at the XIXth Consultative Meeting. The final report was distributed at the XXth Consultative Meeting. No other inspections were reported. Norway indicated that it planned to carry out an inspection during the 1996-1997 austral summer.

On a related matter, Japan reported the discovery of non-native grass found growing in an area approximately 25 km south of Syowa Station. The presence of old shoots suggested that the grass had survived at least three winters. The meeting urged Parties to survey areas around their facilities in Antarctica to look for other non-native species and to take steps to avoid introduction of non-native species.

**Data Archiving and Sharing** — Much of the data currently being compiled by national Antarctic programs may be useful in the future for assessing, preventing, and mitigating the possible adverse effects of scientific research programs, fisheries, tourism, and other activities on the Antarctic environment. The utility of the data will depend, in part, upon their accessibility and comparability. Recognizing this, the Antarctic Treaty Consultative Parties requested in 1985 that the Scientific Committee on Antarctic Research consider and provide advice on steps that might usefully be taken to improve the comparability and accessibility of environmental data regarding Antarctica. The Scientific Committee subsequently recommended and the Consultative Parties initiated inventories and development of national directories listing the types of environmental data being compiled and archived by various organizations, countries. The

National Science Foundation was asked, and along with New Zealand, France, and Italy, has provided funds to the International Center for Antarctic Information and Research in Christchurch, New Zealand, to develop and operate a master data directory.

During the XXth Consultative Meeting, representatives of the Scientific Committee on Antarctic Research and the Council of Managers of National Antarctic Programs (COMNAP) reported on the ongoing efforts to develop both the national and master directories. The COMNAP representative also described the development of an electronic network that allows 26 of the 30 COMNAP members to communicate through the World Wide Web.

**The Protected Area System** — Since the first Consultative Meeting in 1961, the Antarctic Treaty Parties, acting on the advice of the Scientific Committee on Antarctic Research, have elaborated a system for protecting sites of special historic, scientific, and ecological importance in Antarctica. At the XVth Consultative Meeting in October 1989 the representatives of the Consultative Parties recommended that their governments establish two additional categories of protected areas — specially reserved areas to protect areas of outstanding geological, glaciological, geomorphological, aesthetic, scenic, or wilderness value; and multiple-use planning areas to assist in coordinating activities in areas where there are many activities that might interfere with each other and have cumulative environmental impacts.

Annex V of the Antarctic Treaty Protocol on Environmental Protection is intended to simplify and improve the system for identifying and protecting areas of special historic, scientific, environmental, aesthetic, or wilderness value. The Annex was adopted after the Protocol was adopted and, like the Protocol itself, will not come into force until it has been formally approved by all 26 Consultative Parties. The meeting participants urged all Parties to approve both Annex V and the Protocol, including the first four Annexes approved with it.

Protocol Annex V specifies that all existing Specially Protected Areas (SPAs) and Sites of Special Scientific Interest (SSSIs) will automatically be designated as Antarctic Specially Protected Areas

when the Protocol enters into force, and that entry into these areas will be prohibited, except in accordance with a permit issued by an appropriate national authority. Management plans for the existing SPAs and SSSIs will have to be reviewed, and, if necessary, be revised to incorporate the more stringent permitting and other provisions of the Annex. Toward this end, the United Kingdom and the United States tabled proposed revisions, respectively, of the existing management plans for SSSI No. 9 (Rothera Point Adelaide Island) and SSSI No. 19 (Linnaeus Terrace, Asguard Range, Victoria Land). The meeting participants recommended that both management plans be approved. They also recommended that the expiration date of management plans for 12 other existing SSSIs be extended to 31 December 2000.

Brazil and Poland proposed that Admiralty Bay, King George Island, be designated an Antarctic Specially Managed Area in accordance with Protocol Annex V. The proposal included provisions for cooperatively managing the many scientific programs, related support programs, and tourist programs in the area. The proposal was revised to take account of comments provided by the United States and others. The meeting participants recommended that the Treaty Parties comply with the revised management plan on a voluntary basis pending entry into force of Protocol Annex V and that the management plan be revised, if necessary, when Annex V enters into force.

#### **Preparation for the XXIst Consultative Meeting**

— The next consultative meeting will be held in Christchurch, New Zealand, from 19 to 30 May 1997. The meeting will consider a variety of issues related to operation of the Antarctic Treaty System and implementation of the Protocol on Environmental Protection. With regard to the Protocol, the Scientific Committee on Antarctic Research and the Council of Managers of National Antarctic Programs are expected to report the results of workshops held in 1995 and 1996 to help determine what will be necessary to meet the monitoring requirement of Protocol Annex I. The first of these workshops, held in Oslo, Norway in October 1995, focused on identification of activities and environmental impacts that should be of principal concern relative to the Environmental Protocol. The second workshop, held in College Station, Texas, in March 1996, focused on the design of programs that

would cost-effectively meet the environmental monitoring requirements of Protocol Annex I.

On a related point, the Scientific Committee on Antarctic Research was asked to consider and provide a proposal to the 1997 Consultative Meeting for assessing the state of the Antarctic environment.

As it has done in the past, the Marine Mammal Commission will work with the Department of State, the National Science Foundation, other Federal agencies, and the private sector to identify and promote actions necessary to protect the unique ecological, scientific, historic, and other values of Antarctica.

#### **Activities Related to Marine Living Resources**

As noted in past Commission reports, fisheries for krill and finfish in the Southern Ocean began to develop in the 1960s. Concern that these fisheries, particularly the krill fishery, could adversely affect seals, whales, and other non-target species, as well as target species, led the Antarctic Treaty Consultative Parties to negotiate and adopt the Convention for the Conservation of Antarctic Marine Living Resources.

The Convention was concluded in May 1980 and entered into force in April 1982. Among other things, it established the Commission and the Scientific Committee for the Conservation of Antarctic Marine Living Resources. The Commission and Scientific Committee meet annually. The Marine Mammal Commission's involvement in negotiating the Convention and the first 14 meetings of the Antarctic Living Resources Commission and Scientific Committee are described in previous annual reports.

The XVth annual meetings of the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources were held in Hobart, Tasmania, Australia, from 21 October - 1 November 1996. The principal results of these meetings are described below.

*[Meeting reports and other information concerning the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources can be obtained from the headquarters of the Commission, 25 Old Wharf, Hobart, Tasmania, 7000, Australia]*

**The Krill Fishery** — The total reported krill catch in the Southern Ocean in 1995-1996 was 95,040 metric tons (mt), approximately 20 percent less than the 118,715 mt reported caught in 1994-1995. The catch was mainly by vessels from Japan, Poland, and the Ukraine. A small amount (495 mt) was reported taken by vessels registered in Panama, which is not a party to the Convention.

Most of the krill catch occurred in statistical area 48.3, the area around the South Shetland Islands north of the Antarctic Peninsula. Estimates of krill abundance and the potential minimum sustainable level of krill catch in this area are based upon acoustic surveys done in 1980. The Scientific Committee believes that krill abundance may have been abnormally high when the surveys were done and that current krill abundance in statistical area 48.3 may be much less than it was in 1980. The Committee has recommended that a synoptic survey of statistical area 48.3 be done as a matter of high priority. Planning and scheduling of the survey is expected to be done at the next meeting of the Scientific Committee's Working Group on Ecosystem Monitoring and Management to be held at the National Marine Fisheries Service's Southwest Fisheries Science Center in La Jolla, California, in July 1997.

**Finfish Fisheries** — The total reported catch of finfish in the convention area, in 1995-1996 was 8,838 mt, down from 12,933 mt in 1994-1995. Most of the catch (8,739 mt) was Patagonian toothfish, (*Dissostichus eleginoides*). Most of the catch was by Chilean and French vessels in sub-area 48.3 (around South Georgia Island) and sub-area 58.5 (around Kergulen Island), respectively.

In 1995 the Scientific Committee estimated that the unreported catch of *D. eleginoides* in statistical area 48.3 was nearly as great as the reported catch. There were reports of vessels from both member and non-member states fishing in the convention area in 1996 at times and in places where fishing was prohibited. It was not possible, however, to estimate the level of illegal, unreported catch.

**The Crab Fishery** — As noted in previous Marine Mammal Commission annual reports, this is an exploratory fishery governed by conservation mea-

asures adopted in 1993 and continued each year since then. The fishery is limited to statistical area 48.3 and the total allowable catch is 1,600 mt. Until the fishery potential is determined, only one vessel from each member country is allowed to participate in the fishery.

To date, only two vessels have participated in the fishery. Both have been from the United States. The catch has been less than expected (479 mt in the 1994/1995 and 1995/1996 fishing seasons combined), and product storage and transportation costs have been high. Because of this, the owners of the vessel that participated in the fishery in the last two years abandoned the fishery, and in September 1996 surrendered the permit that had been issued by the National Marine Fisheries Service in accordance with the 1984 Antarctic Marine Living Resources Convention Act.

Several other companies have contacted the National Marine Fisheries Service about the possibility of participating in this exploratory fishery. Other Convention Parties have reported similar inquiries. Whether the crab stocks in statistical area 48.3 or other areas of Antarctica are large enough to support an economically viable fishery remains unknown.

**The Squid Fishery** — The Republic of Korea reported that 52 mt of squid, *Martialia hyadesia*, were caught during a research cruise in statistical area 48.3 in June 1996. This was the first reported catch of a significant quantity of squid in the convention area.

Based upon the results of the research cruise, Korea and the United Kingdom notified the Commission that they intended to cooperatively initiate a new fishery for *M. hyadesia* in statistical sub-area 48.3 during the 1996/1997 fishing season. The Commission, acting on the advice of the Scientific Committee, adopted a conservation measure establishing a 2,500-mt limit on the catch in the 1996-1997 fishing season and requiring that each vessel participating in the fishery have a scientific observer on board.

**Other New Fisheries** — Conservation Measure 31/X, adopted by the Commission for the Conservation of Antarctic Marine Living Resources in 1991, requires that members intending to develop new fisheries in the convention area notify the Commis-

sion, not less than three months before the next Commission meeting at which the notification is to be considered. It defines a new fishery as a fishery for a species that has not previously been fished in a particular area. The measure specifies information that is to be provided with the notification.

Four members, in addition to Korea and the United Kingdom, notified the Commission in advance of the 1996 Commission meeting that they were planning to initiate new fisheries in the convention area during the 1996/1997 fishing season. The notifications were by Australia, New Zealand, Norway, and South Africa. The target species, in most cases, were *D. eleginoides* and *D. mawsoni*. The Commission, taking into account advice provided by the Scientific Committee, adopted conservation measures setting one-year catch limits for these fisheries and requiring that each vessel participating in the fisheries carry at least one scientific observer appointed in accordance with the Scheme of International Scientific Observation adopted by the member nations in 1988. The conservation measures require that fishing effort be distributed as broadly as possible to facilitate acquisition of distribution and abundance data needed to estimate fishery potential.

With regard to the preceding point, Conservation Measure 65/XII, adopted in 1993, specifies that after the first year new fisheries shall be classified as "exploratory fisheries" until sufficient information is available to (1) assess the long-term potential yield of the fishery, (2) assess the potential impacts of the fishery on dependent and related species, and (3) allow the Scientific Committee to formulate and provide advice to the Commission on appropriate harvest levels and effort. To ensure that the required information is identified and obtained, the Scientific Committee is directed to develop and annually update data collection plans for each exploratory fishery. Each member active in the fishery or intending to authorize a vessel to enter the fishery is required annually to prepare and submit a research and fishery operations plan for review by the Scientific Committee and the Commission.

If the new fisheries planned to be initiated in the 1996/1997 fishing season indicate that the target stocks could be large enough to sustain economically viable fisheries, the Scientific Committee will be

required to develop an overall data collection plan, and each of the participating members will be required to develop an operations plan, indicating how it would give effect to the data collection plan, before exploratory fishing could begin.

**Resumption of Closed Fisheries** — As noted above, the Commission for the Conservation of Antarctic Marine Living Resources has adopted conservation measures defining and governing new and exploratory fisheries. The purpose of these measures is to ensure that fisheries in the convention area grow no faster than the growth of the information base needed to determine catch levels that can be sustained without adversely affecting either the target species or species that are dependent upon or associated with the target species.

There are no comparable measures in place to ensure that resumption of fisheries closed to allow recovery of depleted stocks does not again result in overfishing before the optimum-sustainable yield level is determined. The United States therefore proposed adoption of a conservation measure, patterned after those for new and exploratory fisheries, to govern resumption of fisheries that have been closed for conservation purposes. Although there was agreement in principle that such a conservation measure was needed, it was not possible to get agreement on a text. The matter will be considered again at the next meeting.

**Incidental Mortality** — Many species of marine mammals, seabirds, sea turtles, and non-target fish species are caught and killed incidental to commercial fisheries throughout the world. Many are also caught and killed in lost and discarded fishing gear or die from eating plastics and other non-digestible material discarded at sea.

As noted in previous Marine Mammal Commission annual reports, the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources have taken a number of steps to assess and prevent such fishery-related mortality in the Southern Ocean. Fishermen are required to report lost fishing gear and incidental catches of marine mammals, seabirds, and other non-target species in the convention area. Placards and information bro-

chures have been prepared and provided to fishermen to ensure that they are aware of hazards posed by lost and discarded fishing gear and other potentially hazardous materials, and to advise them of what they can do to prevent such materials from being lost and discarded at sea. To prevent seabirds from being attracted to baited hooks on longlines, longlines can be set only at night, trash and offal cannot be dumped when longlines are being set or retrieved, and streamers must be towed above longlines as they are set to discourage birds from attempting to take bait.

Despite these efforts, data collected by scientific observers aboard fishing vessels indicate that significant numbers of seabirds are being caught and killed in longline fisheries in the Southern Ocean. The data suggest that more than 1,500 seabirds, mostly albatrosses and white-chinned petrels, were caught during the 1995/1996 fishing season in sub-area 48.3 alone. Several breeding colonies of albatrosses, both in and outside the convention area, are known to be declining, perhaps due to incidental take in fisheries.

Much of the incidental seabird mortality appears due to lack of compliance with the prohibition on daytime setting and the failure to appropriately use streamers during the deployment of longlines. Also, beach surveys carried out in parts of the convention area during the 1995/1996 austral summer indicate that there have been increases in the amount of potentially hazardous marine debris originating from fishing vessels (*e.g.*, plastic bands used to seal bait boxes). The Commission, recognizing that a new education initiative is needed, requested that the Secretariat consult with members to determine how the problem might best be addressed. The Commission also requested that the Secretariat continue consultations with the Commission on the Conservation of Southern Bluefin Tuna, especially its Working Group on Ecologically Related Species, to identify additional actions that the two organizations might take to further reduce the bycatch of albatrosses and other seabirds in fisheries in both the Southern Ocean and adjacent areas.

**Regulation of Fisheries in the Area around South Georgia** — The area covered by the Convention for the Conservation of Antarctic Marine Living Resources extends beyond the area covered by the

Antarctic Treaty. Parts of the area not covered by the Treaty are subject to national jurisdiction. The final act of the May 1980 conference, at which the Convention was concluded, recognizes the rights of parties with jurisdiction over such areas to promulgate and enforce management measures without the concurrence of the Commission for the Conservation of Antarctic Marine Living Resources.

The area around South Georgia Island (statistical sub-area 48.3) has been one of the richest fishing grounds in the convention area. Both Argentina and the United Kingdom claim the island. In 1993 the United Kingdom began to exercise territorial sovereignty around the island by requiring, among other things, that vessels fishing in the area be licensed by the British Government. Argentina believes that, because it disputes the United Kingdom's claim, the unilateral exercise of sovereignty by the United Kingdom is inconsistent with the provisions of the final act of the May 1980 Conference. The United Kingdom interprets the final act differently, and argues that it was necessary to unilaterally exercise sovereignty in the area around South Georgia Island in order to ensure compliance with conservation measures adopted by the Commission for the Conservation of Antarctic Marine Living Resources.

The United States has taken no position on the merits of the dispute. The United States and many other Commission members are concerned, however, that the dispute is adversely affecting the efforts of Argentina and the United Kingdom, and possibly those of other countries, to work together to identify, adopt, and ensure compliance with measures necessary to effectively implement the Convention. The United States therefore called upon, and encouraged other Commission members to call upon, Argentina and the United Kingdom to make every effort to resolve their dispute and, pending resolution of the dispute, to ensure that cooperative efforts to effectively implement the Convention are not diminished.

**The Future** — The Convention for the Conservation of Antarctic Marine Living Resources is unique in several respects. Most importantly, it requires that harvesting of marine living resources in the convention area be conducted so as to (1) prevent depletion of harvested populations; (2) maintain the ecological

relationships among harvested, dependent, and related populations; (3) restore depleted populations; and (4) prevent or minimize the risk of changes in the marine ecosystem that are not potentially reversible within 20 to 30 years.

Efforts to implement the Convention have been very successful and provide a model that can be used to improve fishery management and conservation of marine living resources elsewhere. However, efforts have not been completely successful. It appears, for example, that the continuing dispute regarding the United Kingdom's unilateral exercise of sovereignty around South Georgia Island may have contributed to, rather than prevented, illegal fishing in the area.

Funding is another problem. Article XIX of the Convention specifies that the Commission's budget and the budget of the Scientific Committee must be adopted each year by consensus and that member contributions are to be determined by two criteria: the amount (*e.g.*, quantity and value) of marine living resources harvested by the member; and an equal sharing among all members of the Commission. Fisheries have not developed as fast and have not been as profitable as was anticipated when the Convention was negotiated. Therefore, most of the costs of operating the Commission, the Scientific Committee, and the Secretariat have been borne equally by the members. At the same time, the responsibilities and thus the costs of operating the Scientific Committee and the Secretariat have increased. The Scientific Committee, for example, has had to form several permanent working groups and *ad hoc* specialists groups to compile information, develop methodology, and conduct analyses necessary to advise the Commission on measures required to effectively implement the Convention. These groups must meet in advance of the annual meetings of the Scientific Committee and require support from the Executive Secretary. In addition, compliance with conservation measures adopted by the Commission has resulted in increasing quantities of data being submitted to, and requiring archiving, analysis, and dissemination by, the Executive Secretary. Thus, many of the actions that have contributed to the successful implementation of the Convention also have increased operating costs.

From experience to date, it appears that the Scientific Committee and Executive Secretary will continue to require larger operating budgets in order to continue effective implementation of the Convention. If the size and value of fisheries in the convention area do not increase substantially, continued effective implementation of the Convention will require increases in member contributions.

As noted earlier, the Convention requires that budgets be adopted by consensus. If any Commission member is unable or unwilling to accept budget increases, necessitated by increased operating costs, the future effectiveness of the Convention very well could be jeopardized.

### **The U.S. Antarctic Marine Living Resources Research Program**

The Antarctic Marine Living Resources Convention Act of 1984 provides the domestic legislative authority necessary for the United States to implement the Convention for the Conservation of Antarctic Marine Living Resources. Among other things, the Act directs the National Science Foundation to continue to support basic marine research in Antarctica and 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, to prepare, implement, and annually update a plan for directed research necessary to effectively implement the Convention. The Secretary of Commerce has delegated responsibility for designing and conducting the directed research program to the National Marine Fisheries Service. The Service in turn has assigned program responsibility to the Southwest Fisheries Science Center in La Jolla, California.

*[Information concerning this program and related matters can be obtained from the Chief, Antarctic Ecosystem Research Group, Southwest Fisheries Science Center, P.O. Box 271, La Jolla, California, 92038.]*

The National Marine Fisheries Service's directed research program has two principal elements: (1) ship-supported studies of krill and related oceano-

graphic conditions in the waters near Elephant Island, off the northern tip of the Antarctic Peninsula; and (2) land-based studies of penguins and seals on Seal Island (a small island off the northwest coast of Elephant Island) that could be affected indirectly by krill harvesting in the Elephant Island area. Additionally, land-based studies of penguins on Torgersen Island, near Palmer Station, are conducted jointly with the National Science Foundation.

In 1996 ship-supported studies were done aboard a Russian research vessel, the R/V *Yuzhmorgeologiya*, chartered by the Service. The studies were done between mid-January and mid-March. Average krill abundance in January was the highest observed in the Elephant Island area since March 1983. Large numbers of juvenile krill were present, indicating good spawning success the previous year and high survival of the 1994/1995 year class. These observations support the hypothesis that krill production is related to winter sea-ice conditions.

Studies of penguins and seals on Seal Island were conducted from 21 January to 5 February, and from 12-23 February 1996. The highest count of male fur seals on the island was substantially greater than during the same period in 1995. The number of fur seal pups born on the island also was higher than in 1995. Counts of chinstrap penguin chicks in late January, when the chicks are old enough to be left alone while the parents forage at sea, indicate that the number of breeding chinstraps present may have been the lowest since counts were begun in 1990.

At Palmer Station, studies of penguins were conducted from 1 October 1995 through 21 March 1996. The number of breeding pairs was 2.4 percent less and the number of chicks fledged was 4.7 percent less than during the 1994-1995 austral summer. However, breeding success remained high — 1.58 chicks fledged per breeding pair — and chick fledging weights did not differ significantly from past years.

As noted in previous Commission annual reports, an assessment of the Seal Island study site done during the 1993/1994 austral summer indicated that the living and storage facilities used by the researchers were in an area where heavy rains and earthquakes could lead to landslides and tidal waves that could

destroy the facilities. Also as noted in previous Commission reports, participants in a meeting convened by the Department of State in November 1994 advised that the Seal Island Research Program be transferred to a safer site as soon as possible and that site selection should take into account the results of oceanographic modeling and other related studies being done by researchers supported by the National Science Foundation.

The living and other facilities on Seal Island were removed during the 1996 field season. Several other sites in the Elephant Island area were surveyed during the 1996 field season to look for sites where the land-based research program might be relocated. Cape Sheriff, on Livingston Island, was judged to be a good candidate. Breeding colonies of fur seals and several species of penguins and seabirds are present in the area, and fishing for krill and finfish occurs nearby. Further, Chile has a facility on the island and is conducting related research. Also, the National Science Foundation is supporting a long-term ecological research program, which, while focused in the area around Palmer Station, several hundred miles to the south, includes oceanographic and other studies in the vicinity of Cape Sheriff.

Following the 1996 Antarctic field season, the Department of State convened a meeting of U.S. scientists with firsthand expertise and interest in biological and ecological research in Antarctica to review U.S. efforts to facilitate implementation of the Convention for the Conservation of Antarctic Marine Living Resources, including the basic and directed research programs being carried out by the National Science Foundation and the National Marine Fisheries Service. The meeting participants agreed that Cape Sheriff would be the optimal place to relocate the Seal Island Research Program, and urged the National Marine Fisheries Service to initiate consultations with Chile and to complete evaluation of the Cape Sheriff site and re-establish the land-based research program. Further, the participants urged that high priority be given to obtaining a more up-to-date estimate of krill biomass in statistical area 48.3 in both the National Marine Fisheries Service's directed research program and in U.S. initiatives within the Commission and Scientific Committee for the Conservation of Antarctic Marine Living Resources. The participants also urged

the National Marine Fisheries Service and the National Science Foundation to expedite efforts to evaluate models that have been used and proposed to estimate catches of krill and finfish that can be allowed, without depleting or adversely affecting the relationships among target, dependent, and related species.

### Convention on International Trade in Endangered Species of Wild Fauna and Flora

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) provides an international framework for regulating trade in animals and plants that are or may become threatened with extinction. The Convention entered into force in 1975 and has been signed by 134 parties. During 1996 four additional nations became signatories to the Convention; they are Turkey, Saudi Arabia, Mongolia, and Georgia. Within the United States, the Fish and Wildlife Service is the lead agency for Federal actions under the Convention.

The Convention provides for three levels of trade control. Depending on the extent to which a species is endangered, it may be included in one of three appendices to the Convention. Appendix I includes those species considered to be threatened with extinction and that are or may be affected by trade. Appendix II includes species that are not necessarily threatened with extinction but could become so unless trade in them is strictly controlled. Species may also be included on Appendix II if they are so similar in appearance to a protected species that the two could be confused. Appendix III includes species that any party identifies as being subject to regulation within its jurisdiction for the purpose of preventing or restricting exploitation and for which the party needs the cooperation of other parties to control trade. Additions and deletions of species listed on Appendices I and II require concurrence by two-thirds of the parties voting on a listing proposal. Species may be placed on Appendix III unilaterally by any party.

Parties to the Convention meet every two-and-a-half years to consider, among other things, additions and deletions to the appendices. The next meeting is

scheduled for 9-20 June 1997 in Harare, Zimbabwe.

### Proposed Changes to the Appendices

In preparation for the 1997 meeting, the Fish and Wildlife Service published a notice in the *Federal Register* on 1 March 1996 requesting information on species that should be considered for addition to or deletion from the appendices or transfer from one appendix to another; the Service also requested suggestions for agenda items for discussion at the meeting. On 28 August 1996 the Service published in the *Federal Register* a list of proposals received in response to its 1 March request, including proposals that it did not plan to submit to the CITES Secretariat and proposals for which it was seeking more information. No marine mammal species were included on either list.

The deadline for submission of proposals for consideration at the meeting in Zimbabwe is 10 January 1997. On 30 September 1996 Norway circulated to the parties a draft proposal to transfer the northeast Atlantic and central Atlantic stocks of minke whales (*Balaenoptera acutorostrata*) from Appendix I to Appendix II. As noted in the previous annual report, a similar proposal submitted by Norway was rejected by the ninth Conference of Parties in November 1994. On 3 December 1996 Japan contacted the Fish and Wildlife Service seeking consultation on its draft proposal to transfer five whale species or stocks from Appendix I to Appendix II. They are the Okhotsk Sea/western Pacific and Southern Hemisphere stocks of minke whales, the western North Pacific stock of Bryde's whales (*Balaenoptera edeni*), the eastern Pacific stock of gray whales (*Eschrichtius robustus*), and the southern bottlenose whale (*Hyperoodon planifrons*).

Moving any of these whale stocks from Appendix I to Appendix II could be significant. Import permits may not be issued for species listed on Appendix I if the specimen or part is to be used primarily for commercial purposes. Species on Appendix II, however, may be imported for commercial purposes, provided the necessary permit has been issued.

By letter of 17 December 1996 the Fish and Wildlife Service responded to Japan's request for consultation. It noted that the United States continues to believe that all species and stocks of whales covered by the International Whaling Commission's moratorium on commercial whaling should be on Appendix I of CITES, and should remain there until the IWC sets commercial quotas for these whales. At the end of 1996 it was the Commission's understanding that Japan was deleting the southern bottlenose whale from consideration but planned to proceed with preparation of a proposal to transfer the remaining four whale stocks from Appendix I to Appendix II.

### CITES Significant Trade Reviews

As noted previously, species listed on Appendix II may be traded, provided the country of export has granted a permit for the shipment. Countries issuing permits must make a finding that the export will not be detrimental to the survival of the species concerned and that the specimens were obtained legally. Issuance of permits must be monitored and, if necessary, limited "in order to maintain that species throughout its range at a level consistent with its role in the ecosystems in which it occurs and well above the level at which that species might become eligible for inclusion in Appendix I."

In order to determine whether such limitation is necessary, the CITES Animals Committee undertakes reviews of species for which there are significant amounts of international trade. As has been noted in previous annual reports, there has been concern that international trade in narwhal ivory may be causing harvests to reach unsustainable levels. In 1995 the CITES Animals Committee initiated a study of the level of trade involving the narwhal. As part of this review, Canada and Denmark (for Greenland) were asked to provide information on the basis for their findings that current take levels of narwhals are not to the detriment of the affected populations. In response, both countries submitted information describing the surveys and data on which their determinations were based. The CITES Animals Committee met in the Czech Republic on 23-27 September 1996. In a subsequent report on that meeting, the Secretariat noted that it was satisfied that the information requested had been provided. No further action is planned.

During 1996 the CITES Animals Committee initiated a review of illegal international trade in parts and derivatives of bear species included in the Appendices. The United States and other affected range states were asked to provide information on the status of their wild bear populations and information on trade threats and legislative and regulatory controls on the killing of bears and trade in bear parts. At the end of 1996 the Fish and Wildlife Service was assembling information on three bear species, including the polar bear (*Ursus maritimus*), to be submitted in response to the CITES request.

### Illegal Trade in Whale Meat

Since 1979 CITES parties have cooperated with the International Whaling Commission to prevent trade in whale meat from any species or stock protected from commercial whaling by the IWC. As discussed in previous annual reports, in 1994 CITES parties adopted a resolution recognizing the need for the IWC and CITES to cooperate and exchange information on international trade in whale products. The resolution urged countries to report any incidents of illegal trade in whale products to the CITES secretariat.

In April 1995 the IWC convened a meeting in Tokyo to discuss illegal trade in whale products and to provide a means of exchanging information among those directly involved in regulating whale products. Representatives of the People's Republic of China, Indonesia, Japan, the Republic of Korea, Norway, Russia, and the United States participated. Several proposed recommendations addressing illegal trade were discussed, but no agreement was reached at the meeting. However, both at its 1995 meeting in Dublin, Ireland, and its 1996 meeting in Aberdeen, Scotland, the IWC adopted resolutions to improve mechanisms to prevent illegal trade in whale meat.

Despite the cooperation that has resulted from the resolutions adopted by both CITES and the IWC, the United States believes that illegal trade in meat from Appendix I whale species remains a significant encourage even further cooperation, the Fish and Wildlife Service has proposed that illegal trade in whale meat be included in the agenda for the June 1997 CITES meeting.

## Chapter V

# ACTIVITIES RELATED TO MARINE MAMMALS IN THE ARCTIC

Many species of marine mammals occur in the Arctic seasonally or year-round. They include polar bears, walrus, ringed, bearded, harp, hooded, ribbon, and spotted seals, narwhals, and bowhead and beluga whales. The ranges of most marine mammals occurring in the Arctic include international waters and areas under the jurisdiction of more than one country. Consequently, effective conservation of these species and their habitats requires cooperative action by the Arctic nations.

Many marine mammal species have been an important component of the culture and subsistence of Arctic Natives for centuries. Congress recognized the importance of marine mammals to Alaska Natives when it enacted the Marine Mammal Protection Act in 1972. Section 102 of the Act exempts Alaska Natives from the Act's moratorium on the taking of marine mammals when the taking is not wasteful and is done for subsistence purposes or for purposes of creating and selling authentic Native articles of handicraft and clothing. The 1994 amendments to the Act added Section 119, explicitly authorizing and encouraging the Secretaries of Commerce and the Interior to enter into agreements with Alaska Native groups for the purpose of co-managing marine mammals.

Some of the marine mammals that occur in the Arctic, such as polar bears, walrus, harp seals, and bowhead whales, have been commercially exploited, mostly in the last 100 years. Commercial hunting was poorly regulated and led to over-exploitation and depletion of many stocks.

Other human activities, such as exploration for and development of coastal oil, gas, and hard mineral resources, may also adversely affect marine mammals and the ecosystems of which they are a part. In addition, Arctic ecosystems may be affected by human

activities outside the Arctic. For example, studies indicate that a variety of pollutants that originate from human activities in the middle latitudes are being transported to the Arctic. Pollutants such as organic compounds, heavy metals, acidifying gases, and radionuclides that reach the Arctic may adversely affect the health of Arctic ecosystems, and the organisms and humans that inhabit the region.

This chapter provides background information and describes actions taken by the Commission, in consultation with its Committee of Scientific Advisors, with regard to implementation of the Arctic Environmental Protection Strategy adopted by eight Arctic countries in 1991, and formation of an Arctic Council to oversee and promote cooperative response to Arctic issues of mutual interest or concern. Also described are actions taken with regard to development of agreements between Alaska Native organizations and state and Federal wildlife management agencies to cooperatively manage marine mammals commonly taken by Alaska Natives for subsistence and handicraft purposes; development of agreements with the Russian Federation to cooperatively conserve polar bear and walrus populations whose ranges include parts of both the U.S. and Russian Arctic; promulgation of regulations to govern the import of skins and other parts from polar bears taken by U.S. hunters in Canada; and ongoing efforts to conserve marine mammals and other components of the Bering Sea ecosystem.

### Arctic Environmental Protection Strategy

Recognizing that protection of Arctic ecosystems requires international cooperation, officials from the eight Arctic countries — Canada, Denmark (for Greenland), Finland, Iceland, Norway, the Russian

Federation, Sweden, and the United States — met at the invitation of Finland in September 1989 in Rovaniemi, Finland, to discuss cooperative measures to protect the Arctic environment. Representatives from the eight Arctic nations met again in Rovaniemi in June 1991 and signed the Declaration on Protection of the Arctic Environment. At the same time, they adopted the Arctic Environmental Protection Strategy. The goals of the strategy are to preserve the environmental quality and natural resources of the Arctic; monitor and reduce pollution in the Arctic; and accommodate the traditional and cultural needs and practices of indigenous people, insofar as these relate to the environment and natural resources of the Arctic. Although the Arctic Environmental Protection Strategy contains no legally binding obligations, the eight signatory nations committed themselves to its implementation.

The strategy calls for cooperation in four program areas: assessment and monitoring of environmental pollutants; conservation of flora and fauna; emergency prevention, preparedness, and response; and the protection of the marine environment. Working groups were established to plan and oversee the activities in the four program areas. Each of the working groups has adopted action plans and undertaken activities that are now in various stages of development.

Senior Arctic officials from the eight nations meet at least once a year to review the work being done by the working groups and to identify additional measures needed to implement the Arctic Environmental Protection Strategy. Ministerial-level meetings are held approximately every other year to receive reports from the senior officials and to provide overall guidance. Representatives of three international organizations representing Arctic indigenous people have been afforded permanent participant status and are entitled to attend all working group, senior Arctic official, and ministerial-level meetings. The three organizations with permanent participant status are the Inuit Circumpolar Conference, the SAAMI Council, and the Association of Indigenous Minorities of the North Siberia and the Far East of the Russian Federation.

At the second ministerial meeting, held in Nuuk, Greenland, in 1993, the ministers agreed that a task force should be established to oversee activities related to sustainable development in the Arctic, including resource use by indigenous people. In 1994 the senior Arctic officials agreed that the goals of the Task Force on Sustainable Development and Utilization of Arctic Resources should be to —

propose steps governments should take to meet their commitment to sustainable development in the Arctic, including the sustainable use of renewable resources by indigenous peoples, taking into account that management, planning and development activities shall provide for the conservation, sustainable use and protection of Arctic flora and fauna for the benefit and enjoyment of present and future generations, including local populations and indigenous peoples.

In the United States, the Department of State has lead responsibility for developing and overseeing implementation of U.S. policy regarding the Arctic Environmental Protection Strategy and the working groups established to implement the strategy. To help meet this responsibility, U.S. positions regarding issues to be considered at working group, task force, senior official, and ministerial meetings are developed through the Interagency Arctic Policy Group chaired by the Department of State. This group includes representatives of the Marine Mammal Commission, the Arctic Research Commission, the National Science Foundation, the National Oceanic and Atmospheric Administration, the Fish and Wildlife Service, the Environmental Protection Agency, the Coast Guard, and the Department of Energy. Representatives of the State of Alaska, Alaska Native groups, industry, and public interest groups are consulted to assist in developing policies regarding issues that affect them.

Members of the Marine Mammal Commission's staff regularly attend meetings of the Interagency Arctic Policy Group. The Commission, in consultation with its Committee of Scientific Advisors, provides comments and recommendations on various Arctic Environmental Protection Strategy activities and related documents.

## Formation of an Intergovernmental Arctic Council

Some of the Arctic nations believed that a more formal intergovernmental organization was needed to effectively implement the Arctic Environmental Protection Strategy and to provide a forum to address issues such as sustainable development, health and education of Arctic residents, and other matters of regional concern. In March 1995 Canadian officials proposed the establishment of an intergovernmental Arctic council.

The other countries agreed, and a meeting was held in Ottawa in June 1995 to draft an agreement establishing the council. Prior to the meeting, the Department of State sent a communiqué to the other Arctic nations outlining the U.S. position regarding the organization and functions of the proposed council. The communiqué indicated that the United States believed the council basically should do two things: (1) oversee and coordinate efforts to implement the Arctic Environmental Protection Strategy; and (2) provide a forum for identifying and addressing issues of mutual interest or concern regarding sustainable development in the Arctic.

With regard to the second point, the communiqué noted that a number of issues raised previously within the Task Force on Sustainable Development and Utilization had addressed domestic prerogatives and international legal obligations that went beyond the mandate of the Arctic Environmental Protection Strategy. For example, several proposals tabled by task force members called for the Arctic nations to take collective action to restore markets for seal skins and other marine mammal products in the United States and Europe, and for the United States to repeal or amend the Marine Mammal Protection Act to eliminate restrictions on the import into the United States of furs and other products derived from marine mammals.

Prior to the June 1995 meeting, Canada prepared and circulated a paper to serve as a basis for the discussions. The paper proposed that the activities of the Arctic Environmental Protection Strategy be subsumed under the council and that the strategy be

re-structured to harmonize its mandate and activities with those of the council. In this regard, the paper placed substantial emphasis on economic development. For example, it proposed that the council afford priority attention to such things as development of both renewable and non-renewable resources, promotion of circumpolar trade, and improvement of Arctic transportation and communication systems. Also, it proposed the formation of additional working groups to address a range of development-related issues, including sustainable economic development, science and technology, and social and cultural development. The paper suggested that the working group on sustainable economic development might consider topics such as the fur industry, whaling, fisheries development, and natural resource exploration and exploitation. A draft declaration establishing the council was appended to the paper.

The June 1995 meeting produced general agreement on a number of key points — *e.g.*, that the four working groups established to give effect to the Arctic Environmental Protection Strategy should be continued under the umbrella of the council; that the indigenous people's organizations that were granted permanent participant status relative to the Arctic Environmental Protection Strategy should be afforded similar status in the council and that provision should be made for affording similar status to other organizations representing indigenous Arctic residents; and that additional working groups should be established, as necessary, to address economic, social, and other issues of common concern. However, there was no agreement on other key points — *e.g.*, the potential involvement of non-Arctic countries in the council's activities; broadening representation of indigenous people on the council; and mandating the establishment of separate working groups to promote economic and social development. It was agreed that Canada would prepare a draft declaration taking into account the views expressed at the meeting.

Following the Ottawa meeting, Canada prepared and circulated a draft "Charter on the Establishment of the Arctic Council." The U.S. Government views on the draft were developed through the interagency process and were communicated to Canada on 2 August 1995.

A small drafting group met in Copenhagen in July 1995 to revise the draft. The meeting produced a draft text that was distributed by Canada for review on 16 August 1995. Comments on the draft were provided by the United States and others during and following an informal negotiating session held in Washington, D.C., on 6-8 September 1995. Canada subsequently prepared and circulated a revised draft, dated 3 November 1995. The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, reviewed the 3 November draft and provided comments to the Department of State in a letter dated 22 November 1995. In the letter, the Commission noted that the 3 November draft declaration reflected few of the points raised by the United States in its comments on the previous draft. Also, the Commission pointed out that the draft declaration appeared to make implementation of the Arctic Environmental Protection Strategy subservient to resource development, as advocated by Canada. The Commission recommended that it be made clear to Canada and the other Arctic nations that the United States could not agree to provisions in a declaration establishing an Arctic council that would make resource development a priority over environmental protection and that would establish the council as the appropriate body for resolving trade and other disputes that arise among Arctic states.

The Department of State shared many of the Commission's concerns. It advised the other Arctic governments that the council, as envisioned in the 3 November draft declaration, would be an intergovernmental body with an independent legal personality, and in this regard it went beyond what the United States viewed as a useful, high-level forum in which governments could address issues of mutual regional concern. It also pointed out that the declaration proposed a council with a broad and ill-defined mandate for promoting sustainable development of Arctic resources — a mandate that could impinge on domestic policy prerogatives and obligations imposed by other international agreements.

Further discussions concerning the structure and purposes of the proposed Arctic Council were held during the meeting of the senior Arctic officials in Toronto on 29 November - 1 December 1995. At that meeting, the United States tabled a simplified

draft of the declaration for establishing the council. The draft reflected the U.S. view that the council should be a high-level intergovernmental forum for identifying and addressing issues of mutual regional concern and that protection of the Arctic environment was the principal issue of mutual concern. Although several countries agreed with the general approach proposed by the United States, most thought that the draft declaration tabled by the United States was too abbreviated.

Recognizing that continued attempts to reach agreement on the council could interfere with preparations for the ministerial meeting scheduled to be held in March 1996, the senior officials decided to defer further consideration of the council until after the March 1996 meeting. Instead, attention was focused on preparation for the meeting itself.

In anticipation of the March 1996 ministerial meeting, Canadian officials prepared a draft ministerial report and distributed it for review. The Marine Mammal Commission's staff reviewed the draft report and by letter of 22 January 1996 provided comments to the Department of State. The letter noted that the draft report used phrases such as "further development and utilization of Arctic resources" which could be viewed as placing emphasis on increased utilization for commercial purposes without consideration of the possible impacts on subsistence uses. It also noted that terms such as "sustainable utilization," "sustainable development," and "sustainable development and utilization" used throughout the report could be subject to multiple interpretations, and that future disagreements as to intent could be avoided by defining the meaning of these terms.

The letter also pointed out that the sections in the draft report pertaining to sustainable development recognized only one aspect of the potential role of trade in sustainable development — *i.e.*, that trade can contribute to the economies of Arctic people and countries. It did not recognize that trade can lead to market development and that past history demonstrates that market development without adequate safeguards and reliable knowledge of the size and productivity of resources leads almost inevitably to over-exploitation of resources. Further, the letter noted that uncontrolled market development could also have adverse

impacts on other components of the ecosystems of which the resources are a part and on which indigenous people depend.

These comments and those provided by other agencies were incorporated into comments on the draft report transmitted by the Department of State to Canada and the other Arctic nations on 31 January 1996. Canada subsequently provided a revision of the draft report to the senior Arctic officials for consideration before the March 1996 ministerial conference. Canada also prepared and circulated a revision of the draft Arctic Council declaration, which it titled the Inuvik Declaration.

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, provided comments to the Department of State on both documents by letter of 6 March 1996. The Commission pointed out that both drafts contained terms and statements that were ambiguous and could be subject to multiple interpretations. For example, the term “sustainable utilization” was used repeatedly in the draft ministerial report in ways that the meaning was not entirely evident. In this same regard, the Commission pointed out that it was not clear what was meant by “sustainable development approach” and “integrating the AEPS [Arctic Environmental Protection Strategy] Programmes with Arctic economies and social initiatives to uphold the principles of sustainable development” in the draft proposed statement that read —

The Ministers recognized that a strong and vibrant AEPS is an essential component of a sustainable development approach to the Arctic, and emphasized the importance of integrating the work of the AEPS Programmes with Arctic economies and social initiatives to uphold the principles of a sustainable development approach in the Arctic.

The Commission also pointed out that if the declaration establishing the Council was accepted as drafted, it would imply, for the reasons stated below, that the United States and the other Arctic countries had agreed that Arctic communities have interrelated economies independent of the economies of the nations of which they are a part. Therefore, the

Commission advised the Department of State that, before agreeing to either document, it should ensure that they contained no language which could be interpreted to mean that the United States agreed to something it had not.

Prior to the meetings of senior Arctic officials and ministers in Inuvik, a draft position paper was prepared by the Department of State and distributed to the Interagency Arctic Policy Group for review and comment. Also distributed, was a discussion paper by Canada proposing changes to the sections on sustainable development in the draft ministerial report and draft declaration.

By letter of 13 March 1996 to the Department of State, the Commission’s staff provided comments on both the draft position paper and the Canadian proposals. The letter noted that the Canadian proposals indicated clearly that Canada and the United States continued to have substantially differing views as to how sustainable development should be considered within the context of the Arctic Environmental Protection Strategy. It noted that the Canadians apparently considered the protection strategy to be a subset of economic and social initiatives in the Arctic, rather than vice versa, and that development and utilization of Arctic resources for “equitable” economic and social benefit should be a common goal of all eight Arctic nations. In this context, the letter pointed out that the latest draft of the Arctic Council declaration prepared by Canada contained multiple references to equal opportunities and equitable use and development of Arctic resources. The letter also pointed out that it would be inadvisable to accept any language which implies, as did the proposed Canadian declaration, that (1) the Arctic Environmental Protection Strategy is a component of sustainable development, rather than vice versa; (2) the interests and economies of Arctic communities are independent of the interests and economies of the states and nations of which they are a part; or (3) each of the eight Arctic nations have the same interests in developing and utilizing renewable and non-renewable resources.

The third ministerial conference was held on 20-21 March 1996 in Inuvik, Canada. At the meeting, Arctic nation representatives signed the Inuvik Declaration on Environmental Protection and Sustainable

Development, which, among other things, committed their countries to finalizing an agreement on the Arctic Council by summer 1996. In their meeting report, the ministers stated that establishing the council would strengthen the Arctic Environmental Protection Strategy and enhance circumpolar cooperation in other areas of mutual concern.

In addition, the ministers decided to elevate the Task Force on Sustainable Development and Utilization to the level of a working group. They recognized that, before an agreement on the council could be concluded, certain issues needed to be resolved including finding a mechanism for more balanced and representative participation by Arctic indigenous groups and agreeing on terms of reference for the Working Group on Sustainable Development. With respect to the latter point, the ministers concluded that, in the absence of agreed terms of reference, the senior Arctic officials should provide specific direction on activities to be undertaken.

In light of the ministers' commitment to concluding an agreement on the council by summer 1996, the senior Arctic officials agreed to hold another negotiating session in Ottawa on 18-20 April 1996. In preparation for that meeting, Canada circulated an annotated revision of the draft declaration.

Following the Inuvik meetings, the Commission and other interested agencies were briefed by the Department of State on the outcome and given relevant documents from the meeting, including the ministers' report and the above-referenced revision of the draft declaration. The agencies were asked to provide comments on both documents.

In a 10 April 1996 letter to the Department of State, the Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, provided comments on the revised draft declaration. The Commission noted that the draft indicated incorrectly that at the last negotiating session there was consensus on provisions which the U.S. had previously indicated it could not accept. This included a provision indicating that the Arctic nations agreed that sustainable development of Arctic resources should be a goal, independent of the Arctic Environmental Protection Strategy. It also included wording which, if accepted,

would require that the United States and the other Arctic nations make economic development of resources a priority over protection of the Arctic environment and protection of the cultures and traditional lifestyles of Arctic Natives. Further, it would require that development of Arctic resources be carried out in ways that produce shared benefits to all Arctic nations and residents. It also contained wording that would obligate the United States to work with the governments of the other Arctic nations to raise the standard of living and ensure full employment of Arctic residents, functions which in the United States normally are the responsibility of the private sector and local or state governments, not the Federal Government.

On a related point, in its 10 April 1996 letter to the Department of State, the Commission questioned the procedures being used to develop U.S. positions regarding activities of the Arctic Environmental Protection Strategy, the establishment of the Arctic Council, and related issues. The 10 April letter indicated that, in the last year, the Commission, in consultation with its Committee of Scientific Advisors, and members of the Commission's staff had provided the Department of State with detailed comments and drafting suggestion concerning previous drafts of the proposed Arctic Council declaration and a variety of other documents bearing on the implementation of the Arctic Environmental Protection Strategy. However, it had not always been clear to the Commission if and if so how the views provided by the Commission and other agencies were being factored into U.S. positions as represented by the Department of State to the other nations.

To illustrate this point, the Commission referred to its letter of 6 March 1996 to the Department of State commenting on the second draft of the Inuvik Declaration and fourth draft of the proposed report of the 20-21 March 1996 ministerial meeting. The Commission also cited its 13 March 1996 comments to the Department of State on the draft position paper prepared for the Inuvik meetings.

The Commission indicated that some, but not all, of its drafting and other suggestions apparently were accepted by the Department of State and were reflected in position papers and comments provided by the Department to the originators of the various docu-

ments. However, the Commission had not been advised as to why some of its suggestions apparently were rejected.

In this context, the Commission noted that, in its view, U.S. positions regarding formation of the proposed Arctic Council, sustainable development and utilization of Arctic resources, and other potentially sensitive Arctic issues had not been developed or appropriately cleared through the standard interagency review process. Therefore, the Commission recommended that the Department of State take such steps as necessary to ensure that U.S. positions regarding formation of the Arctic Council, the sustainable development program, and other Arctic policy issues be developed in consultation with, and cleared by, those Federal agencies with relevant interests and responsibilities. It noted further that similar, if not identical, procedures are used routinely to develop U.S. positions on issues concerning the Antarctic Treaty and related agreements.

As noted above, another session to negotiate the establishment of the Arctic Council was held in Ottawa on 18-20 April 1996. At the meeting, the United States and the other Arctic nations provided comments on the 16 January draft declaration. In addition, the United States, once again, tabled a simplified version of the council declaration. Among other things, the shortened version called for the establishment of rules of procedure for the council after, rather than before establishment of the Council. It also called for a sustainable development program to be defined after the council was established.

During the negotiations, the U.S. delegation was able to clarify a number of its positions, but it was unsuccessful in getting consensus on streamlining the declaration. The session resulted in a 19 April draft declaration which contained much text on which consensus had not been reached. Therefore, the group decided to meet again on 8-9 June 1996 in Iqaluit, Canada, to try to resolve the differences and move toward an agreed declaration.

The 19 April draft was circulated to interested U.S. federal agencies, state agencies, and private sector groups for comment. Comments and a revised version of the simplified draft declaration were

conveyed by the Department of State to the other Arctic nations prior to the June 1996 negotiating session. In its transmittal note, the United States reiterated its interest in streamlining the declaration. At the 8-9 June meeting, a simplified draft declaration was prepared, based largely on the U.S. draft. Agreement among the Arctic nations was reached on this draft at a 5-6 August meeting of the senior Arctic officials.

The Declaration on the Establishment of the Arctic Council was signed in Ottawa on 19 September 1996. The Declaration established the Arctic Council as a high-level forum to (1) provide a means for promoting cooperation, coordination, and interaction among the Arctic states, with the involvement of the Arctic indigenous communities and other inhabitants on Arctic issues of common concern, in particular on environmental protection and sustainable development in the Arctic; (2) oversee and coordinate the programs established under the Arctic Environmental Protection Strategy; (3) adopt terms of reference for, and oversee and coordinate, a sustainable development program; and (4) disseminate information, encourage education, and promote interest in Arctic-related issues.

After signing the Declaration, the Arctic nations issued a joint communiqué indicating that the Council's initial priority tasks would be to (1) develop and adopt rules of procedure for the Council; (2) develop and adopt terms of reference for a sustainable development program aimed at identifying and promoting collaboration on specific projects of common interest; and (3) ensure an effective transition of the Arctic Environmental Protection Strategy into the Arctic Council.

During the meeting at which the declaration was signed, the United States tabled proposed rules of procedure for the Council and draft terms of reference for the sustainable development program for consideration by the other parties.

The draft terms of reference for the sustainable development program proposed that, instead of forming a working group to develop and oversee implementation of a general program plan, the program be developed by submitting to the senior Arctic officials for endorsement proposals for specific

projects of possible interest to all or the majority of the Council members. The proposals would include a description of the issue of interest or concern, a statement of objectives and the cooperative actions that would be required to meet them, an assessment of the expected outcome, a timetable for the project, and a budget estimate. The senior Arctic officials would recommend to the ministers projects that they believe merit cooperative support. Working groups could be constituted to facilitate cooperative planning and implementation of specific projects.

On 13-16 November 1996, the senior Arctic officials met in Oslo to review the status of Arctic Environmental Protection Strategy programs, and to consider the draft rules of procedure for the Council and the draft terms of reference for the sustainable development program tabled by the United States. After preliminary consideration of the drafts, the senior Arctic officials referred both to small drafting groups for further consideration and refinement. The groups were asked to provide proposed revisions to the senior officials by 12 January 1997. As of the end of 1996 the Commission was aware of no further developments in this regard.

On a related point, there appears to be some uncertainty within the working groups constituted to give effect to the Arctic Environmental Protection Strategy as to what the sustainable development program will entail and how it will be implemented. This uncertainty is illustrated by a draft discussion paper entitled "Cooperative Strategy for the Conservation of Biodiversity in the Arctic Region" prepared by Finland for consideration by the Working Group on Conservation of Arctic Flora and Fauna (CAFF).

This paper was provided by the Department of State to the Commission and others for review and comment in September 1996. Members of the Commission's staff reviewed the draft paper and provided comments to the Department of State by letter of 7 October 1996. The letter pointed out that, if the biodiversity strategy was adopted as written, the Convention on Biological Diversity, signed in December 1993, would replace the Arctic Environmental Protection Strategy as the foundation of the conservation of arctic flora and fauna program.

The letter noted that the draft strategy indicated that a Biodiversity Task Force had been established in 1994 by the CAFF working group and "charged with the responsibility of determining how regional cooperation through CAFF could assist and facilitate the collective implementation of the CBD [Convention on Biological Diversity] to further the conservation and sustainable use of Arctic flora and fauna." It pointed out that, if sustainable development and utilization of resources was to be one of the principal focal points of the CAFF working group as implied in the draft biodiversity strategy, there would be no apparent need for a separate working group on sustainable development. The letter also pointed out that the definition of "biological diversity" in the draft strategy referenced "variability among living resources," but made no mention of either abundance or taxa lower than species (*e.g.*, populations). Further, the letter pointed out that the draft strategy provided no guidance for determining when a species or population has been over-harvested, or when a species or population no longer is able to fulfill its functional role in the ecosystem of which it is a part. With regard to the last point, the letter pointed out that, while one of the goals of the draft strategy was to further the sustainable use of Arctic flora and fauna, the draft did not articulate or provide guidance for determining the levels at which species and populations of Arctic flora and fauna should be maintained to meet that goal.

These comments and those provided by other agencies were incorporated into comments transmitted by the Department of State to Finland (who had prepared the draft) for consideration in preparing a proposed strategy for consideration at the next meeting of senior Arctic officials.

### **Coordinating U.S. Involvement in Arctic Council Activities**

As noted above, the Declaration on the Establishment of the Arctic Council was signed in Ottawa on 19 September 1996. However, all of the activities to be undertaken by the Council and its various programs, and U.S. contributions to those activities, are as yet not well-defined and need to be defined before the first meeting of the Council. In this regard, the Marine Mammal Commission reviewed available

information concerning U.S. Arctic policies and initiatives, and on 31 December 1996 wrote to the Department of State about U.S. involvement in the Council and its programs. The Commission indicated that, as a result of the review, it had concluded that U.S. Arctic policy, particularly as it relates to marine mammals, had been developed and pursued without sufficient interagency review and consultation with Federal, state, and local government agencies, and with Native and other private groups that are affected by, or are responsible for, implementing the policy. The Commission stated its belief that broader consultation and critical interagency review are essential to ensure that U.S. Arctic policy will optimally further the interests of Alaska Natives, the State of Alaska, and the United States as a whole. Further, the Commission expressed the view that the United States should provide greater leadership and be more proactive in proposing and promoting ecologically sound approaches to Arctic conservation and development.

Toward this end, the Commission recommended that a thorough review of the terms of reference for and operation of the existing Arctic Environmental Protection Strategy working groups be undertaken by the Interagency Arctic Policy Group before the United States takes any position on decisions regarding the future activities of the existing working groups, and the termination, reorganization, or formation of any additional working groups. To facilitate the discussion of issues that should be considered in the course of the recommended interagency review, the Commission developed and transmitted with its letter an outline indicating the range of tasks possibly meriting consideration and the working groups that might reasonably be assigned lead and subsidiary responsibilities for the various tasks.

On a matter related to the recommended review of U.S. Arctic policy, Title III of the Antarctic Science, Tourism, and Conservation Act of 1996 calls upon the National Science Foundation to provide a detailed report to Congress on all of the Federal programs relating to Antarctic and Arctic research and the total amount of funds expended annually for such programs, and the status of the implementation of the Arctic Environmental Protection Strategy and Federal

funds being used for its implementation. The report to Congress is to be completed by 1 March 1997.

With assistance from the Interagency Arctic Research Policy Committee — a committee chaired by the Foundation and established by the Arctic Research and Policy Act of 1984 — the Foundation requested and reviewed information provided by the Department of State regarding funding of Arctic Environmental Protection Strategy programs. At the end of 1996 the Foundation was compiling the information into its report to Congress. The review being done by the Foundation and the review recommended by the Commission would complement each other inasmuch as both presumably would assess the status of the environmental protection strategy programs and the current and desired role of the United States in those programs.

### Ongoing Activities

As of the end of 1996 preparations were being made for the fourth ministerial meeting, scheduled for June 1997 in Tromsø, Norway. The ministers will receive reports from each of the working groups and recommendations from the senior Arctic officials regarding the Council's rules of procedure and terms of reference for the sustainable development program. As noted earlier, the latter two are being considered by drafting groups, and revisions are expected to be provided early in 1997.

Also, as noted earlier, the Arctic Environmental Protection Strategy working groups will report to the ministers on the various projects underway. For example, the Working Group on the Arctic Monitoring and Assessment Program is expected to provide two reports. One will describe the technical findings of a five-year, multi-national pollutant monitoring effort and is expected to provide a comprehensive summary of information on the sources, distribution, pathways, fates, and effects of major pollutants in the Arctic. The second report will provide an interpretation of the findings of the technical report for a more general readership and will include recommendations for reducing pollutant levels in the Arctic. The reports will mark completion of a major goal for the working group. Drafts of the reports are expected to be circulated to the eight Arctic nations early in 1997.

Also, this working group will likely submit a proposal to the ministers for follow-up activities.

The Working Group on Protection of the Arctic Marine Environment is completing and is expected to provide a report to the ministers on guidelines for offshore oil and gas exploration and development in the Arctic. The United States, which has lead responsibility for this project, prepared a draft report in 1996, which has been reviewed by the U.S. agencies, non-governmental organizations, and representatives of the Arctic nations. Also, the working group is developing a recommended regional program of action to address pollution of the marine environment from land-based activities, and is developing an internationally compatible system for collecting information on shipping activities in the Arctic.

The Working Group on Emergency Prevention, Preparedness and Response has completed a risk assessment of sites (*e.g.*, oil and gas facilities and nuclear power facilities) in the Arctic where a significant environmental impact could result if an accident were to occur. Under U.S. leadership, the group has initiated an analysis and assessment of the existing emergency response and accident reporting systems. Also, work is progressing on a guide to field procedures that should be followed for emergency responses in Arctic waters, and an analysis of emergency-related agreements and arrangements. Work on these projects will be continued in 1997.

As noted above, the Working Group on Conservation of Arctic Flora and Fauna is developing a strategy for conserving Arctic biodiversity. The group recently completed the first listing of species of Arctic plants and animals at risk, and a cooperative strategy for protecting murres, which are circumpolar seabird species. Work that will be continued in 1997 includes submitting national plans to implement a Circumpolar Protected Area Network, and considering how to incorporate marine protected areas as a part of the network. In addition, the group has recently undertaken an analysis to determine what more could be done to address gaps in Arctic conservation efforts.

The Marine Mammal Commission is concerned that human activities both in and outside the Arctic can have significant adverse effects on marine mam-

mals and the Alaska Natives who depend on them for subsistence use if the activities are not structured and monitored appropriately. Therefore, the Commission, in consultation with its Committee of Scientific Advisors, will continue to review and provide advice to the Department of State and other agencies on actions that could adversely affect Arctic marine mammals and the Alaska Natives who depend on them.

### **Co-management Agreements with Alaska Native Groups**

Section 119 of the Marine Mammal Protection Act was added in 1994 to provide explicit authority to the Secretaries of Commerce and the Interior to "enter into cooperative agreements with Alaska Native organizations to conserve marine mammals and provide co-management of subsistence use by Alaska Natives." Under this provision, either Secretary may provide grants to Native organizations to facilitate (1) collection and analysis of marine mammal data, (2) monitoring of subsistence harvests of marine mammals, (3) participation in marine mammal research projects by federal agencies and others, and (4) development of co-management structures with federal and state agencies. Section 119 authorizes an annual appropriation of \$1.5 million to the Department of Commerce and \$1.0 million to the Department of the Interior through fiscal year 1999 to carry out its purposes.

On 9 April 1996 the Indigenous People's Council for Marine Mammals, an organization representing a broad spectrum of Alaska Native subsistence interests, wrote the National Marine Fisheries Service and the Fish and Wildlife Service concerning the need to develop a co-management framework agreement to govern the development of cooperative agreements for individual species. The Council believed that a framework agreement setting forth general guidelines would facilitate preparation of consistent species-specific co-management agreements between the federal agencies and specific tribes or Native organizations. The Council provided a draft agreement for agency consideration.

Representatives of the Council and other Native organizations met with agency officials and Congressional staff members in April to discuss the draft framework agreement and the funding of co-management activities. Following those meetings, the National Marine Fisheries Service made certain commitments to the Council regarding the development of co-management agreements. The Service, in a 14 May 1996 letter, expressed its general support for the Council's suggested approach. Although the Service did not endorse all aspects of the draft agreement, the Service indicated its willingness to work from the Council's draft rather than writing another document. The Service also committed to following a nine-month schedule for finalizing the framework agreement. The Service indicated a willingness to seek the full amount authorized by Congress for co-management activities, but noted that agency and Native representatives should jointly identify and set priorities for needed research and management actions before a budget request is submitted.

The Fish and Wildlife Service wrote to the Council on 30 May making similar commitments to work toward concluding a framework agreement by the end of 1996. The Service noted, however, that the President's budget proposal for fiscal year 1997 did not include funding for co-management activities under section 119.

Following its 12-14 November 1996 annual meeting, the Marine Mammal Commission wrote to the National Marine Fisheries Service and the Fish and Wildlife Service concerning the status of the co-management agreements. The Commission noted that it had intended to have a detailed discussion of co-management issues at its 1995 annual meeting, which was canceled due to funding constraints. Detailed discussion of co-management matters at the 1996 meeting was precluded by the pressing need to address right whale and Florida manatee issues. The limited discussion that was possible indicated that the Fish and Wildlife Service had been appropriated funds for carrying out section 119 and that the agency had recently met with representatives of the sea otter, polar bear, and walrus commissions concerning co-management agreements.

Concerned that it was not being fully apprised of actions being taken to conclude co-management agreements and to provide funding to Native organizations under section 119 and that it was not being adequately consulted, the Commission requested that the Services provide it with (1) an update on the status of negotiations, (2) a schedule for developing and implementing co-management plans for various marine mammal species, and (3) information on funding needed to support co-management activities in fiscal year 1998 and subsequent years. While neither the National Marine Fisheries Service nor the Fish and Wildlife Service had provided the Commission a written reply by the end of 1996, discussions with agency officials indicated that (1) they and the Indigenous People's Council for Marine Mammals were nearing conclusion of a mutually acceptable framework agreement, (2) the Fish and Wildlife Service expected to conclude cooperative agreements with the Alaska Walrus Commission, the Alaska Sea Otter Commission, and the Alaska Nanuuq Commission (for polar bears) early in 1997, and (3) the Fish and Wildlife Service had received an appropriation of \$250,000 as an add-on to the fiscal year 1997 budget for co-management activities. Discussion of the expected allocation and use of those funds are discussed in the sections on walruses, sea otters and polar bears in Chapter II.

### **Agreements Related to Polar Bears**

As discussed in Chapter II, polar bears occur throughout the Arctic in six relatively discrete populations that overlap national boundaries. Thus, effective conservation of polar bears requires cooperative actions by the range states. Activities concerning international efforts to conserve polar bears and actions to review the effectiveness of those efforts are discussed below.

#### **Agreement on the Conservation of Polar Bears**

In 1973 the Governments of Canada, Denmark (for Greenland), Norway, the Soviet Union, and the United States negotiated the Agreement on the Conservation of Polar Bears. The Agreement was prompted by growing concern about the possible effects of polar bear sport hunting, which had increased during

the 1950s and 1960s, and the effects of industrial activities on polar bears and their habitat. Article I of the Agreement prohibits the taking of polar bears, subject to certain exceptions set forth in Article III. Article II requires that each contracting party “take appropriate action to protect the ecosystems of which polar bears are a part, with special attention to habitat components such as denning and feeding sites and migration patterns....” When the Agreement was concluded, the parties also adopted a resolution calling on the parties to ban the hunting of polar bear cubs, female bears with cubs, and bears moving into denning areas or in dens.

As noted above, the Polar Bear Agreement requires contracting parties to focus special attention on protecting important components of polar bear habitat, such as denning and feeding sites and migration routes. Steps taken by the Fish and Wildlife Service to meet this requirement, including the preparation of a polar bear habitat conservation strategy, are described in Chapter VIII in the discussion of small-take authorizations.

As discussed in previous annual reports, the Marine Mammal Commission and others have questioned whether the Marine Mammal Protection Act or other domestic statutes provide sufficient legal authority for the United States to implement fully all provisions of the Agreement, particularly with respect to habitat protection. In 1992 the Commission contracted for an examination of the relevant provisions of the Agreement, the Marine Mammal Protection Act, and other domestic legislation to identify possible inconsistencies and provide suggestions as to how provisions of the Agreement and the Act might be reconciled. The report of that study was provided to the Fish and Wildlife Service in January 1994. That report, *Reconciling the Legal Mechanisms To Protect and Manage Polar Bears under United States Law and the Agreement for the Conservation of Polar Bears* (see Appendix B, Baur 1995), was updated in 1995 to reflect amendments to the Marine Mammal Protection Act enacted in 1994 and forwarded to the Service.

In response to concerns that the Agreement on the Conservation of Polar Bears may not have been implemented fully by the United States and other parties,

Congress amended section 113 of the Marine Mammal Protection Act in 1994 to require the Secretary of the Interior to initiate two reviews. Section 113(b) requires the Secretary, in consultation with the other contracting parties, to review the effectiveness of the Agreement. That review was to be initiated by the end of April 1995. Also, the Secretary was directed to work with the contracting parties to establish a process by which future reviews of the Agreement will be conducted. Section 113(c) requires the Secretary of the Interior, in consultation with the Secretary of State and the Marine Mammal Commission, to review the effectiveness of U.S. implementation of the Agreement, particularly with respect to its habitat protection mandates. A report on the results of that review was to be submitted to Congress by 1 April 1995.

By letter of 18 July 1994 the Commission recommended to the Fish and Wildlife Service that, as a first step toward meeting the requirements of the amendments, the Service convene a meeting of representatives of interested governmental and non-governmental entities to consider points put forth in the legal analysis prepared for the Commission. The Commission identified three issues as being of greatest concern regarding full implementation of the Agreement by the United States. These were (1) the habitat protection mandate, (2) the prohibition on the use of aircraft and large motorized vessels for taking polar bears, and (3) the resolution calling on parties to ban the hunting of cubs and females with cubs and hunting bears in denning areas.

On 31 August 1994 the Service endorsed the Commission's recommended approach and indicated its intent to convene a meeting of interested groups to review U.S. implementation of the Agreement on the Conservation of Polar Bears, using the Commission report as a starting point. A meeting was held on 26-27 June 1995 and included participants from the Service, the Commission, the State Department, the Alaska Nanuuq Commission, the Alaska Eskimo Walrus Commission, the Inuit Circumpolar Conference, and the Department of the Interior's Solicitor's Office. Participants identified some discrepancies between the Agreement and the Marine Mammal Protection Act, but generally agreed that there was no need to open the Agreement to modification.

The Service subsequently prepared a draft report and circulated it to the Commission and other meeting participants for comment. The draft report assessed U.S. compliance with each of the provisions of the Agreement and with the resolution concerning the taking of female bears, cubs, and denning bears. Four areas of concern were identified.

The draft report noted that the taking of polar bears incidental to oil- and gas-related activities in the Beaufort and Chukchi Seas has been authorized under the small-take provisions of the Marine Mammal Protection Act (see Chapter VIII). Any lethal taking of polar bears that might occur under such authorizations would be inconsistent with the provisions of the Agreement. The Service believed, however, that there is little likelihood of lethal takings occurring at a rate that would cause concern, inasmuch as the Service imposes conditions designed to prevent or minimize any taking. The Service also noted it retained authority to respond to any increase in take levels by modifying, suspending, or revoking incidental-take authorizations.

With respect to habitat protection, the draft report noted that the Marine Mammal Protection Act provided sufficient authority for issuing regulations to protect polar bear denning, feeding, and migration routes. The Service noted that it had, in fact, used this rulemaking authority to develop a polar bear habitat conservation strategy in promulgating small-take regulations for oil and gas activities in the Beaufort Sea. Nevertheless, the Service recognized that it may not have invoked its authority to the extent intended under Article II of the Agreement. The Service also explained that certain areas, such as the Arctic National Wildlife Refuge, enjoyed statutory protection from a variety of activities, including oil and gas exploration. The Service believed that any change in the status of the Arctic National Wildlife Refuge would necessitate reevaluation of U.S. compliance with the habitat mandates of the Agreement.

The Service concluded that the United States is only partially in compliance with the Agreement's limitation on the use of aircraft to take polar bears. Under section 101(b) of the Marine Mammal Protection Act, Alaska Natives are authorized to take polar bears and other marine mammals for subsistence and

handicraft purposes, as long as the taking is not accomplished in a wasteful manner. The Service does not have authority to regulate taking under this exception unless it first determines that the affected stock is depleted. Thus, airborne hunting by Alaska Natives is not addressed under the Marine Mammal Protection Act. The Airborne Hunting Act prohibits the use of aircraft to harass or herd polar bears and other animals, but does not prohibit same-day landing and shooting.

The Service noted that the Agreement's provision concerning the use of aircraft to hunt polar bears had been partially addressed by the agreement between the North Slope Borough and the Inuvialuit Game Council, which, among other things, prohibits the use of aircraft to hunt polar bears in the Beaufort Sea. That prohibition, however, does not have the effect of federal law. No similar prohibition exists to address airborne hunting of polar bears from the Chukchi Sea population. The Service believed that compliance with the Agreement could be enhanced in several possible ways — a prohibition on airborne hunting could be included in the bilateral polar bear agreement being explored with Russia, Native organizations could agree that their members would not use aircraft to hunt polar bears as part of a co-management agreement with the Service, or amendment of the Marine Mammal Protection Act or other legislation could be sought.

The Service noted that the taking of female bears with cubs, cubs, or bears in denning areas had been addressed by the North Slope Borough/Inuvialuit Game Council agreement. However, in the Service's view, efforts to improve compliance with the agreement are necessary. Further, the Chukchi Sea polar bear population remains vulnerable to the taking of females with cubs, cubs, and denning bears. The Service indicated its intent to address this issue in the bilateral agreement being explored with Russia and noted the possibility that any lingering ambiguity could be resolved by amending the Marine Mammal Protection Act.

The Commission provided comments to the Service on the draft report by letter of 5 July 1996. In general, the Commission believed that the draft report did a good job of identifying the areas in which the

United States may not have fully implemented the provisions of the Agreement on the Conservation of Polar Bears. The Commission did, however, suggest several technical revisions and clarifications to be incorporated into the report before it is provided to Congress. The Commission also noted that the Commission-sponsored report on reconciling U.S. law and the Agreement on the Conservation of Polar Bears discussed many of the relevant issues in greater detail than did the Service's report, and recommended that it, too, be provided to Congress.

At the end of 1996 a draft final report had been prepared and was undergoing review within the Department of the Interior for transmittal to Congress in 1997.

As noted above, section 113 of the Marine Mammal Protection Act also directs the Secretary of the Interior to consult with contracting parties to review the effectiveness of the Agreement on the Conservation of Polar Bears. Early in 1996 the Fish and Wildlife Service drafted letters to the other parties to seek their consideration of such a review. At the end of 1996 revisions to the draft letters suggested by the State Department and others were being incorporated. It is expected that letters exploring the breadth of support for a multilateral review of the Agreement's effectiveness will be sent to the other parties in 1997.

Apparently independent of the requirement to initiate a review of the effectiveness of the Agreement, the Task Force on Sustainable Development and Utilization of the Arctic Environmental Protection Strategy (which includes all parties to the Polar Bear Agreement) initiated a review of the Agreement as it pertains to sustainable development in the Arctic. Although a discussion paper on the issue was prepared by Norway and considered by the task force, as discussed in the section on the Arctic Environmental Protection Strategy above, further consideration was held in abeyance until terms of reference for a sustainable development program under the Arctic Council are adopted.

### **Bilateral Polar Bear Agreements**

As discussed in Chapter II, two discrete polar bear populations occur in Alaska, and both are shared with

other countries. The northern (Beaufort Sea) population is shared with Canada and the western (Bering-Chukchi Seas) population is shared with Russia. Efforts to develop cooperative programs with these countries for the management and conservation of polar bears are discussed below.

**North Slope Borough/Inuvialuit Polar Bear Agreement** — Prior to passage of the Marine Mammal Protection Act in 1972, both sport and subsistence hunting of polar bears in Alaska were managed by the State. The Act transferred management authority to the Fish and Wildlife Service, and exempted coastal Alaska Natives from its moratorium on taking, provided the taking is non-wasteful and for subsistence purposes or for making authentic handicrafts or clothing.

The Beaufort Sea polar bear population is hunted by Natives from northwestern Canada as well as Alaska. If not regulated effectively, such hunting, by itself and in combination with other activities, could cause the population to decline. 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.

In certain respects this Native-to-Native agreement is more restrictive than the Marine Mammal Protection Act. For example, the agreement calls for protecting cubs, females with cubs, and all bears inhabiting or constructing dens, and prohibits airborne hunting. As discussed above, these voluntary measures adopted by the Natives have enhanced U.S. compliance with the Agreement on the Conservation of Polar Bears. Other provisions of the agreement prohibit hunting at certain times of the year and provide that a harvest quota, based on the best available scientific evidence, be established annually. Quotas are allocated equitably between Natives in Alaska and Canada, and data are collected and shared on the number, location, age, and sex of bears killed. Although the agreement is not legally binding as a matter of federal law, both Alaska and Canadian Natives have largely complied with the mutually agreed conservation measures.

The agreement does not apply to Native subsistence hunting of polar bears in Alaska south and west of Icy Cape. Polar bears in this area are part of the population shared with Russia and, as described below, efforts are underway to conclude agreements for the cooperative management of this population as well.

**U.S.-Russian Polar Bear Agreement** — A relatively discrete polar bear population, the western or Bering-Chukchi Seas population, occurs partially in Alaska and has traditionally been used by Native peoples of both Alaska and Chukotka, Russia. As discussed in previous annual reports, the Marine Mammal Commission wrote to the Fish and Wildlife Service in 1992 about the possible need for a cooperative U.S.-Russian program to manage the take of polar bears from the Bering-Chukchi Seas population. Such action was initiated by the Fish and Wildlife Service on 22 October 1992, when the Service's Alaska Regional Director and a representative of the Russian Ministry of Ecology and Natural Resources signed a protocol stating the parties' intentions to conclude an agreement on the conservation and regulated use of polar bears from the Bering-Chukchi Seas population common to the two nations. The protocol called on both governments to create special working groups composed of representatives of government agencies and Native peoples to prepare proposals for such an agreement and to convene a meeting of the working groups to prepare a draft agreement.

At about the same time, informal discussions between the Fish and Wildlife Service and Alaska Native groups concerning the development of a polar bear conservation plan identified the desirability of forming an Alaska polar bear commission similar to the Alaska Eskimo Walrus Commission and the Alaska Sea Otter Commission to represent the interests of the Alaska Native community in matters affecting the conservation of polar bears. It was subsequently agreed that, in order to stimulate Russian Native interest in the process of negotiating a bilateral polar bear conservation agreement, it would be useful to hold a meeting involving Natives of both countries prior to the first meeting of U.S. and Russian delegations, as called for in the protocol.

Prompted in part by a 1994 amendment to the Marine Mammal Protection Act calling on the Secretary of the Interior to consult with Russian officials on developing and implementing enhanced cooperative research and management programs for the conservation of polar bears in Alaska and Russia, efforts to conclude a bilateral agreement began in earnest in 1994. Shortly after enactment of the amendments, the Alaska Nanuuq Commission was established to represent Native polar bear hunters in 20 Alaska communities. Formation of this group moved the negotiating process along by giving the Fish and Wildlife Service a single Native entity from which advice on a U.S.-Russian polar bear agreement could be obtained.

Representatives of Native organizations and government agencies from the United States and Russia met on 6-9 September 1994 in Nome, Alaska, for technical discussions concerning joint conservation of the shared population of polar bears occupying the Chukchi, Bering, and eastern Siberian Seas. As a result of that meeting, the parties, on 9 September 1994, signed the Protocol on U.S./Russia Technical Consultation for the Conservation of Polar Bears of the Chukchi/Bering Sea Regions. Further scientific and technical discussions relative to a future government-to-government agreement on the conservation and management of the Chukotka-Alaska population of polar bears, as well as joint management of the shared walrus population, including representatives of the United States and the Russian Federation and the affected Native communities, were held on 14-20 September 1995 in Petropavlovsk-Kamchatskiy, Russia. A representative of the Marine Mammal Commission was a member of the U.S. delegation.

Although technical discussions have occurred between U.S. and Russian officials regarding a bilateral polar bear agreement, the Department of the Interior must obtain formal authorization from the Department of State before it can negotiate such an agreement. In an effort to secure the required authorization, the Fish and Wildlife Service, in December 1994, provided the State Department, the Commission, and others a draft request for authorization to participate in negotiations with Russia on the conservation and management of polar bears. Several shortcomings in the draft request were identified. To address these concerns, the Service prepared, and on

6 November 1995 circulated, a discussion document entitled "Draft Principles of Conservation and Management of the Alaska-Chukotka Polar Bear Population" to the Commission and others for comment. The Commission's comments on the draft principles are discussed in the previous annual report. It was expected that the Service would revise the draft principles and make them available for public comment early in 1996 and submit a formal request to the Department of State for authority to enter into formal negotiations with Russia on the bilateral polar bear agreement at that time.

Slowed by government-wide furloughs in late 1995 and early 1996 and the resulting backlog, the Service provided the Commission and others with a revised schedule on 20 February 1996. In it, the Service indicated that it had decided to defer development of draft language for a bilateral agreement in favor of developing a "framework of conservation principles" to govern negotiations. The Service also indicated its intent to prepare a draft environmental assessment on development of the bilateral agreement based on those principles.

The "Draft Environmental Assessment on the Development of a U.S./Russia Bilateral Agreement for the Conservation of Polar Bears in the Chukchi/Bering Seas" was made available for public review by the Service on 19 July 1996. It set forth three basic alternatives — (1) no U.S. government action, (2) government-to-Native agreements in each country, or (3) a government-to-government agreement with a Native-to-Native side agreement — and analyzed the possible environmental consequences of each. The third alternative was identified as the preferred alternative. Under the preferred alternative, joint efforts would be undertaken with respect to research and management, population and harvest monitoring, enforcement, and habitat protection. A key feature would be the establishment of a joint commission, composed of government and Native representatives, to oversee implementation of the agreement and set annual quotas.

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, provided comments to the Service on the draft Environmental Assessment on 20 December 1996. As a threshold

matter, the Commission stressed that its comments should be read in the context of the adequacy of the Environmental Assessment under the National Environmental Policy Act, rather than as endorsing or opposing specific substantive positions that might be included in a bilateral agreement.

The Commission believed that the Service did a good job of identifying sub-alternatives under the no-U.S.-action alternative (*e.g.*, no action, action by Russia only, or action by Natives only), but that sub-alternatives under the other two alternatives should similarly be noted and discussed. In particular, the Commission thought the Service needed to consider a broader range of provisions that might be included in the contemplated government-to-government and Native-to-Native agreements. While recognizing the importance of securing Native cooperation in the success of a bilateral agreement, the Commission stated that the National Environmental Policy Act nevertheless required a full exposition of the range of available alternatives regardless of whether they were likely to be supported by Native groups. In this context, the Commission noted that it would, however, be appropriate for the Service to explain why it prefers certain options and discounts others.

The Commission also commented that the discussion of the preferred alternative should be expanded to provide a clearer picture of the respective roles of, and the relationship between, the proposed government-to-government and Native-to-Native agreements. While recognizing the need to have Native groups involved in management, research, monitoring, and enforcement programs, the Commission cautioned that it was also important to ensure that these aspects were binding on the federal parties through the government-to-government agreement. The Commission noted that one way to delineate governmental and Native responsibilities more clearly, and to heighten accountability and enforceability, would be to conclude government-to-Native implementation agreements as well as the other agreements under the preferred alternative.

In several places, the draft environmental assessment referenced a need for the proposed U.S.-Russian agreement to be consistent with the multilateral Agreement on the Conservation of Polar Bears. The

Commission also believed it necessary for the Environmental Assessment to explain the need for, or at least discuss the pros and cons of, consistency with the purposes and policies of the Marine Mammal Protection Act. In this regard, the Commission noted several places where the draft Environmental Assessment could be interpreted as deviating from the Act's goal that marine mammal stocks be maintained within their optimum sustainable population range. For consistency with the Marine Mammal Protection Act, the Commission recommended that references to maintaining the polar bear stock at "sustainable levels" or to establishing harvest limits below the "sustainable yield" be revised to clarify that harvest levels would set so as to ensure that the stock remains above, or increases toward, its maximum net productivity level.

A key feature of the envisioned bilateral agreement is the establishment of quotas and allocation of those quotas between the two countries to ensure that the stock is not subject to over-harvesting. The Commission noted that a complicating factor in ensuring that quotas are not exceeded is that the ranges of the Chukchi/Bering Sea stock and the Beaufort Sea stock of polar bears overlap in the area between Point Hope and Barrow. The Commission therefore suggested that the final Environmental Assessment be expanded to discuss the options available to apportion polar bears harvested in that area to either stock and how such apportionment would ensure that the quotas established under the proposed bilateral agreement and the North Slope Borough/Inuvialuit Game Council Management Agreement are not exceeded.

In several places the draft environmental assessment referenced economic difficulties faced by the Russian government and Russian people. Economic factors were implicated as a contributing factor in the suspected increase in illegal taking of polar bears in Russia and as the cause of the Russian government's inability to enforce its current prohibition on hunting polar bears or to carry out den surveys or other research. It was not clear from the discussion, however, how the proposed bilateral agreement would alleviate these problems. The Commission therefore recommended that the final Environmental Assessment describe expected and possible sources of funding for carrying out the provisions of the proposed bilateral

agreement, the likelihood that such funding would become available, and the consequences if adequate funding is not forthcoming. The Commission advised that, if the necessary funding for full implementation seems unlikely, the agreement should be negotiated with this in mind. That is, methods used to establish quotas should be sufficiently conservative to account for any uncertainties inherent in incomplete population surveys and taking should be permitted by either party only if a sufficiently funded monitoring program is in place.

The Commission also raised questions about the discussion of the demand for polar bear products in European and Asian markets as a factor contributing to illegal hunting in Russia. The discussion did not sufficiently describe the extent to which illegal trade is believed to be occurring or explain why the provisions of the Convention on International Trade in Endangered Species of Wild Fauna and Flora are insufficient to regulate trade in polar bear products resulting from illegal harvests of polar bears. The Commission noted that trade in polar bear products taken illegally in Russia are currently precluded by the Convention and questioned why a U.S.-Russian agreement would be any more likely to stem illegal trade.

At the end of 1996, the Fish and Wildlife Service was working to complete a final Environmental Assessment. Publication is expected early in 1997. Once the assessment is complete, the Service intends to submit a formal request to the Department of State seeking authority to negotiate an agreement with their Russian counterparts.

## **Polar Bear Trophy Imports**

The 1994 amendments to the Marine Mammal Protection Act allow the Secretary of the Interior to issue permits to import sport-hunted polar bear trophies from Canada. Such permits may be issued under section 104(c)(5) of the Act to authorize the importation of legally acquired polar bear parts (other than internal organs), provided that the Secretary, in consultation with the Marine Mammal Commission, finds that:

- Canada has a monitored and enforced sport-hunting program consistent with the purposes of the Agreement on the Conservation of Polar Bears;
- Canada has a sport-hunting program based on scientifically sound quotas ensuring the maintenance of the affected population stock at a sustainable level;
- the export and subsequent import are consistent with the provisions of the Convention on International Trade in Endangered Species of Wild Fauna and Flora and other international agreements and conventions; and
- the export and subsequent import are not likely to contribute to illegal trade in bear parts.

The amendments also direct the Secretary to charge a reasonable fee for the issuance of polar bear import permits. Monies received are to be used for developing and implementing cooperative research and management programs for the conservation of polar bears in Alaska and Russia.

The Secretary is further directed to undertake a scientific review of the impact of issuing import permits on the polar bear populations in Canada. The review is to be subject to public comment and was to be completed by 30 April 1996. Under a statutory provision, no permits may be issued after 30 September 1996 if the review indicates that the issuance of such permits is having a significant adverse effect on Canadian polar bear stocks. Inasmuch as the required findings have yet to be made, and no permits have been issued, such a review has not been undertaken. It remains unclear what plans the Fish and Wildlife Service has for conducting the review when and if polar bears imports from Canada are authorized.

As discussed in previous annual reports, the Fish and Wildlife Service began developing proposed regulations in mid-1994 to implement the new import measures. Consultations with the Commission on draft proposed regulations identified several outstanding questions that needed to be resolved before the required findings could be made.

On 3 January 1995 the Fish and Wildlife Service published in the *Federal Register* a proposed rule to establish application requirements, permit procedures, issuance criteria, permit conditions and a special

issuance fee for permits to import polar bear trophies from Canada. The Service stated that it was working with Canadian wildlife authorities to obtain information needed to make the required legal and scientific findings and that it expected to issue a second proposal addressing these findings early in 1995. A supplemental proposed rule addressing the required legal and scientific findings was published by the Service on 17 July 1995.

The proposed rule noted that the worldwide population of polar bears is estimated at 21,000 to 28,000 animals, including an estimated 13,120 in Canada. According to the Service, the Canadian polar bear population comprises 12 relatively discrete stocks, all of which are in or are shared with the Northwest Territories. Because this is the only area in Canada where polar bears currently can be harvested by non-residents through a regulated sport hunting program, the Service limited its proposed rule to the Northwest Territories.

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, reviewed the Service's proposed rule and provided comments by letter of 9 November 1995. In its letter, the Commission addressed the findings required under section 104(c)(5)(A), stated above. In general, it concluded that some of the findings proposed by the Service could be better explained or further justified. In particular, the Commission believed that findings with respect to consistency with the Agreement on the Conservation of Polar Bears and the scientific soundness of Canada's sport-hunting program needed additional explanation.

The Commission noted that the Polar Bear Agreement does not include a specific section describing its purposes, and recommended that the required determination be made by examining whether Canada's program is consistent with each of the applicable provisions of the Agreement. To be consistent, the Commission believed that Canada's sport hunting program must fit under at least one of the exceptions to Article III of the Agreement which authorizes taking. Article III.1.(d) authorizes parties to allow taking "by local people using traditional methods in the exercise of their traditional rights and in accordance with the laws of that Party." As noted by the

Service in its proposed rule, Canada has long interpreted this provision as allowing local people in a settlement to authorize the selling of a polar bear permit from its quota to a non-Inuit or non-Indian hunter. Nevertheless, the Commission recommended that the Service, in the final rule, discuss whether it concurred with Canada's interpretation. In particular, the Commission believed that the Service needed to address whether this exception is limited to taking by local people or whether it would include taking by non-nationals.

Article III.1.(e) authorizes the taking of polar bears "wherever polar bears have or might have been subject to taking by traditional means by its nationals." In its letter, the Commission concurred that the best interpretation of this exception would allow a party to authorize taking by any person, including a non-national, as long as the take occurs in an area where the nationals of that country have engaged in or might have engaged in taking by traditional means. The Commission suggested that, if the Service concurred with this interpretation, it should take steps to determine where polar bears in Canada were or might have been taken by traditional means at the time the Agreement was negotiated and compare that to where sport hunts now occur.

Article II of the Polar Bear Agreement requires each party to take appropriate action to protect the ecosystem of which polar bears are a part and to manage polar bear populations in accordance with sound conservation practices based on the best available scientific data. The Commission stated its belief that Canada's polar bear program is generally sound and satisfies the requirements of Article II. However, the Commission suggested that it is also necessary to make a related finding of conformity with a resolution adopted by the parties in 1973 to ban the hunting of female polar bears with cubs and their cubs and to prohibit the hunting of polar bears in denning areas.

The Commission also indicated a need for further discussion of Article IV of the Agreement. That provision requires the parties to prohibit the use of aircraft and large motorized vessels for the purpose of taking polar bears, except where the application of such a prohibition would be inconsistent with domestic laws. The Service's *Federal Register* notice indicated

that "[a]ircraft, snow machines, and boats are sometimes used to transport equipment, hunters, and dogs to base camps which can be a great distance from the community." While recognizing the some uses of aircraft and vessels may be consistent with the treaty, the Commission believed that further discussion of the use of aircraft to transport equipment, *etc.*, to base camps was needed. In the Commission's view, the use of airplanes to identify base camp locations with high polar bear densities or otherwise to assist in locating or taking bears would run afoul of the treaty provisions, as would using aircraft to gain access to areas that would not have been hunted traditionally. The Commission therefore recommended that the final rule provide more information on how aircraft are used in the hunting of polar bears and better explain the rationale for determining that such use is consistent with the Agreement.

The Commission noted that the 1973 resolution calling on the parties to ban the hunting of cubs and female polar bears with cubs and to prohibit the hunting of polar bears in denning areas is considered by some to be non-binding. Nevertheless, these prohibitions fit within the purposes of the agreement and, in the Commission's opinion, should be considered as sound conservation practices under Article II. Therefore, the Commission supported the Service's proposal not to approve the importation of trophies taken from any population or management unit unless adequate provisions are in place to prohibit the taking of cubs and females with cubs and to protect all polar bears in or moving into denning areas.

As noted above, before the Service can authorize the importation of polar bear trophies from Canada, it must determine that Canada has a sport hunting program based on scientifically sound quotas ensuring the maintenance of the affected stock at a sustainable level. The Service in the proposed rule considered whether this provision requires the Service to make the findings based on one population for the whole of Canada or on the 12 units under which Canada has been managing polar bears. The Commission commented that the Service's discussion of possible interpretations apparently failed to consider the statutory definition of the term "population stock." The Commission therefore recommended that the Service provide additional justification in the final rule

if it determines that the 12 management units used by Canada constitute separate population stocks as defined in the Act. If there remains any doubt concerning what constitutes a separate population, the Commission suggested that the Service interpret the available information conservatively.

The Commission further suggested that the Service factor into its determinations the status and trends of polar bears in adjacent management units. In particular, it should be recognized that splitting a discrete, naturally occurring population into smaller sub-units could lead to an affirmative finding for one or more sub-units that would not be reached if the population were considered as a whole.

The proposed rule provided a population estimate, the calculated sustainable harvest level for the last harvest season and averaged over the last three and five seasons, and an indication, in relative terms, of the population status (*i.e.*, increasing, decreasing, or stable) for each of Canada's 12 polar bear management units. For each population estimate, it also provided an assessment of the reliability of the estimate in relative terms (*i.e.*, good, fair, or poor). However, as the Commission pointed out, there was no explanation or definition of what constitutes acceptable and uncertain precision or of minimum capture bias or capture bias problems. Therefore, the Commission did not believe that it was possible to evaluate the reliability of the assessment ratings based on the information contained in the proposed rule.

The Commission noted that the Service's approach for determining population status assumed that the population estimates provided by Canada are accurate and that population size is affected only or principally by the harvest. In the Commission's opinion, a number of factors, independent of kill levels, may likely affect population size. These include the age and sex structure of the population, ice and denning conditions, prey availability, and disease. Therefore, the Commission suggested that the final rule provide a better justification for using this method for making determinations concerning population status.

The Commission also commented on the production model used by the Northwest Territories to establish harvest levels, which assumes that polar

bears are experiencing maximal recruitment and survival rates. The Commission noted that use of the model will result in very conservative management for populations near carrying capacity, but that populations below their maximum net productivity level will remain depleted under this management scheme. The greatest uncertainty regarding the model, however, is the reliability of the population estimates being used. If a population estimate is precise or negatively biased, the formula for calculating harvest levels is reasonable. If, however, an estimate of the population has low precision or is positively biased, use of the formula could lead to over-harvesting. To assess the validity of the determinations, the Commission recommended that the final rule provide quantitative estimates of standard errors and, where possible, identification of likely biases.

The Commission suggested that it would also be useful if the Service were to explain why the use of midpoint or "best" population estimates, rather than minimum population estimates (as used in calculating potential biological removal levels under the 1994 amendments to the Marine Mammal Protection Act), is believed to be appropriate.

The Commission did not foresee any difficulties with respect to the proposed finding that the export and subsequent import of polar bear trophies from Canada would be consistent with the requirements of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The Commission believed that issuance of an export permit by Canada would provide sufficient evidence that the export and subsequent import are consistent with the Convention.

Before authorizing the importation of polar bear trophies from Canada, the Service is also required to determine that the export and subsequent import are not likely to contribute to illegal trade in bear parts. The Commission believed that the system for marking and tracking bear trophies in Canada, as described in the proposed rule, provides adequate assurance that only those bears legally taken in an approved sport hunt will be allowed entry into the United States. The requirement that a CITES permit be obtained from the appropriate Canadian authorities further assures that only those bears legally taken will be exported.

The Commission concurred with the Service's assessment that the only potential illegal trade problem involves gall bladders. Although polar bear gall bladders may not be as desirable as those from other bear species, the number of exports over the years suggests some demand exists in Asian countries. The Commission agreed with the Service's proposal to eliminate the possibility that imports of polar bear trophies into the United States will contribute to illegal trade by requiring that gall bladders be destroyed. However, the Commission suggested that, rather than relying on hunters to certify that gall bladders had been destroyed, it would be more appropriate to have the responsible government agency issue the certification.

The proposed rule also discussed the applicability of the Marine Mammal Protection Act's prohibition on importing any marine mammal that was pregnant or nursing at the time of taking or less than eight months old. The Commission agreed with the Service that this prohibition remains applicable to polar bear imports from Canada. The Service identified three possible means for ensuring that the statutory requirements pertaining to imports of pregnant, nursing, or young bears are satisfied. These were to (1) have the Northwest Territories certify that at the time of take the bear was not pregnant, was not a nursing cub, and was not a mother with cubs, (2) condition the import permit to require the permittee to certify at the time of import that at the time of take a female bear was not pregnant or a mother with cubs, and a young bear was not nursing, and/or (3) include issuance criteria that permits would not be issued for female bears taken during the month of October or for bears taken while in family groups.

Because of the difficulty in determining and verifying that a polar bear was not pregnant, lactating, or nursing when taken, the Commission stated it did not believe that options one or two would provide sufficient assurance that such bears would not be imported. With respect to option three, the Commission noted that, while some pregnant bears are still building dens or moving to denning sites in October and November, virtually all pregnant females are in dens by December. There is also a good possibility that individual, adult female bears taken in October or November could be pregnant. Therefore, the third

option provided little assurance that bears taken at those times are not pregnant females. The Commission recommended that a fourth option be incorporated into the final rule – that no import permits be issued for polar bears taken from populations for which the hunting season begins prior to 1 December.

Section 104(c)(5) of the Marine Mammal Protection Act also allows for the importation of polar bear trophies from Canada that were taken, but not imported, prior to enactment of the 1994 amendments. Such imports are subject to the same findings as are imports of trophies taken after enactment of the amendments. The Service proposed issuing permits for sport-hunted polar bears taken prior to the effective date of any final rule that may be issued, provided the applicant shows that the polar bear was legally taken and was not pregnant or nursing when taken. The Commission noted that this proposal seemed to overlook the applicability of the requirement that the Service determine the Canadian sport hunting program to be based on scientifically sound quotas ensuring the maintenance of the affected population stock at a sustainable level. While the statute does not explicitly require the finding to be based on historical data, the Commission believed that the nature of the required finding strongly suggests that historical data must be used. The Commission stated that it did not see how the Service could find that the quotas are scientifically sound and ensure that the affected populations are maintained at sustainable levels if it did not consider the quotas that were in place at the time the bears were taken. Even if the Service's interpretation of the timing of the required sustainability finding were correct, it appeared that a present-day finding needed to be in place. The Commission therefore recommended that, at the absolute minimum, the Service should require the applicant to demonstrate that the trophy to be imported was taken from a population for which the Service has made a current affirmative finding.

With respect to the required showing that a pre-amendment bear was not pregnant or nursing at the time of taking, the Commission commented that the Service should assume that a bear is a female unless the applicant provides sufficient evidence that it is a male and should assume that the bear may have been

pregnant or nursing unless it was taken at a time of year when all such bears would normally be in dens.

The Service also proposed including a mechanism in the regulations to allow trophies taken after the effective date of the rule, from a population for which an affirmative finding has yet to be made, to be imported. Such an import would be permissible if the Service later determined that the "total harvest during [the] harvest season [in which the bear was taken] and the average of the three preceding harvest seasons was sustainable for the affected population" and a management agreement was in place with Greenland and/or other provinces for shared populations. In the Commission's opinion, inclusion of this provision is not based on sound policy. It is not necessary and can only serve to encourage U.S. hunters to take bears from populations that may be declining. It would make more sense to limit imports, once the final rule is in place, to trophies taken from those populations for which an affirmative finding has already been made. The Commission therefore recommended that this provision be deleted in the final rule.

Throughout much of 1996 the Fish and Wildlife Service consulted with Canadian officials to obtain additional information on the status and management of polar bears in Canada and worked on drafting a final rule to respond to the comments of the Commission and others on the proposed rule. Publication of a final rule is expected early in 1997.

### **Agreements Related to Walruses**

As discussed in Chapter II, a single stock of walruses occurs in waters off Alaska and eastern Russia. Government officials and Native communities in both countries therefore share common interests with regard to assessing the status and trend of this walrus population and in addressing conservation issues arising from harvests to meet Native subsistence needs and the impacts of tourism, oil and gas development, and other human activities. To develop a cooperative international framework for conserving this walrus stock and, as discussed above, the shared stock of polar bears, government officials and Native community leaders from both countries met in Nome, Alaska, on 6-9 September 1994. At that meeting,

representatives of both countries signed a protocol agreeing to develop bilateral government-to-government and Native-to-Native walrus agreements that would set forth shared responsibilities for walrus research and management. To pursue this goal, it was agreed that the parties would hold a technical meeting in the fall of 1995 to consider specific topics that might be included in the agreements.

The Russian Federation Ministry of Protection of the Environment and Natural Resources hosted a meeting in Petropavlovsk, Kamchatka, Russia, on 13-20 September 1995 to discuss possible agreements for walruses and polar bears. The U.S. delegation was led by a representative of the Fish and Wildlife Service and included representatives of the Alaska Native community, the Marine Mammal Commission, the State of Alaska, and the environmental community. Based on the discussions relating to walruses, representatives of the Fish and Wildlife Service and the Russian Ministry signed a new protocol of intent concerning the bilateral walrus agreements.

The protocol expressed a mutual understanding that government-to-government and Native-to-Native agreements would be pursued to provide for the conservation, research, habitat protection, and Native subsistence use of the Pacific walrus stock. It also noted that such negotiations would be based on principles of sustained yield and maintenance of the Pacific walrus population at its optimum sustainable level. The protocol noted also expressed a commitment by both countries to assist Native communities in developing a Native-to-Native walrus agreement and recognized the need for Native communities to participate in determining harvest allocations. Regarding scientific data, the protocol indicated that joint five-year population surveys should be continued to the extent permitted by funding and environmental conditions; that the age, sex, and number of walruses taken annually in each country should be monitored; and that scientific and technical data should be exchanged routinely.

Areas noted in the protocol as needing further discussion included the methods to be used in determining biologically sustainable harvest levels, the need for a joint scientific committee with government and Native representation, and determination of

geographic boundaries that would be subject to the agreements. In view of these points, the two sides agreed to continue discussions on developing government and Native walrus agreements at a meeting in the United States in 1996.

The Marine Mammal Commission reviewed the terms of the signed protocol and concluded that it provided a solid basis on which to begin drafting specific language for the proposed bilateral walrus agreements. By letter of 11 December 1995 to the Service, the Commission noted that the September meeting was an important step forward and congratulated the U.S. delegation for its accomplishments. In view of the need for further work and plans for a joint meeting in 1996, the Commission also noted its interest in remaining involved in the development and negotiation of the walrus agreements and asked to be advised of the steps and schedule to be followed in drafting the text of the bilateral walrus agreement and in preparing for the next meeting. Although no formal response to the Commission's letter was provided, the Fish and Wildlife Service has endeavored to inform the Commission of actions relative to the walrus agreements. At the Commission's November 1996 annual meeting, a representative of the Service indicated that the status of talks on the walrus agreements are a year or more behind those for the polar bear agreements. The representative predicted that formal negotiation of the walrus agreements would not be initiated until 1998.

## The Bering Sea Ecosystem

As noted in previous Commission reports, there have been alarming declines during the past two decades in populations of northern fur seals, Steller sea lions, harbor seals, and several species of fish-eating birds in parts of the Bering Sea and Gulf of Alaska. The cause or causes of the declines are not apparent. Therefore, in December 1990 the Commission and the National Marine Fisheries Service jointly sponsored a workshop to identify the critical uncertainties and the research that would be required to resolve them. A related workshop was held by the Alaska Sea Grant College Program in March 1991.

Participants in both workshops noted that the harbor seal and Steller sea lion declines were continuing in parts of Alaska, including the Bering Sea, and that they appeared to be food-related. They also noted that available data were insufficient to determine whether the apparent declines in food availability were a product of natural environmental cycles or change, a consequence of the pollock fishery that had developed since the late 1960s, or some combination of these or other factors.

The participants in the December 1990 workshop noted that potentially relevant data were being collected and archived by several Federal and state agencies and private institutions, but that the data often were difficult to locate and access. Among other things, they recommended development of a common data management system to facilitate archiving, accessing, mapping, and integrating marine mammal, seabird, fish, fishery, environmental, and other data concerning the Bering Sea and Gulf of Alaska (see Appendix B, Swartzman and Hofman 1991). Actions taken by the Commission in response to this and other recommendations from the December 1990 workshop are described in previous Commission reports (see Appendix B, Hoover-Miller 1992 and 1995).

### National Research Council Bering Sea Ecosystem Study

In 1992 the Department of State provided funds to the National Research Council to "study the available scientific and technical information on the Bering Sea ecosystem, focusing, in particular, on environmental factors that influence natural variability in populations of marine mammals, seabirds, and fish." To meet this charge, the National Research Council's Polar Research Board established a Committee on the Bering Sea Ecosystem, comprised of experts in marine science, management, policy, and socioeconomics. The committee met five times in 1993, 1994, and 1995 to review and evaluate information concerning environmental factors and ecological relationships that control the Bering Sea ecosystem; the life history, distribution, population dynamics, and probable causes and effects of fluctuations in commercially important species, particularly those that are highly migratory; the current status of and interrelationships among, and

factors contributing to fluctuations in, populations of marine mammals, seabirds, and commercially important species; the history of commercial fisheries in the Bering Sea; and the relationships among biological resources, indigenous peoples, commercial fisheries, and other components of the Bering Sea ecosystem.

The committee's report, released by the National Research Council in February 1996, concluded that the observed changes in the Bering Sea ecosystem since the 1970s are due to a combination of natural environmental fluctuations and human exploitation of marine resources. The report noted that climate-driven variability occurs at many different timescales and appears to cause relatively rapid shifts in ecosystem organization — the most recent of which occurred in the late 1970s.

The report pointed out that whales were intensively exploited in parts of the Bering Sea and the Gulf of Alaska in the 1950s, 1960s, and early 1970s and that, during this period, trawl fisheries severely reduced flatfish and rockfish populations in the eastern Bering Sea. It noted that pollock abundance increased in the eastern Bering Sea in the late 1960s, possibly as a result of more food being available because of the reduction of whales and other fishes, and that the trawl fisheries switched their primary focus to pollock, which now dominates the fish assemblage in the eastern Bering Sea. The report hypothesized that natural environmental fluctuations or change, combined with fishery-related changes in exploited and related populations, may have had a cascade effect. That is, the increase in adult pollock and other predatory fishes in the past 20 years may have caused a corresponding decrease in smaller forage fishes that have higher nutritional value than pollock and may be responsible for at least some of the marine mammal and seabird declines. The possible food shortages caused by the decline in high-calorie forage fishes may have been exacerbated by pollock fishing that was concentrated in time and space and that may have caused declines in pollock abundance at critical times and places (*e.g.*, near Steller sea lion and harbor seal pupping/breeding colonies during the pupping/breeding season).

The report emphasized that the cascade hypothesis does not lead to the conclusion that overfishing of

pollock is either directly or indirectly responsible for the marine mammal and seabird declines observed since the late 1970s. It pointed out that an overall reduction in pollock fishing probably would not stop or reverse the population declines but that distributing fishing effort in time and space might benefit some marine mammals and seabirds by limiting reductions in pollock abundance near key pupping/nesting colonies during the pupping/nesting season.

Finally, the report pointed out that it is highly unlikely that the productivity of the Bering Sea ecosystem can sustain both the current rates of human exploitation and the large populations of marine mammals and birds that existed before commercial exploitation began. Thus, if the goal is to restore and maintain top-level predators at historic levels, it is likely that harvesting at lower trophic levels will have to be reduced. Further, some of the changes in the Bering Sea ecosystem may be irreversible anytime in the foreseeable future, which emphasizes (1) the need for an adaptive approach to management; and (2) the importance of reliable, long-term data on physical and biological processes.

The Committee's report described critical uncertainties and recommended research and management actions to effectively conserve the Bering Sea ecosystem and its component elements. Among other things, the Committee recommended that —

- a broader ecosystem perspective be adopted for both scientific research and management of Bering Sea resources;
- available information be evaluated further to (1) better document the nature and possible causes of changes in the Bering Sea ecosystem over the past 50 years, and (2) assess how well management and management institutions are structured to identify and provide appropriate solutions to management problems;
- steps be taken to better define the management philosophy and objectives of, and to improve and better coordinate, Federal, state, and international management efforts;
- a research program be developed to improve understanding of the Bering Sea ecosystem and to provide the information needed to allow policy-

- makers to solve both short-term management problems and long-term ecological problems; and
- the distribution of fishing effort, especially for pollock, be broadened over time and space to try to improve the food supply for the declining populations of marine mammals and birds.

*[The Committee's report, entitled "The Bering Sea Ecosystem," is available from the National Academy Press in Washington, D.C.]*

### **Development of a Coordinated Studies Plan for the Bering Sea**

The 1994 amendments to the Marine Mammal Protection Act directed that the Secretary of Commerce, in consultation with the Secretary of the Interior, the Marine Mammal Commission, the State of Alaska, and Alaska Native organizations, "undertake a scientific research program to monitor the health and stability of the Bering Sea ecosystem and to resolve uncertainties concerning the causes of population declines of marine mammals, seabirds, and other living resources of that marine ecosystem." In partial response to this directive, the National Marine Fisheries Service developed a draft study plan that described and evaluated existing Bering Sea research programs from an ecosystem perspective and identified additional research needed to meet the previously noted objectives.

The draft study plan was provided to the Commission, other Federal and state agencies, and Alaska Native organizations for comment in March 1995. On 2-3 November 1995 the National Marine Fisheries Service held a workshop in Anchorage, Alaska, to review and finalize the plan. Participants included representatives of the Commission, the National Marine Fisheries Service, the Fish and Wildlife Service, the State of Alaska, the University of Alaska, and Alaska Native organizations. The workshop report was completed and provided to participants in March 1996.

Alaska Native organizations believe that the study plan developed by the National Marine Fisheries Service does not adequately consider or factor in traditional ecological knowledge. Representatives of

these organizations raised this issue during the November 1995 workshop, but were unable to provide specific recommendations as to how traditional ecological knowledge should be integrated into the study plan.

Representatives of the National Marine Fisheries Service and Alaska Native organizations met in Anchorage on 16-17 December 1996 to discuss how this problem could be overcome. The Native representatives agreed to draft a section on traditional ecological knowledge for inclusion in the study plan. When the plan has been completed, the National Marine Fisheries Service plans to initiate a series of pilot research projects to address scientific priorities identified in the November 1995 workshop. It is expected the research will be conducted in cooperation with qualified Alaska Native organizations.

### **The North Pacific Marine Science Organization (PICES)**

As noted in previous Commission reports, Canada, Japan, the People's Republic of China, the former Soviet Union, and the United States concluded the Convention for the North Pacific Marine Science Organization (PICES) in December 1990. The purpose of the Convention is to provide scientific understanding of the North Pacific Ocean and its processes, living resources, and oceanographic features. The Convention entered into force in 1992. In 1995 both the Russian Federation and the Republic of Korea acceded to the Convention.

At the second annual meeting in October 1993 PICES established a working group on the Bering Sea. This group has nearly completed its work. A symposium on the Bering Sea was held in the fall of 1995 in conjunction with the PICES annual meeting in Qingdao, China. The proceedings of this symposium are expected to be published in the near future. In addition, a hardcover book updating scientific knowledge of the Bering Sea currently is in the preliminary editorial stage. The group also has produced a list of key topics for Bering Sea research.

At its third annual meeting in October 1994, PICES established a steering committee for a program

initially called climate change and carrying capacity and now called PICES-GLOBEC. The objective of this program is to determine how climate variability affects ecosystem structure and the productivity of key biological species at all trophic levels in the open sub-Arctic and coastal North Pacific Ocean.

The National Oceanic and Atmospheric Administration and the National Science Foundation have joint responsibility for planning and funding U.S. contributions to the international GLOBEC Program. Anticipating that funding for the climate change and carrying capacity program would be forthcoming, the National Oceanic and Atmospheric Administration held a workshop in Seattle, Washington, on 31 January - 2 February 1996 to develop a science plan that could be used to direct potential research activities. For the Bering Sea, the science plan focused on assessing hypotheses relating zooplankton production to predation and physical processes, and involved key species from all trophic levels. It anticipated that the program will employ a number of approaches, including monitoring, retrospective analyses, modeling, and process-oriented studies.

### **Southeast Bering Sea Carrying Capacity Program**

In 1996 the National Oceanic and Atmospheric Administration also initiated the southeast Bering Sea carrying capacity program. The goal of this program, funded as part of the agency's coastal ocean program, is to improve understanding of the southeast Bering Sea ecosystem, while at the same time producing information useful for fisheries management. The fundamental hypothesis is that juvenile pollock (age 0-1) are a nodal element of the Bering Sea ecosystem, such that a large fraction of the energy in the system passes through this population. Juvenile pollock respond to and potentially affect primary and secondary production through grazing, and likely influence the availability of food for upper-trophic-level species, including adult pollock, seabirds, and marine mammals. The role of the physical environment as a driving force is a major element of the program, especially with regard to climate variability.

Retrospective and modeling studies are underway. A small amount of field work was initiated in the summer of 1996. A major field effort is expected in 1997.

It is anticipated that one of the products of the program will be indices of annual juvenile pollock abundance. It also is anticipated that the study results will be used by the North Pacific Fishery Management Council to improve management of Bering Sea pollock stocks, and to assist the council in moving toward ecosystem-oriented fishery management. [For a general understanding of ecosystem-oriented fishery management, see the section in Chapter IV concerning the Convention for the Conservation of Antarctic Marine Living Resources.]

### **The Arctic Research Initiative**

The National Oceanic and Atmospheric Administration's fiscal year 1997 budget appropriation included \$1 million earmarked for support of Arctic research. To help determine how these new funds might best be used, the agency and the University of Alaska's Cooperative Institute for Arctic Research convened a workshop at the University of Alaska-Fairbanks on 5-6 November 1996 to determine scientific priorities. The workshop participants identified five science areas meriting priority attention: (1) biological production and processes; (2) atmosphere-ice processes that influence ecosystem variability; (3) atmosphere, cloud, and boundary layer processes; (4) Arctic haze, ozone, and ultraviolet flux; and (5) contaminant inputs, fate, and ecosystem effects.

On 3 December 1996 the Cooperative Institute for Arctic Research published a call for proposals related to these five science areas. The deadline for submission of proposals is 10 January 1997. Proposals will be reviewed by a panel of scientists expected to meet during the week of 20 January 1997. Awards are expected to be made in March 1997.

Continuation of the agency's Arctic Research Initiative in 1998 and beyond will be contingent on Congressional appropriation of additional funding.

## North Pacific Universities Marine Mammal Research Consortium

As noted in Chapter II, the severity of the Steller sea lion population decline led to the species' being listed as threatened under the Endangered Species Act in 1990. Recognizing that the uncertainty concerning the cause of the decline could lead to restricting fisheries in areas where the decline had occurred, representatives of several North Pacific fisheries initiated efforts in 1992 to develop and seek funding for an independent, non-government research program to investigate the relationship between fisheries and marine mammals in the eastern Bering Sea and Gulf of Alaska. This led to the formation of the North Pacific Universities Marine Mammal Research Consortium, members of which include the University of Alaska, the University of British Columbia, the University of Washington, and Oregon State University.

In 1993 the North Pacific Marine Science Foundation was formed to seek and manage funding. The Marine Mammal Commission provided a small amount of funding in 1993 to help with start-up costs.

A five-year research plan was completed and initiated in January 1993. The plan includes a balance of short- and long-term projects designed to test hypotheses concerning the possible cause or causes of the Steller sea lion declines in the Gulf of Alaska and Aleutian Islands. The program includes field studies, laboratory studies, and studies involving captive animals.

One of the principal objectives of the field program has been to conduct comparative studies of stable, healthy populations and declining populations. The studies, which are ongoing, involve collection and comparison of data on behavior, feeding habits, dietary composition, food availability, individual condition, and pup production and survival.

Captive studies of Steller sea lions are being done at the Vancouver Aquarium. They are aimed primarily at determining the energetic needs of the animals and the nutritional value of typical prey. Studies also are being done to determine the degree to which collection and assessment of scats can be used to identify the diets of wild animals, and to determine whether there are significant differences in the physiology and blood chemistry of wild animals compared to those kept in captivity under controlled conditions.

Analytic studies done in 1996 included assessment of historic sea lion diets from the presence and levels of certain isotopes in whiskers from sea lions in museum collections, and assessment of the hypothesis that over-exploitation of whales earlier in the century caused or contributed to a shift in the abundance of lower-trophic-level species.

*[Information concerning the consortium and its research program can be obtained from the North Pacific Universities Marine Mammal Research Consortium, 6248 Biological Sciences Road, University of British Columbia, Vancouver, BC, V6T 1Z4, and through the Internet at [consortium@zoology.ubc.ca](mailto:consortium@zoology.ubc.ca)]*



## Chapter VI

# MARINE MAMMAL STRANDINGS AND DIE-OFFS

There has been an apparent increase in the incidence of unusual marine mammal mortalities in the past 15 to 20 years. There also appears to have been an increase in unexplained marine mammal population declines. (For examples, see the discussions in Chapter II of the continuing declines of Hawaiian monk seals, Steller sea lions, and harbor seals in Alaska.) Further, there appears to have been a general increase in the number of marine mammal strandings in some coastal areas. For example, the number of dead marine mammals found on beaches in the southeastern United States has doubled since the mid-1980s.

The unusual marine mammal mortality events have involved a broad range of species in widely separated geographic areas, including monk seals in the Northwestern Hawaiian Islands, harbor seals and humpback whales in New England, sea lions in California, manatees in Florida, and bottlenose dolphins along the East and Gulf coasts of the United States. The largest and most publicized events were the deaths of more than 700 bottlenose dolphins along the U.S. mid-Atlantic coast in 1987-1988, more than 17,000 harbor seals in the North Sea late in 1988, and more than 1,000 striped dolphins in the Mediterranean Sea in 1990-1991 (see Appendix C, Geraci 1989, for information on the 1987-1988 bottlenose dolphin die-off).

Several of the mass mortality events appear to have been caused by a morbillivirus, congeners of which cause distemper in dogs and measles in humans. It is not known whether cetaceans and pinnipeds have been exposed to the virus only recently, and thus have no acquired immunity to it, or whether more virulent forms of the virus have evolved. Further, it is not known whether animals in the affected populations had been stressed in ways that compromised their immune systems or whether there simply are better means now for detecting both viruses and unusual mortality events than there were in the past.

High levels of a number environmental contaminants were found in the blubber, liver, and other tissues of some of the bottlenose dolphins and striped dolphins that died during the unusual mortality events referenced earlier. These contaminants may have affected the animals' immune systems and made them more vulnerable to the virus. Available information is insufficient, however, to determine how, or at what levels and in what combinations, environmental contaminants may compromise the immune systems or otherwise affect marine mammals. As indicated in Chapter VII, the Marine Mammal Commission plans to hold a workshop in 1997 to better document and determine how to resolve such uncertainties.

### Unusual Mortality Events in 1996

There were three unusual marine mammal mortality events in U.S. waters in 1996. One involved the deaths of more than 150 endangered manatees along the southwest coast of Florida. Another involved the deaths of five northern right whales off northeast Florida and Georgia. Both events are described in Chapter II.

The third event occurred along the Florida panhandle and the coasts of Alabama, Mississippi, and Louisiana in October and November 1996. On 30-31 October 1996 five dead bottlenose dolphins were found along two miles of beach on the Florida panhandle. During November, 18 dead bottlenose dolphins were found on beaches or floating offshore in Mississippi. During the same period, three dead bottlenose dolphins stranded in Alabama and two in Louisiana. In past years, an average of only three bottlenose dolphins have stranded in these areas at this time of the year.

There were major incidents of red tide in the areas and at the times the strandings occurred. Oyster

fisheries were closed in Alabama, Mississippi, and Louisiana. Unusual fish and seabird kills were reported at the same time.

No common pathological conditions were found in the dolphins that were recovered and necropsied. However, all tests had not been completed by the end of 1996. Circumstantial evidence suggests that the higher than normal bottlenose dolphin mortality may have been caused by the red tide.

## Response to Unusual Mortality Events

As noted in previous Commission reports, the deaths of hundreds of bottlenose dolphins along the U.S. mid-Atlantic coast in 1987-1988 led Congress to add Title IV — Marine Mammal Health and Stranding Response — to the Marine Mammal Protection Act in 1992. Among other things, the new title directed the Secretary of Commerce to (1) establish an expert working group to provide advice on measures necessary to better detect and respond appropriately to future unusual marine mammal mortality events; (2) develop a contingency plan for guiding response to such events; (3) establish a fund to compensate persons for certain costs incurred in responding to unusual mortality events; (4) develop objective criteria for determining when rehabilitated marine mammals can be returned to the wild; (5) continue development of the National Marine Mammal Tissue Bank (described in previous Marine Mammal Commission annual reports); and (6) establish and maintain a central database for tracking and accessing data concerning marine mammal strandings.

The Secretary of Commerce delegated responsibility for implementing these directives to the National Marine Fisheries Service. In response, the Service, in consultation with the Commission and the Fish and Wildlife Service, established a working group in 1993 to advise on measures necessary to better detect and respond to unusual marine mammal mortality events. The group held its first meeting on 1-2 April 1993 and met again on 15 March 1994, 3-4 April 1995, and 15-16 April 1996. A member of the Marine Mammal Commission staff serves on the working group.

## Completion of the National Contingency Plan

As noted earlier, Title IV of the Marine Mammal Protection Act directed the Secretary of Commerce to develop a contingency plan for guiding response to future unusual marine mammal mortality events in U.S. waters. As noted in previous Commission reports, the National Marine Fisheries Service completed and requested comments on a draft plan in June 1994. The Commission, in consultation with its Committee of Scientific Advisors, reviewed and provided comments on this and a subsequent draft by letters of 12 September 1994 and 21 March 1995. The final plan, done in consultation with the Unusual Marine Mammal Mortality Working Group, was published by the Service in September 1996.

The plan, titled the "National Contingency Plan for Response to Unusual Marine Mammal Mortality Events," notes that Title IV of the Marine Mammal Protection Act specifies that responses to unusual mortality events are to be directed by an onsite coordinator, who will be the appropriate National Marine Fisheries Service or U.S. Fish and Wildlife Service regional director or someone designated by the appropriate regional director. Thus, the primary purpose of the plan is to provide guidance to the regional directors of the two Services on such things as (1) criteria that can be used to determine when an unusual event is occurring; (2) steps that should be taken to protect the health and welfare of the public in cases where dead or dying animals, or the agents killing them, could pose a threat to the public; (3) planning that should be done in advance to be prepared to respond appropriately to unusual events; (4) steps that should be taken, depending upon the nature of the event, to determine the cause and biological significance of the event; and (5) steps that should be taken to document the collection and disposition of tissue and other samples, especially in cases where the mortality event may be a consequence of a toxic chemical spill or other human-related action.

The plan includes eight addenda. Addendum A provides the names, addresses, and phone numbers, by state, of the members of the regional marine mammal stranding networks. Addendum B identifies

the Federal agencies with beachfront authority, again by state. Addendas C and D identify the wildlife resource agencies and public health agencies of coastal states. Addendum E identifies contact points for Native American organizations in the States of Washington and Alaska. Addendum F provides a list of facilities approved for holding live-stranded animals. Addendum G provides a list of individuals and organizations with information and expertise regarding necropsy of dead marine mammals and the collection and preservation of tissue samples from the carcasses. Addendum H is a list of veterinary organizations and colleges that can be consulted to provide advice and assistance on efforts to determine the cause of unusual mortality events.

It is the Commission's understanding that the national plan is being used by the regional directors of the National Marine Fisheries Service and Fish and Wildlife Service to develop regional response plans.

### Development of Release Criteria

If marine mammals strand because they are sick, returning them to the wild before they are fully recovered could risk transmitting disease-causing organisms to healthy animals. Further, returning stranded animals to the wild before they are fully recovered could lead to death from starvation or injury because the animals are not healthy enough to capture prey, avoid predators, or defend themselves from other animals. Similar problems could result from releasing animals that have been maintained in captivity for relatively long periods of time if the animals are not healthy and have not been properly conditioned to survive in the wild.

Title IV of the Marine Mammal Protection Act directs that the Secretary of Commerce —

shall, in consultation with the Secretary of the Interior, the Marine Mammal Commission, and individuals with knowledge and experience in

marine science, marine mammal science, marine mammal veterinary and husbandry practices, and marine conservation, including stranding network participants, develop objective criteria, after an opportunity for public review and comment, to provide guidance for determining at what point a rehabilitated marine mammal is releasable to the wild.

Recognizing the importance of this issue, the Marine Mammal Commission and National Marine Fisheries Service jointly sponsored a workshop in December 1991 to seek expert advice on rescue, rehabilitation, and release of stranded marine mammals. The workshop participants included representatives of public display facilities and marine mammal rehabilitation centers, state and Federal agencies with jurisdiction over marine mammals and marine mammal display and rehabilitation facilities, and scientists with related expertise. The workshop report, "Rescue, Rehabilitation, and Release of Marine Mammals: An Analysis of Current Views and Practices," was published by the National Marine Fisheries Service in July 1996 (see Appendix C, St. Aubin *et al.* 1996).

The Unusual Marine Mammal Mortality Event Working Group has been asked to recommend criteria for determining when it is appropriate to return stranded marine mammals to the wild. The pros and cons of possible criteria were discussed at the working group's meetings in 1994, 1995, and 1996, but no consensus was reached. A sub-group was established during the 1995 meeting to prepare recommended criteria for consideration by the group as a whole.

A preliminary draft of a paper setting forth possible release standards was provided to the working group for review and comment in May 1996. It is anticipated that a revised draft will be provided to the working group for consideration at its next meeting, expected to be held in April 1997.



## Chapter VII

# EFFECTS OF POLLUTION ON MARINE MAMMALS

Marine mammals can be affected directly and indirectly by a variety of environmental contaminants of anthropogenic origin. Direct effects include such things as mortality from toxic chemical spills and entanglement in lost and discarded fishing gear. Indirect or second-order effects include such things as decreased survival and productivity due to contaminant-caused decreases in essential prey species.

This chapter provides background information and describes efforts taken by the Commission, in consultation with its Committee of Scientific Advisors, to identify actions necessary to minimize threats to marine mammals posed by marine debris, chemical pollutants, and noise from various sources.

### Marine Debris

Marine debris is a significant pollution problem in all the world's oceans. Marine debris includes lost and discarded items ranging in size from minute plastic pellets, no more than a few millimeters in diameter, to derelict fishing nets, hundreds or thousands of meters long. Although the issue is often overlooked marine debris is a serious source of injury and mortality for a wide range of species. It affects wildlife in two ways: entanglement and ingestion.

Most entanglement involves lost and discarded netting, monofilament line, rope, and strapping bands used to bind bait boxes and cargo. For some species, particularly seals, the vast majority of entanglement incidents occur to young animals whose curiosity or instinct for play apparently attract them to debris. Once entangled, animals unable to free themselves quickly are likely to die either from exhaustion and drowning, infection of wounds caused by debris abrasion or constriction, or reduced ability to catch food or avoid predators. Entanglement seems more likely than ingestion to cause serious injury or death;

however, some animals that ingest debris also are debilitated or killed from blocked or punctured digestive tracks. The most hazardous ingested items are plastic bags and plastic sheeting.

As shown in Table 12, marine debris entanglement and ingestion records have been reported for at least 267 species. These records include at least 43 percent of the world's marine mammal species, at least 44 percent of the world's seabird species, and all but one of the world's sea turtle species. Several of these are listed as endangered, threatened, or depleted (*e.g.*, West Indian manatees, Hawaiian monk seals, northern fur seals, right whales, humpback whales, and all species of sea turtles). The vast majority of debris interaction records are from land-based observations of carcasses that strand on beaches or animals that return to shore to molt, breed, nest, or roost.

Efforts to quantify the frequency of interactions and their impact at the population level have been frustrated by an inability to reliably detect and measure the proportion of a population that become entangled at sea and die without returning to land. Available evidence, however, indicates that amounts of hazardous debris in some areas can be high and that some populations sustain significant impacts from marine debris (see Appendix C, Laist 1996a and 1996b). Among the evidence is the following:

- As noted in Chapter II, 5 of 24 (21 percent) Hawaiian monk seal pups born at one of the species' five major breeding colonies in 1996 were found entangled in marine debris.
- Studies of the northern fur seal herd on the Pribilof Islands, the world's largest herd, suggest that late in the 1970s up to 50,000 juvenile fur seals per year were entangled and killed annually in marine debris. The population's failure to recover since then suggests entanglement is still a significant source of mortality.

**Table 12.** The number and percentage of species worldwide with records of marine debris entanglement and ingestion by species group<sup>1</sup>

<u>Species Group</u>	<u>Total No. of Species Worldwide</u>	<u>Entanglement Records No. (%)</u>	<u>Ingestion Records No. (%)</u>	<u>One or Both Types of Records No. (%)</u>
<b>Sea Turtles</b>	7	6 (86%)	6 (86%)	6 (86%)
<b>Seabirds</b>	312	51 (16%)	111 (36%)	138 (44%)
Sphenisciformes (Penguins)	16	6 (38%)	1 (6%)	6 (38%)
Podicipediformes (Grebes)	19	2 (10%)	0 (0%)	2 (10%)
Procellariiformes (Albatrosses, Petrels, and Shearwaters)	99	10 (10%)	62 (63%)	63 (64%)
Pelicaniformes (Pelicans, Boobies, Gannets, Cormorants, Frigatebirds, and Tropicbirds)	51	11 (22%)	8 (16%)	17 (33%)
Charadriiformes (Shorebirds, Skuas, Gulls, Terns, and Auks)	122	22 (18%)	40 (33%)	50 (41%)
<b>Other Birds</b>	—	5	0	5
<b>Marine Mammals</b>	115	32 (28%)	26 (23%)	49 (43%)
Mysticeti (Baleen Whales)	10	6 (60%)	2 (20%)	6 (60%)
Odontoceti (Toothed Whales)	65	5 (8%)	21 (32%)	22 (34%)
Otariidae (Fur Seals and Sea Lions)	14	11 (79%)	1 (7%)	11 (79%)
Phocidae (True Seals)	19	8 (42%)	1 (5%)	8 (42%)
Sirenia (Manatees and Dugongs)	4	1 (25%)	1 (25%)	1 (25%)
Mustellidae (Sea Otter)	1	1 (100%)	0 (0%)	1 (100%)
<b>Fish</b>	—	34	33	60
<b>Crustaceans</b>	—	8	0	8
<b>Squid</b>	—	0	1	1
<b>Species Total</b>	—	136	177	267

<sup>1</sup> Laist, D.W. 1996a (see appendix C).

- Six percent of more than 800 loggerhead sea turtles caught for purposes of tagging in waters around the Azores from 1990 to 1993 were found entangled in marine debris.
  - Estimates of dungeness crab mortality in derelict traps lost in the British Columbia dungeness crab fishery were estimated at 21,000 kg in 1984, equal to seven percent of the year's landings.
  - An estimated 31,600 pots were lost in Alaska's Bristol Bay king crab fishery in 1990 and 1991. If each pot caught and killed one legal-sized crab per year, more than 200,000 lbs of king crab would have been lost in those traps alone.
  - Lost gillnet retrieval efforts off Newfoundland, Canada, recovered 148 nets in 20 days in 1975, and 176 nets in 24 days in 1976. Together, the 324 nets contained 8,000 kg of fish and 4,000 kg of crabs.
- Prior to 1996 the principal Federal agencies involved in mitigating marine debris pollution were the National Oceanic and Atmospheric Administration, the

U.S. Coast Guard, the Environmental Protection Agency, the U.S. Navy, and the National Park Service. Most of these agencies continued their efforts in 1996. However, as discussed below, the National Oceanic and Atmospheric Administration provided almost no funding to continue its marine debris-related research and management activities in 1996 even though its past efforts had been a cornerstone of the Federal work to reduce marine debris and despite the fact that fisheries are the principal source of the most hazardous debris items for marine life.

As noted in past annual reports, the Marine Mammal Commission also has been actively involved in Federal and international efforts to reduce marine debris pollution. Its actions and those of other agencies in this regard in 1996 are discussed below.

### **The Marine Entanglement Research Program**

Between 1985 and 1995 the only Federal agency program dedicated explicitly to identifying and supporting a broad-based research and management approach for reducing sources of marine debris was the Marine Entanglement Research Program under the National Oceanic and Atmospheric Administration's National Marine Fisheries Service. In recent years, the program has been supported at levels of about \$600,000 to \$650,000 per year. As noted in past annual reports, the program was the principal source of Federal funding for work to assess marine debris impacts, monitor marine debris levels, inform the public about problems and solutions, reduce the amount of derelict fishing gear, and encourage international efforts to address marine debris pollution.

For fiscal year 1996 the National Oceanic and Atmospheric Administration requested \$650,000 for the Marine Entanglement Research Program, the same funding received to continue the program in 1995. However, as part of efforts to reduce Federal spending, Congress denied the request in its proposed fiscal year 1996 appropriation bill. Because of a budgetary impasse between Congress and the President, the appropriations bill was not enacted in 1995 and, at the end of the year, funding for National Oceanic and Atmospheric Administration programs authorized for 1995 was provided by Congress through a series of continuing resolutions. Given Congress' expressed

intent to eliminate funding for the Marine Entanglement Research Program, the agency took no steps to provide funds to continue the program early in 1996.

Concerned about the need to continue efforts to reduce marine debris, the Commission wrote to the agency on 10 May 1996 to urge that it make a greater effort to provide at least some support for the constructive work that had been identified for support in 1996 by the Marine Entanglement Research Program. Through work supported by the program over the years, the Commission noted that the agency had demonstrated a leadership role that had been a pivotal factor in bringing about domestic and international progress to address marine debris pollution. While recognizing the difficult budgetary position of the National Oceanic and Atmospheric Administration in general, the Commission noted that the agency's statutory obligations previously met by the program remained to be addressed and that continuation of its leadership in the issue was crucial if continued progress was to be realized.

With respect to agency obligations, the Commission noted that the Marine Plastic Pollution Research and Control Act of 1987 directs the agency to undertake a public outreach program in cooperation with the Coast Guard and the Environmental Protection Agency to educate boaters, fishermen, and others about plastic pollution and the importance of actions by individuals to prevent plastic discharges. To meet this directive the Marine Entanglement Research Program had been providing about \$150,000 per year to help develop, print, and distribute public awareness and education materials. In addition, it had allocated about \$50,000 per year to help organize annual national beach clean-up campaigns involving hundreds of thousands of volunteers. To sustain at least core elements of these activities, the Commission recommended that the agency provide \$25,000 to continue the public outreach program and \$25,000 to help organize the 1996 volunteer beach clean-up campaign.

The Commission also noted that derelict fishing gear was the most hazardous form of marine debris for marine life. Although ports are required to have adequate reception facilities for receiving routine ship-generated garbage, most ports — and even many landfills — refuse to accept old fishing gear. This effec-

tively discourages proper land-based disposal of old fishing gear. To help eliminate this disincentive, the 1996 Marine Entanglement Research Program had proposed a \$19,000 project with the Gulf of Maine Council to develop port reception facilities along the Gulf of Maine coast and a \$19,000 project in North and South Carolina in cooperation with fishing industry groups to develop port reception and recycling programs for old fish traps and nets. The Commission recommended that the agency find an alternative means of funding these projects.

The Commission also noted that the National Coastal Monitoring Act of 1992 directs the National Oceanic and Atmospheric Administration and the Environmental Protection Agency to jointly develop

and implement a long-term monitoring program to collect and analyze data on environmental quality, including the accumulation of marine debris. To do so, the Marine Entanglement Research Program helped fund a five-year marine debris survey program at eight national seashores within the National Park Service. Based on results of that program, the Environmental Protection Agency convened a working group to develop sampling protocols for a national marine debris monitoring plan to detect and monitor long-term trends in the amounts and types of debris. The plan, completed in 1995, provided a strategy for meeting the statutory requirements for monitoring debris under the Coastal Monitoring Act. To provide partial support in cooperation with the Environmental Protection Agency for initiating sampling along the Gulf of Mexico, the 1996 Marine Entanglement Research Program had proposed allocating \$40,000. To help initiate this program, the Commission recommended that the agency try to contribute at least \$25,000 in 1996.

The Commission also noted that available data suggest that accumulation of derelict fishing gear in some areas is a significant source of mortality for commercial shellfish and finfish. In this regard, the Commission urged that the National Oceanic and Atmospheric Administration give high priority to support studies to assess the amounts and impact of lost fishing gear, and to examine habitat improvement possibilities through directed derelict fishing gear

retrieval projects in New England waters where accumulation of derelict fishing gear may be greatest.

The National Oceanic and Atmospheric Administration responded to the Commission's letter on 24 July 1996. It stated that the agency could not continue to fund programs that Congress had specifically chosen not to fund. During 1996 the agency provided no additional funding for the above-mentioned projects or other projects proposed for funding under the 1996 Marine Entanglement Research Program. It also requested no funding for the entanglement program in 1997, thereby ending almost all of the agency's efforts to reduce marine debris and address related statutory obligations.

### **Amendments to the Marine Plastic Pollution Research and Control Act**

In 1987 the United States ratified Annex V of the International Convention for the Prevention of Pollution from Ships. Annex V establishes international standards for the disposal of ship-generated garbage. Among other things, it includes a ban on the disposal of all plastic materials at sea. As part of the ratification process, Congress passed the Marine Plastic Pollution Research and Control Act of 1987, providing authority to implement Annex V requirements in the United States. The Act also required various studies, research, and public education efforts by involved Federal agencies.

Because sources of marine debris are diverse (*e.g.*, commercial fisheries, offshore platforms, commercial vessel traffic, military ships, recreational boats, sewer outfalls, beachgoers, *etc.*) and affect many species of wildlife and marine areas, Federal responsibility for aspects of marine debris pollution falls to many different agencies. Interagency coordination needs were not addressed in the 1987 act. Rather, in response to a 2 April 1987 letter to the President signed by 30 Senators, an Interagency Task Force on Marine Debris was convened under the White House Domestic Policy Council in the spring of 1987.

The task force was charged with preparing a national plan to reduce marine debris. It was chaired by representatives of the National Oceanic and Atmo-

spheric Administration, and included members from the Animal and Plant Health Inspection Service, the Coast Guard, the Department of State, the Environmental Protection Agency, the Fish and Wildlife Service, the Food and Drug Administration, the Marine Mammal Commission, the Mineral Management Service, the National Park Service, the Navy, and the Office of Management and Budget. After completing a plan in 1988, the task force was disbanded. Since then, interagency coordination needs have been met in an *ad hoc* manner, such as planning meetings for the National Oceanic and Atmospheric Administration's Marine Entanglement Research Program, Annex V coordination meetings held by the Coast Guard, and most recently by an interagency group convened by the Environmental Protection Agency (see below).

With no mandate to oversee marine debris activities, these *ad hoc* approaches have been neither effective, comprehensive, nor lasting. Therefore, as part of a Coast Guard authorization bill (PL 104-324) passed by Congress in October 1996, the Marine Plastic Pollution Research and Control Act was amended to direct that the Secretary of Commerce establish a marine debris coordinating committee chaired by an official of the National Oceanic and Atmospheric Administration. The committee is directed to meet at least twice a year for purposes of coordinating efforts on national and international research, monitoring, education, and regulatory actions concerning persistent marine debris problems. Other committee members are to include representatives of the Environmental Protection Agency, the Coast Guard, the Navy, and other interested Federal agencies. At the end of 1996 it was unclear what steps the National Oceanic and Atmospheric Administration planned to take to address the new directive.

### **Actions Taken by the Environmental Protection Agency**

As indicated above, the Environmental Protection Agency, in cooperation with the National Oceanic and Atmospheric Administration and the Coast Guard, is required to undertake a public outreach program to increase awareness of marine debris problems and related mitigation measures. In cooperation with the

National Oceanic and Atmospheric Administration, the Agency also is required to monitor floating debris as part of a national program to monitor the quality of coastal environments. Both needs have been met through grants, contracts, and cooperative agreements with Federal agencies, industry, and non-governmental environmental groups.

With past funding from the National Oceanic and Atmospheric Administration, the Environmental Protection Agency, and the Coast Guard, two marine debris information offices were established to prepare and distribute information packets to educators, schoolchildren, the commercial fishing industry, recreational boaters, and others. To heighten public awareness, grants have been given to the Center for Marine Conservation since the mid-1980s to help organize annual national and international beach clean-up campaigns, which involve hundreds of thousands of volunteers. The Environmental Protection Agency continued to help support these clean-ups by providing approximately \$100,000 to the Center in 1996. With elimination of funding by the National Oceanic and Atmospheric Administration, Federal support for these programs was significantly reduced, and the Environmental Protection Agency was the principal Federal contributor in 1996.

To develop a statistical basis for assessing trends in the types and amounts of marine debris, the Environmental Protection Agency led an interagency working group to develop a national marine debris monitoring plan. The plan, completed in 1995, identifies sampling protocols and site-selection criteria for collecting and analyzing data on specific types of marine debris. To initiate data collection efforts, the Environmental Protection Agency provided \$100,000 in 1996 to begin monthly sampling at sites along the U.S. Gulf of Mexico, Puerto Rico, and the U.S. Virgin Islands. Sampling efforts began in April 1996 and are expected to be expanded to include the U.S. East Coast in 1997.

In addition, to help coordinate interagency activities related to Federal marine debris research and management, the Environmental Protection Agency convened a Federal Marine Debris Coordinating Committee. By letter of 21 June 1993, the Marine Mammal Commission had recommended that the Agency

convene such a group to (1) review ongoing and planned work by those agencies directly involved in resolving marine debris issues, (2) develop recommendations for cooperative studies among those agencies, and (3) establish an informal mechanism for improving coordination and cost efficiency of supported projects.

Recognizing that responsibility for addressing marine debris pollution involved many Federal agencies, and that an effective mechanism for coordinating support on related projects had not been established, the Environmental Protection Agency invited other Federal agencies involved in the marine debris issue, including the Marine Mammal Commission, to participate in a working-level meeting to discuss the formation of a marine debris coordinating committee. The meeting was held on 4 June 1996. Participants, in addition to representatives of the Environmental Protection Agency and the Commission, included officials from the Animal and Plant Health Inspection Service, the Coast Guard, the Food and Drug Administration, the Minerals Management Service, the National Oceanic and Atmospheric Administration, the National Park Service, the Navy, and the Office of Management and Budget.

During the meeting, participants discussed options and exchanged views on the structure, function, and role of a Federal marine debris coordinating committee, overall research and management priorities, and possible areas of cooperation. Among other things, participants expressed grave concern about the lack of funding for the National Oceanic and Atmospheric Administration's Marine Entanglement Research Program. There also was agreement that maintaining support for public outreach efforts was critical, that other priority actions needed to be defined more clearly, and that agency plans with regard to funding priority work needed to be reviewed early in the planning process.

While there was agreement that further meetings were needed to determine priority areas for cooperative support among agencies, agreement on specific terms of reference for the committee and a meeting schedule was not resolved. No further meetings were held in 1996 and, as of the end of the year, the future role of the Environmental Protection Agency in

convening a marine debris coordination committee was uncertain, given the above-noted Congressional directive that the National Oceanic and Atmospheric Administration convene a Marine Debris Coordinating Committee.

### **Navy Compliance with Annex V of the International Convention for the Prevention of Pollution from Ships**

As noted above, Annex V of the International Convention for the Prevention of Pollution from Ships establishes international standards for the disposal of ship-generated garbage. Among its principal features are a ban on at-sea discharges of all plastic wastes, discharge limits for at-sea disposal of other vessel-generated solid wastes, and the designation of "special areas" in which more stringent discharge restrictions apply. Within special areas, no garbage is to be discharged at sea except for ground-up food wastes that can pass through a 25-mm (one inch) mesh screen. The latter discharges are permitted in special areas if a ship is farther than 12 nautical miles from land. The Annex lists eight special areas: the Mediterranean Sea, the Black Sea, the Red Sea, the Persian Gulf/Gulf of Oman, the Wider Caribbean Sea, the North Sea, the Baltic Sea, and the Antarctic Ocean. Of these, only the last three were in effect as of the end of 1996.

Under the provisions of Annex V, compliance with discharge standards for solid wastes by government vessels, including military ships, is required only to the extent "reasonable and practicable." However, when Congress passed the Marine Plastic Pollution Research and Control Act of 1987 providing domestic authority to implement Annex V, it directed U.S. government ships, including Navy ships, to comply with all Annex V discharge provisions by 1993. In response, the Navy initiated efforts to reduce its discharges of garbage and began designing suitable garbage-processing equipment, such as pulpers and compactors for use aboard its ships. As part of this effort, Navy engineers also invented a thermal plastic processor to compress plastic wastes into sanitized blocks for easy storage aboard ship.

The Navy made significant progress toward meeting Annex V discharge requirements; however, it was unable to meet the 1993 compliance deadline. It advised Congress of the steps it had taken in a report, which noted that, while Navy ships could comply with discharge provisions outside special areas, compliance with special area requirements was problematic because of the limited space for storing garbage on military ships and because of long voyages away from port in listed special areas.

Based on the report, Congress extended the compliance deadline for Navy ships as part of its National Defense Authorization Act passed late in 1993. The Act directed the Navy to install its new plastic processor on all its larger ships and to comply with the Annex V prohibition on disposal of plastic wastes by 1998. With regard to discharge requirements in special areas, the act directed the Navy to work toward bringing its surface ships into full compliance by the end of 2000 and bringing its submarines into full compliance by the end of 2008. The act also directed the Navy to submit a report to Congress by November 1996 outlining its plans to meet these new deadlines.

To develop its compliance plan, the Navy promptly took several steps. It initiated a series of studies to assess (a) options for storing, processing, and transferring waste to shore, (b) the impact of solid-waste discharges from its new pulpers and shredders, and (c) other existing and potential onboard waste destruction technologies. To ensure a thorough review of all feasible options, the Navy also convened a panel of agency officials, technical experts, and other concerned parties to critique the results of its studies and its compliance plans. On 12 October 1995 the Navy announced plans to prepare an environmental impact statement on its shipboard solid waste management plans.

As noted in its previous annual report, the Commission was invited to participate on the panel, which met for the first time on 3 November 1995 to review results of the above-mentioned studies. On 22 November 1995 the Commission also commented to the Navy on approaches that should be considered in developing solid-waste management plans for Navy ships. The Commission commended the Navy for its

extensive efforts to investigate disposal options and to carry out research and development to improve shipboard garbage-processing equipment. It noted that, through technology transfer to other fleets of commercial and government ships, the Navy's extensive efforts to assess and improve garbage-processing equipment would have important benefits far beyond direct application to Navy ships. With respect to Navy plans for handling shipboard solid wastes, the Commission urged that it consider a combination of approaches for different classes of Navy ships using commercially available incinerators and steps to process, store, and off-load other solid wastes to shore.

The above-noted panel met a second and final time on 28 February 1996 to review the Navy's proposed approach. Based on the results of its studies, comments by panel members, and other information, the Navy completed a draft plan for compliance with Regulation 5 of Annex V of the MARPOL Convention and a draft environmental impact statement on disposal of U.S. Navy shipboard solid waste. Availability of the documents was announced in the *Federal Register* on 1 May 1996 and copies were forwarded to the Commission for review and comment.

In its draft plan, the Navy concluded that full compliance through installation of incinerators aboard large ships would be technologically feasible but that it would cost in excess of \$1 billion. Based on its studies of the effects of discharging pulped and shredded wastes, the Navy also concluded that, compared to full compliance, little if any additional environmental benefit would result if it were to adopt a far less costly plan involving use of pulpers and shredders. Therefore, to comply to the extent "reasonable and practicable," as required by the Annex V, the Navy proposed the following approach.

For all of its ships smaller than frigates, full compliance would be required. As these ships typically operate near shore and return to port every few days, the Navy concluded that eliminating all at-sea discharges of solid waste could be accomplished through source reduction and onboard storage. For frigate class and larger vessels, which will all have plastic processors installed by 1998, the Navy proposed installing pulpers and shredders by the year

2000 at an estimated cost of \$300 million. With this equipment, all plastic wastes would be processed and off-loaded to shore, food wastes and paper would be pulped and discharged as a slurry no closer than three nautical miles to shore, and glass and metal wastes would be shredded, bagged in burlap sacks, and thrown overboard at least 12 nautical miles from shore. Noting that these discharges would meet Annex V discharge restrictions outside special areas but exceed special area standards allowing only for disposal for ground-up food wastes, the Navy proposed that Congress amend the Act to Prevent Pollution from Ships to allow discharges of non-plastic, non-floating pulped and shredded materials by large Navy vessels in special areas. For this purpose, the Navy developed a proposed amendment to the U.S. Act to Prevent Pollution from Ships to allow such discharges.

On 12 June 1996 the Commission provided comments to the Navy on its draft plan and draft environmental impact statement. In its letter, the Commission expressed support for the Navy's proposed plan. It noted that most documented solid-waste impacts on large marine species involve entanglement and ingestion of plastics, and that processing and returning all plastics to shore, as proposed by the Navy, should therefore substantially reduce direct impacts on marine megafauna.

The Commission also noted, however, that studies of possible impacts from discharges of shredded glass and metal wastes were too limited to reach definitive conclusions about possible effects of small particles on small marine microfauna or benthic communities. Also noting that the draft documents indicate that the volume of glass and metal wastes generated aboard Navy ships constitute about one-third the volume of plastic wastes, and that recycling programs for glass and metal are generally well established, the Commission recommended that the Navy attempt to eliminate glass and metal discharges through shipboard processing and storage and return them to port for recycling.

To work toward further reducing discharges, the Commission also recommended that designs for Navy ships not yet built incorporate plans for additional solid waste storage, processing equipment for glass and metal, and incinerators for reduction of paper

wastes. In doing so, the Commission noted that high costs associated with reconfiguring space on existing ships to retrofit equipment and provide for waste storage would be avoided, and that the Navy could make further progress in reducing solid-waste discharges pending the development of more effective long-term technological solutions.

On 30 August 1996 the Navy circulated a final environmental impact statement on plans for disposing of shipboard solid waste from Navy ships and, as required, it submitted its plans for complying with Annex V provisions to Congress by November 1996. The Navy's proposed action was not changed from that described above, and a response to comments by the Commission and others was included in the final statement. With regard to recycling glass and metal wastes, the Navy noted that the cost of providing storage space for such wastes was estimated at \$200,000 to \$500,000 per ship and that wastes were generally food-contaminated and therefore posed health problems. It also noted that transport to shore would cause additional logistical problems and costs and that many ports did not have recycling programs. With respect to incorporating additional space for waste storage and processing equipment in designs of new Navy ships, the final statement noted that more space for storage and environmental protection systems would be included on future ships, and that the Navy would continue to monitor and evaluate technological developments in solid-waste processing equipment for installation on those vessels.

In September 1996 Congress enacted the Navy-sponsored amendment to allow certain ships to discharge pulped and shredded solid wastes in designated special areas. The amendment modified the Act to Prevent Pollution from Ships, which also addresses other requirements necessary to conform U.S. programs with provisions of the International Convention for the Prevention of Pollution from Ships. The Navy's plan currently calls for pulpers and shredders to be installed on all frigate-size and larger surface ships and for such ships to use their equipment for solid-waste disposal worldwide. Additional studies are being conducted to determine a long-term solid-waste management approach for submarines.

## Coast Guard Compliance with Annex V of the International Convention for the Prevention of Pollution from Ships

As noted above, when Congress passed the Marine Plastic Pollution Research and Control Act of 1987 providing domestic authority to implement Annex V, it directed that U.S. government ships comply with all Annex V discharge provisions by 1993. To meet its obligations under this directive, the Coast Guard has adopted a policy for storing all wastes not permitted for discharge. Like Navy ships, storage space aboard Coast Guard cutters is limited and also poses sanitation and safety problems. To address these problems, the Coast Guard reviewed alternative waste-handling approaches for use onboard its vessels.

On 26 November 1996 the Coast Guard published a *Federal Register* notice announcing the availability of an environmental assessment and a finding of no significant impact for a proposed action to install incinerators aboard certain classes of Coast Guard vessels larger than 65 feet in length. The assessment noted that air emissions from a prototype incinerator planned for use by the Coast Guard had been tested and found to be below emission standards established by the International Maritime Organization for shipboard incinerators and the Environmental Protection Agency for municipal incinerators.

## Effects of Chemical Contaminants

As noted in Chapter VI, there appears to have been an increase in the past 15 to 20 years in the incidence of unusual marine mammal mortality events. There also appears to have been an increase in unexplained marine mammal population declines such as the declines in northern fur seals, Steller sea lions, and harbor seals described in Chapter II and the section of Chapter V concerning the Bering Sea ecosystem. Likewise there appears to have been a general increase in the number of marine mammal strandings, both dead and alive, in some coastal areas. For example, the number of dead marine mammals found on beaches in the southeastern United States has doubled since the mid-1980s.

The cause or causes of many of the unusual marine mammal mortality events could not be documented with certainty. Likewise, what caused the death of many of the marine mammals found dead on beaches often is not documented, principally because no effort is made to do so or the animals are so badly decomposed that an assessment cannot be done.

In some cases, the apparent increases in both unusual mortality events and the frequency of live and dead marine mammal strandings may be due simply to increased monitoring of beaches and nearshore waters, and reporting of live- and dead-stranded animals and animals seen floating dead or behaving abnormally in nearshore waters. In other cases, the increases may be due to increasing marine mammal populations, increases in naturally occurring biotoxins or exposure to such toxins, and human-caused decreases or natural fluctuations in key prey species (*e.g.*, El Niño events in the eastern Pacific). Other increases may be due to evolution of virulent new disease agents and/or exposure of previously unexposed “naive” populations to existing disease agents. Some may be due to chronic exposure and accumulation of toxic levels of anthropogenic contaminants. Yet others may be due to a combination of factors.

High levels of anthropogenic contaminants were found in some of the bottlenose dolphins that died along the mid-Atlantic coast in the United States in 1987-1988. High levels of contaminants also were found in some of the harbor seals that died during the phocine distemper epizootic in the North Sea in 1988, and in many of the striped dolphins that died during the morbillivirus epizootic in the Mediterranean Sea in 1990-1992. Further, high levels of contaminants, including heavy metals, have been found in pinnipeds and cetaceans in many other parts of the world — *e.g.*, beluga whales in Canada’s St. Lawrence River, harbor seals in the Baltic Sea, and small cetaceans from both the east and west coasts of South Africa.

Anthropogenic contaminants may have both acute lethal effects and sub-lethal effects. Sub-lethal effects may include suppression of the immune system, making animals more vulnerable to viral, bacterial, fungal, and parasitic infections; disruption of endocrine functions and corresponding decreases in longevity and reproduction; and errors in DNA replication

and cell division (mutagenesis) that can cause birth defects, cancers, and other life-threatening problems. In cases where marine mammals are eaten by humans, as in Alaska, contaminants in the marine mammals may be conveyed to, and have significant adverse effects on, the humans who eat them.

Many agencies and organizations in the United States and other countries have initiated efforts to assess and minimize threats posed by anthropogenic contaminants. As noted in Chapter V, for example, the United States and the seven other countries with territory in the Arctic have cooperatively initiated a program to assess and monitor the sources, fates, and effects of anthropogenic contaminants in the Arctic.

It is not clear whether everything that reasonably could be done is being done to determine and minimize or mitigate the effects of anthropogenic contaminants on marine mammals and the ecosystems of which they are a part. Likewise, it is not clear whether consideration has been given to the possibility that certain marine mammals might be good indicators of the presence and levels of contaminants in coastal marine ecosystems and, if so, what is being done to develop useful and appropriate monitoring programs. Therefore, in 1996 the Marine Mammal Commission (1) compiled a partial bibliography of publications concerning anthropogenic contaminants in the marine environment and their effects on marine mammals (see Appendix C, Kirk and Vanderhye 1996); and (2) began planning workshops to identify and determine how best to resolve critical uncertainties concerning anthropogenic contaminants that may be adversely affecting marine mammals and the ecosystems of which they are a part. The Commission also initiated consultations with the National Marine Fisheries Service, the Environmental Protection Agency, and other organizations to seek funding and to determine how best to structure the workshops. The first of these workshops is expected to be held in 1997.

### Effects of Noise

Many species of marine mammals use sound to communicate, navigate, and capture prey. Sperm whales, for example, dive to ocean depths of more

than a mile where no light penetrates, and produce and apparently use different types of sound to communicate their locations to one another, to determine their distance from the bottom, and to capture prey in total darkness.

Both natural and manmade sounds may interfere with these and other vital functions. If the disruption is particularly acute or occurs continuously or frequently, it may cause animals to abandon important feeding, breeding, or resting areas or migratory routes. This in turn may make the animals more vulnerable to starvation, reproductive failure, predation, and disease. Annoying or aversive sounds also may cause some species to avoid preferred habitats and concentrate in undisturbed areas, which in turn may result in crowding, overexploited food resources, increased mortality, and decreased productivity. Certain sounds also may cause physiological and psychological stress and make animals more vulnerable to parasites, diseases, and predation. Sounds also may attract animals and make them more vulnerable to hunting, harassment, and collisions with boats, or alter the distribution, density, movements, or behavior of important prey species, making it more difficult for marine mammals to capture suitable prey. Further, high-intensity sounds and pressure waves, such as those produced by underwater explosions, can cause temporary or permanent hearing loss and, in some circumstances, injure or kill marine mammals.

How sounds affect marine mammals depends on a number of variables. They include the nature and intensity (loudness) of the sound itself, and such things as the species, age, sex, reproductive status, activity, and previous experience of the animals exposed to the sound. For example, blue whales and other baleen whales that apparently use low-frequency sounds for long-distance communication presumably are more likely to be affected by low-frequency sounds from anthropogenic sources than species that do not use low-frequency sounds.

In some species, distribution, diet and behavior — and thus both exposure and sensitivity to sound — may differ between sexes and between age groups. For example, female fur seals that pup and breed on the Pribilof Islands migrate to waters off central California during the winter, non-breeding season,

while most adult males migrate only as far south as the Gulf of Alaska. Further, pups and possibly yearlings are not able to dive as deep or as long as adults; they may therefore have a more restricted diet and be affected more by sound-caused changes in prey availability. Also, pregnant females and females with dependent young may have habitat-use patterns, food preferences, feeding behaviors, and response thresholds that make them more or less sensitive to anthropogenic sounds than juveniles, males, or females that are not pregnant or nursing.

In some cases, responses to certain types of sound may be accentuated or dampened by prior exposure to that sound. If a sound causes pain or is associated with a painful experience (*e.g.*, hearing and then being hit by a boat), exposure to that sound may evoke a greater response in an “experienced” animal than in a “naive” animal. Conversely, if the sound is startling because it is unusual, repeated exposure may evoke less and less response — *i.e.*, the animal may become so used to the sound that the response is extinguished.

Responses to sound also may vary depending upon the environment. Responses may differ, for example, in deep water versus shallow water, in murky water versus clear water, in embayments versus the open ocean, *etc.* In some cases, the differences may be due to differences in ambient noise levels, which in turn are affected by wind, weather, the presence of ice, and other variables. In other cases, the difference may be related to the animal itself — *e.g.*, an animal in an unfamiliar environment may respond to a sound differently than it would in a familiar environment. Similarly, response to certain sounds may depend on the activity in which the animal was involved when it was exposed to the sound. For example, some species and individuals may be nearly oblivious to external stimuli when engaged in activities such as courtship, while other species and individuals may be particularly sensitive to disturbance when engaged in such activities.

There is growing recognition that sounds from various anthropogenic sources could be having adverse effects on certain species and populations of marine mammals. There also is growing recognition, as discussed below, that certain types of sound can be

used to help elucidate the structure and dynamics of ocean water masses and how ocean processes affect and reflect weather and climate. In addition, there is growing recognition, also discussed below, that certain types of sound might be used to keep marine mammals away from areas where they may be hit by ships or become entangled in fishing gear.

Available information often is insufficient to identify and make reasoned judgments about the relative costs and benefits of human activities that use or produce sounds that could affect marine mammals and other inhabitants of the world’s oceans. The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, reviews sound-producing activities that may adversely affect marine mammals or the ecosystems of which they are a part, and provides recommendations to the responsible regulatory agencies on measures needed to ensure that the activities do not have significant adverse effects on marine mammals. The Commission’s recommendations with regard to requests for authorization to take small numbers of marine mammals incidental to seismic exploration and other activities associated with offshore oil and gas development are described in Chapter VIII. Commission recommendations regarding requests for authorization to take small numbers of marine mammals incidental to oceanographic research and vehicle launches from Vandenberg Air Force Base in California are described in Chapter X. Commission reviews and recommendations concerning other sound-producing activities that could adversely affect marine mammals are described below.

### **Acoustic Thermometry of Ocean Climate Program**

As noted in previous Commission reports, oceanographers from the United States and other countries conducted an experiment in 1991 to determine if measuring the transmission time of low-frequency sounds across ocean basins could be used to detect changes in ocean temperature possibly indicative of global warming. The experiment, referred to as the Heard Island Feasibility Test, was successful, and in 1993 the Defense Department’s Advanced Research Projects Agency provided funding to the Scripps Institution of Oceanography for a follow-up proof-of-

concept study. This study, titled the Acoustic Thermometry of Ocean Climate (ATOC) Program, called for installing 260-watt, low-frequency sound generators in deep water 15 km off Hanea Point on the Island of Kauai, Hawaii, and 40 km off Point Sur, California.

Available information was insufficient to determine how the ATOC sound transmissions might affect marine mammals. Consequently, a marine mammal research program was included as part of the program. An advisory board, composed of five scientists not associated with the program, was established to provide advice on the study design. The Marine Mammal Commission was asked and agreed to have a staff member serve as an *ex officio* member of the advisory board.

The study design recommended by the advisory board involved (1) collection of baseline information on the species and numbers of marine mammals present in areas where they reasonably might be expected to be affected by sound transmissions from the two ATOC sound sources; and (2) operation of the sources, in conjunction with marine mammal surveys and behavioral observations, to experimentally determine whether the sound transmissions affect the distribution or behavior of marine mammals in the vicinity. The research involved possible taking of marine mammals in waters off both Hawaii and California and required scientific research permits under both the Marine Mammal Protection Act and the Endangered Species Act. As noted in the Commission's two previous annual reports, several scientists, environmental groups, and legislators called for public hearings on the permit applications. In response, the National Marine Fisheries Service held a series of public hearings in the spring of 1994. Individuals attending the hearings questioned whether the proposed marine mammal studies would resolve the uncertainties concerning the possible effects of the ATOC program on marine mammals and other marine organisms. They questioned whether information sufficient to resolve the uncertainties could be gathered before routine operation of the sound sources was scheduled to begin. They also questioned whether the planned placement of a sound source on Sur Ridge, within the Monterey Bay National Marine Sanctuary in California, was consistent with either the

sanctuary's objectives or California's Coastal Zone Management Program. They called for revision and expansion of the proposed marine mammal research program and preparation of environmental impact statements to ensure identification and objective evaluation of the possible environmental impacts of the planned ATOC sound transmissions in both Hawaii and California.

In response to the concerns expressed, the Advanced Research Projects Agency prepared environmental impact statements for both the California and Hawaii components of the ATOC program. Draft statements were made available for public review and comment in December 1994. The Commission provided comments on the drafts by letters of 27 January and 9 March 1995.

**The California Research Program** — As noted in the Commission's previous annual report, the National Ocean Service, part of the National Oceanic and Atmospheric Administration, advised the project sponsors by letter of 6 February 1995 that the Service had concluded it was not "appropriate to locate the [California] ATOC sound source — and thus the zone of greatest ecological risk and uncertainty — within the Monterey Bay National Marine Sanctuary." It urged the Advanced Research Projects Agency and Scripps Institution of Oceanography to select one of two alternate sites identified in the draft environmental impact statement on the California component of the ATOC program.

Following receipt of the National Ocean Service's comments, project personnel decided to switch the location of the planned California sound source from Sur Ridge to the Pioneer Seamount, approximately 89 km southwest of San Francisco. The switch necessitated changes in the design of the marine mammal research program and revision of the environmental impact statement.

The research design was amended, taking into account recommendations provided by the advisory board, and was forwarded to the National Marine Fisheries Service in May 1995 as part of a revised application for scientific research permits under the Marine Mammal Protection Act and the Endangered Species Act. The Sierra Club Legal Defense Fund

and several other environmental groups questioned whether the revised research program would resolve the uncertainties concerning the possible effects of the California ATOC program on marine mammals and other biota. Representatives of these groups met with representatives of the University of California (representing Scripps Institution of Oceanography and the ATOC project) several times in April and May 1995 to identify and determine how questions concerning the adequacy of the planned California marine mammal research program might be resolved.

The discussions led to an agreement signed on 2 June 1995 by representatives of the University of California and by representatives of the Sierra Club Legal Defense Fund, the Natural Resources Defense Council, the Environmental Defense Fund, Earth Island Institute, the Humane Society of the United States, and the American Oceans Campaign. Among other things, the parties agreed that the marine mammal research program in California would be continued through the entire 18-24-month proof-of-concept study; control of the sound source would remain with the personnel conducting the marine mammal research program throughout the proof-of-concept study; and two additional members and two additional observers would be appointed to the marine mammal research program advisory board from individuals nominated by the environmental organizations.

Installation of the California sound source began on 27 October 1995. During installation, a series of tests were done to determine whether the power output was within the specified performance standards. The tests were done before the scheduled 9 November 1995 beginning of the marine mammal research program and were not under the control of the program personnel, as specified in the 2 June 1995 agreement.

As noted in the Commission's previous annual report, a dead humpback whale was observed floating near Stinson Beach, California, on 3 November 1995. The carcass washed ashore the next day and was buried to prevent a public health hazard. The cause of death was not evident from external examination and a necropsy was not performed. Two more dead humpback whales were seen floating off the Farallon Islands on 8 and 9 November 1995.

Because of the concurrence with the installation tests of the ATOC transmitter on Pioneer Seamount, several of the environmental groups that had signed the 2 June 1995 agreement questioned whether the humpback whales could have been killed by the test transmissions. The advisory board reviewed available information concerning the sightings and condition of the dead humpback whales and the engineering tests, and concluded that it was unlikely that the test transmissions were responsible for the deaths.

The advisory board's conclusion was conveyed to the leader of the ATOC marine mammal research program by letter of 30 November 1995. In addition to conveying the conclusion that the deaths of the whales were not caused by the test transmissions, the letter indicated the board's belief that there had been a breakdown in communication between the engineers and oceanographers who were installing and testing the sound source and the researchers responsible for designing and carrying out the marine mammal research program. The board recommended that all future ATOC transmissions during the 18-24 month experimental period, including any future test transmissions, be either under the control, or with the full knowledge and documented advance concurrence, of the scientists responsible for the marine mammal research program.

The board also recommended that the National Marine Fisheries Service authorize resumption of experimental sound transmissions which had been suspended during the investigation of the humpback whale mortalities. The Service authorized resumption of experimental transmissions on 30 November 1995. These transmissions, which are a component of the marine mammal research program, were resumed on 2-3 December 1995.

The California marine mammal research program includes (1) aerial surveys of the area around the ATOC sound source on Pioneer Seamount — before and during or immediately following periods of experimental sound transmissions — to determine if there are observable differences in the species, distribution, numbers, movements, or other behavior of marine mammals present in the area during periods when the sound source is and is not operating; (2) boat-based observations and photo-identification

studies to determine whether the movements or other behavior of individual marine mammals are affected in detectable ways by the sound transmissions; (3) recording and comparison of cetacean vocalizations — before and after sound transmissions — to determine if there are transmission-associated differences in vocalization types or rates; and (4) experiments to determine whether the general migratory paths and dive patterns of northern elephant seals are affected in detectable ways by the ATOC sound transmissions. The latter study involves capturing and attaching satellite-linked radio tags and recoverable data loggers to representative elephant seals, and releasing the instrumented seals in areas where they are likely to swim past the Pioneer Seamount on their way to and from pupping/breeding colonies on Año Nuevo Island. The satellite-linked radio tags provide at-sea position fixes, accurate to within 1-2 km, each time the ARGOS satellite passes over radio-tagged seals that are at the surface with the radio-tag antenna out of the water (generally once or twice a day). The data loggers record data on swimming speed and direction, depth and frequency of dives, and sounds (ATOC transmissions, ship noises, *etc.*) to which the animals are exposed.

Progress reports on the marine mammal research program are provided bimonthly to the National Marine Fisheries Service, the research program advisory board, and other interested parties. Although not complete, analysis of the data collected to date indicates that the experimental ATOC transmissions have not had detectable effects on the species, distribution, numbers, or movements of marine mammals in the vicinity of the Pioneer Seamount. Final analysis using more powerful statistical techniques may find transmission-associated differences in these variables.

*[The bimonthly progress reports and other information concerning the ATOC program can be obtained from the ATOC Project Office, Scripps Institution of Oceanography, La Jolla, California 92093.]*

**The Alternate Source Test** — Preliminary analysis of the acoustic data from the California ATOC test transmissions suggested that a lower frequency sound might be transmitted more effectively over long distances, and both improve the likelihood of being

able to detect climate-related changes in ocean temperature and reduce the time that the sound source would have to be operated to do so. To evaluate this possibility, the oceanographers involved in the project proposed testing an alternate sound source, with the same total power output as the Pioneer Seamount source (195 dB), but with a frequency band centered at approximately 25 Hz as well as a frequency band centered at approximately 75 Hz (the center frequency of the Pioneer Seamount source).

Recognizing that the alternate source test could result in the taking of marine mammals, the ATOC principal investigator requested that the National Marine Fisheries Service modify the scientific research permit to authorize the possible taking of marine mammals incidental to the alternate source test. The permit modification request indicated that the alternate source test would be carried out in late June or early July 1996, that operation of the fixed sound source at Pioneer Seamount would be suspended during the alternate source test, and that the alternate source would be operated from a ship approximately 10 nm (18 km) southwest of the Pioneer Seamount.

The National Marine Fisheries Service requested that the advisory board be consulted to determine its views concerning the proposed alternate source test. Members of the board and the advisory board observers, including the Marine Mammal Commission's Scientific Program Director, discussed the pros and cons of the proposal via conference calls held on 6 February and 5 March 1996. Many members of the board were concerned that (1) assessing the possible effects of the alternate source test on marine mammals would require switching the focus of the on-going marine mammal research program from the Pioneer Seamount area to the area where the alternate source test would be conducted; (2) both the test itself and the shift in research focus during the test period might compromise collection and interpretation of data concerning the possible effects of transmissions from the Pioneer Seamount source; (3) it would be difficult, if not impossible, to distinguish the effects of the alternate source transmissions on marine mammals from the effects of the noise from the ship; and (4) while the alternate source test might provide sufficient information to determine whether the climate-related

objectives of the ATOC project might be better met by a 25-Hz signal, the available baseline information was insufficient and the test would be too short to provide any useful information concerning the possible effects, or lack thereof, of the lower frequency transmissions on marine mammals.

The views of the advisory board were conveyed to the National Marine Fisheries Service and others in a statement dated 14 March 1996. Among other things, the statement indicated that (1) the board had always believed it would be difficult, with the time and resources available, to obtain sufficient data to test hypotheses concerning the effects of the 75-Hz ATOC source on marine mammals in the Pioneer Seamount area; (2) the delay in beginning the marine mammal studies in the Pioneer Seamount area heightened this concern; and (3) the board was unanimously and strongly of the opinion that there should be no further reduction in the number of replicate on/off cycles of the Pioneer Seamount sound source conducted and observed under the marine mammal research program. The statement also indicated that, while the alternate source test was not likely to provide sufficient information to determine whether a 25-Hz signal would have less effect on marine mammals than a 75-Hz signal, some members of the board believed that the test might provide some useful information, and would be worth doing if it in no way compromised the scope or outcome of the Pioneer Seamount studies. The board advised that use of program resources and observation opportunities for the alternate source test would be justifiable only if there were firm commitments for compensatory financing and extension of the marine mammal research program beyond the then-current funding period (30 September 1996).

The ATOC principal investigator subsequently was able to provide assurance that resources and observation opportunities used for the alternate source test would be made up both financially and by extending the period of performance for the Pioneer Seamount studies. On 14 June 1996 the National Marine Fisheries Service issued the requested permit modification. The alternate source tests were conducted from 30 June to 8 July 1996. A total of 42 transmissions were made. The signals were received up to 5,000 miles away.

Few marine mammals were seen in the vicinity of the ship before, during, or after the experimental sound transmissions. As expected, the observations provided no indication as to whether the 25-Hz signal would have less or more effect on any species of marine mammal than the 75-Hz signal.

#### **The Hawaii Marine Mammal Research Program**

— This program was initiated in 1993. It includes (1) systematic observation of humpback whales from two high vantage points on the north shore of Kauai; (2) periodic aerial and boat surveys and observations of whales and other marine mammals in the area where the Kauai sound source is to be located; and (3) playback of ATOC-like sounds to humpback whales off the Kohala coast of the Island of Hawaii. The shore-based observations are intended to provide baseline information on the distribution, abundance, movements, and other behavior patterns of humpback whales during the winter months when humpback whales are present in Hawaiian waters. The aerial and boat surveys are intended to provide similar baseline information from the area around the future ATOC sound source that cannot be observed from shore. If the program is continued, comparable studies will be done after the sound source is installed to determine if there are detectable changes in distribution, abundance, movements, or other behavior patterns associated with operation of the source. The sound playback experiments are intended to provide an indication of the type of response that might occur and how subsequent experiments using the actual ATOC sound source should be designed to best answer the questions concerning the possible effects of the ATOC program on marine mammals.

As noted in the Commission's previous annual report, by the end of 1995 the State of Hawaii had not issued the permits necessary to allow installation of the ATOC sound source off Kauai. The required permits were issued in 1996. Installation was scheduled to be done in October before humpback whales began to return to the islands. Both visual and acoustic monitoring of marine mammals were planned to be done during the installation. It was expected that the installation would be completed in time to conduct experimental transmissions during the winter months (December-March) when humpback whales are present in Hawaiian waters.

A meeting of the ATOC marine mammal research program advisory board was held in La Jolla, California, on 29-30 September 1996. The purposes of this meeting were to review the results of studies that have been done and to provide advice on tentative plans for follow-up studies. With regard to the Kauai sound source installation, the board noted the concerns and delays that had followed the sightings of dead humpback whales after the installation testing of the ATOC sound source on the Pioneer Seamount. It recommended that (1) the National Marine Fisheries Service be consulted to help develop a plan, utilizing the regional marine mammal stranding network, for responding to reports of dead marine mammals in areas and at times that the animals could have been exposed to ATOC test transmissions; and (2) that aerial reconnaissance of the area around the Kauai source be done during and after installation to verify, insofar as possible, that no marine mammals were killed or injured by the test transmissions.

Although attempted, the Kauai sound source was not successfully installed in October as planned. At the end of 1996 the Commission understood that another attempt likely would be made to install the sound source sometime in 1997.

### **Acoustic Deterrence of Harmful Marine Mammal-Fishery Interactions**

Many species of marine mammals interact with commercial fisheries and aquaculture operations in ways that kill and injure marine mammals and cause loss and damage of fishing gear and fish catch. Much time and money have been spent investigating possible ways to prevent or reduce such harmful interactions. Because many marine mammals are known to use sound to communicate, navigate, and capture prey, many of the experiments have involved use of sound reflectors and sound generators to try to make marine mammals aware of, and to avoid, fishing gear and aquaculture operations.

The results of the experiments have been inconclusive, possibly due to insufficient sample sizes and poor study design. Therefore, in October 1995 the National Marine Fisheries Service provided funds to the Commission to organize and hold a workshop to

assess and identify critical uncertainties concerning the effectiveness and possible side effects of acoustic devices that have been and might be used to minimize the adverse impacts of marine mammal-fishery interactions. The workshop was held in Seattle, Washington, on 20-22 March 1996. Participants included representatives of the fishing industry, the environmental community, and manufacturers of acoustic deterrence devices, staff members from the National Marine Fisheries Service and corresponding government agencies in Canada and Australia, and scientists with relevant expertise from seven countries and 21 academic and private institutions.

Among other things, the workshop participants concluded that experiments conducted in the Gulf of Maine in the fall of 1994 and 1995 and off northern Washington in the summer of 1995 had demonstrated that attaching small, low-intensity sound generators (pingers) to sink gillnets may substantially reduce the number of harbor porpoises caught incidentally in sink gillnet fisheries. Given the experimental results, the participants also concluded that it would be appropriate to proceed with the full-scale integration of pingers into the management regime for the New England sink gillnet fishery and to experimentally assess the potential utility of pingers in other gillnet fisheries in which the bycatch of harbor porpoises and other cetaceans is a concern, provided the regimes include (1) observer programs adequate to verify that the marine mammal bycatch does not increase over time, and (2) monitoring programs adequate to verify that neither the target marine mammals nor any non-target species are affected adversely.

The workshop participants pointed out that it is not known why pingers apparently prevent the bycatch of harbor porpoises, at least in some circumstances. They noted that the possibilities include (a) harbor porpoises simply avoid unfamiliar sounds; (b) unfamiliar sounds cause harbor porpoises to begin echolocating or to change the rate or focus of their echolocation pulses, allowing them to detect and avoid gillnets; and (c) the sound produced by the pingers causes key harbor porpoise prey species, such as herring, to leave or avoid the areas, thus reducing the possibility that harbor porpoises will enter these areas. The participants also pointed out that, if harbor porpoises are simply avoiding or responding to an

unfamiliar sound, they may stop doing so if they are exposed to the sound repeatedly and the sound becomes familiar. Thus, the apparent reduction in harbor porpoise bycatch associated with pinger use could be a short-lived phenomenon unless something is done to prevent the sound from becoming familiar. Although the cause is unknown, higher than anticipated numbers of harbor porpoises were caught in experimental pinger fisheries in Massachusetts Bay and on Jeffreys Ledge in spring 1996 following the workshop.

Because of the possibility of habituation, the workshop participants recommended, as noted earlier, that integration of pingers into fishery management regimes should be accompanied by observer programs adequate to verify that the apparent effectiveness of pingers in reducing harbor porpoise bycatch does not decrease over time. They also recommended that studies be done to determine why the sounds produced by pingers prevent or substantially reduce the bycatch of harbor porpoises and whether pinger use displaces harbor porpoises from essential habitats or has other adverse effects on either harbor porpoises or other species (*e.g.*, commercially important fish species such as herring).

The workshop participants also noted that high-intensity sound generators are being used in the United States and elsewhere to try to keep seals and sea lions away from areas where commercially valuable fish aggregate during annual migrations, and from aquaculture facilities in which salmonids are being raised. The current generation of these devices, commonly referred to as acoustic harassment devices or AHDs, appear to work because they produce sounds that are painful or frightening to pinnipeds that come near them. The workshop participants concluded that such high-intensity acoustic harassment devices also might be tested to determine if they could prevent or reduce other marine mammal-fishery problems — *e.g.*, to keep seals and sea lions away from drift gillnets and other types of fishing gear and from areas where wild salmonids aggregate because of natural and human-constructed impediments to in- and out-migration in river systems.

It has not been documented whether and, if so, at what distances, the sounds produced by acoustic

harassment devices cause pain. It also is not known whether seals and sea lions will approach operating acoustic harassment devices close enough to have their hearing damaged, either temporarily or permanently. Also, it is not known whether the sound produced by these devices will affect other species adversely.

Because of the risks and the uncertainties concerning possible adverse effects on both target and non-target species, the workshop participants concluded that (a) use of high-intensity acoustic harassment devices should be considered only when other less potentially aversive measures — *e.g.*, locating fish farms away from pinniped rookeries and constructing physical barriers to keep seals and sea lions away from fish pens — have been tried and found to be inadequate; (b) studies should be done both to verify the effectiveness of the acoustic harassment devices and to assess the risks to both target and non-target species; and (c) until the risks have been assessed and determined negligible, some form of licensing or prior authorization should be required for operational as well as experimental use of high-output devices that reasonably may be expected to harm either target or non-target species.

With regard to the last point, the participants noted that it might be possible in some situations to use aversive sounds to condition animals to respond to benign warning sounds, thus allowing the aversive sound to be used only occasionally to prevent the conditioned response from being extinguished. They pointed out that it would be desirable to conduct studies to determine whether sound might be used to condition seals, sea lions, and other marine mammals to avoid aquaculture facilities and other areas where they may harm or be harmed by fishery operations. Participants also pointed out that conditioning experiments must be designed and carried out carefully to avoid conditioning animals not to respond or to respond inappropriately to the warning sounds.

The Commission forwarded the workshop report to the National Marine Fisheries Service on 11 October 1996. Copies of the report are available from the Service (see Appendix C, Reeves *et al.*, 1996).

## Shock Testing the SEAWOLF Submarine

The National Defense Authorization Act requires that the hulls and other critical components of ships and submarines constructed for the Navy undergo shock tests prior to service with the fleet. The purpose of the tests is to evaluate the structural and electronic systems that are vital to the overall function and performance of the vessel and crew under combat conditions. To approximate combat conditions, shock tests are conducted by exploding charges of various sizes near representatives of all new classes of vessels and evaluating the effects on the hull and other critical vessel components.

In June 1996 the Navy issued for public review and comment a draft environmental impact statement for shock testing the SEAWOLF submarine. The draft impact statement indicated that the tests would be done offshore either Mayport, Florida, or Norfolk, Virginia, and would involve a series of 4,536-kg (10,000-lb.) explosive charge detonations sometime between 1 April and 30 September 1997. It indicated that visual and acoustic surveys would be carried out before each test to ensure, insofar as possible, that no marine mammals are present in the area where they could be affected adversely by the tests. The area around the test site would be searched methodically for 48 hours following each test to determine, insofar as possible, whether any marine mammals were killed or injured. It indicated that the area off Florida was the preferred location for the test, principally because the number of marine mammals likely to be present there was estimated to be about eight times less than in the area off Virginia.

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, reviewed the draft impact statement and provided comments to the Navy by letter of 12 August 1996. The Commission concurred that, given the planned mitigation measures, the shock tests were unlikely to have significant adverse effects on any species or population of marine mammal. The Commission also concurred that fewer marine mammals likely would be affected if the tests were done off Florida rather than off Virginia, provided the tests were not begun earlier than 1 May when right whales might be present in the area.

The Commission pointed out that some of the assumptions and methods used to estimate how and how many marine mammals might be affected by the tests were not described in sufficient detail to judge their validity. For example, the Commission pointed out that the draft impact statement concluded, but did not provide convincing justification, that sounds produced by the explosions could startle and otherwise affect the behavior of marine mammals far from the test site but, because the sounds would not be long-lasting, “no lasting impact on movements, migration patterns, breathing, nursing, breeding, feeding, or other normal behaviors would be expected.” The Commission pointed out a number of ways that the impact statement could be strengthened.

The Navy also submitted a request to the National Marine Fisheries Service in June 1996 for authorization, pursuant to section 101(a)(5)(A) of the Marine Mammal Protection Act, to take small numbers of marine mammals incidental to the required shock testing of the SEAWOLF submarine. The Commission, in consultation with its Committee of Scientific Advisors, reviewed this request and provided comments to the Service by letter of 16 September 1996. The Commission’s comments on this request are described in Chapter X.

## Low-Frequency Active Sonar

On 18 July 1996 the Department of the Navy published in the *Federal Register* a notice of intent to prepare environmental impact statements for employment of surveillance towed array sonar system (SURTASS) low-frequency active (LFA) sonar. The notice indicated that the sonar system employs low-frequency sound propagation (<1000 Hz) to detect objects on and under the sea and that the Navy proposed to make the system available to fleet commanders for “worldwide employment to enhance antisubmarine capabilities.” The *Federal Register* notice requested information and views concerning issues that should be addressed in the environmental impact statements.

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, responded to the Navy’s request by letter of 4 September 1996. The Commission pointed out that the *Federal Register*

notice made no mention of the provisions of the Marine Mammal Protection Act prohibiting taking of marine mammals incidental to activities, such as the proposed employment of the low-frequency active sonar system, without appropriate authorization. The Commission also noted that the notice did not indicate the sound output level of the system, the depth or depths at which sounds would be propagated, or how often or for what lengths of time the system is expected to be used. In this context, the Commission pointed out that both the effects on marine mammals and the number of animals affected will depend, in part, on the intensity and other characteristics of the sounds produced by the system, and when, where, how, and how often and for what lengths of time the system is used.

The Commission also pointed out that, if the LFA sonar system is made available for use worldwide as proposed, all species and populations of marine mammals possibly could be affected. Further, the Commission pointed out that, depending upon the variables noted earlier, the possible effects could include:

- death from lung hemorrhage or other tissue trauma;
- temporary or permanent hearing loss or impairment;
- disruption of feeding, breeding, nursing, acoustic communication and sensing, or other vital behavior and, if the disruption is severe, frequent, or long-lasting, possible decreases both in individual survival and productivity and in population size and productivity;
- annoyance and subsequent abandonment or avoidance of traditional feeding, breeding, or other biologically important habitats and, if suitable alternative habitats are not available nearby, decreases both in individual survival and productivity and in population size and productivity;
- psychological and physiological stress, making animals more vulnerable to disease, parasites, and predation; and
- changes in the distribution, abundance, or productivity of important marine mammal prey species and subsequent decreases both in individual marine mammal survival and productivity and in population size and productivity.

With regard to the last point, the Commission pointed out that changes in the distribution, abundance, or productivity of important marine mammal prey species might be caused both directly and indirectly by the LFA sonar transmissions. Transmissions could, for example, kill or impair development of the eggs and larval forms of certain important marine mammal prey species. They also might disrupt feeding, spawning, and other vital functions or cause shifts in distribution patterns of certain important marine mammal prey species, and make some prey species more vulnerable to disease, parasites, and being eaten by other non-mammalian predators.

The Commission concurred that many of the possible adverse effects on marine mammals possibly could be avoided or minimized by combinations of measures, such as detection and avoidance of particularly sensitive species and areas, as noted in the *Federal Register* notice. In this regard, the Commission indicated that careful examination of the natural history and the demography of the marine mammal species likely to occur in and near areas where the LFA sonar may be employed would help to identify measures that could be taken to prevent or minimize possible adverse effects.

With regard to the last point, the Commission noted that, in some cases, available information may be insufficient to make reasoned judgments concerning possible adverse effects. For example, if the hearing range and thresholds of a potentially affected species are unknown, it would not be possible, except by analogy with similar species whose hearing ability is known, to reasonably determine the distances at which the species may be able to detect and possibly be affected by the LFA sonar transmissions. The Commission advised that the environmental impact statements should clearly identify any uncertainties and any assumptions concerning the possible impacts of the proposed action and the alternative actions on marine mammals and other biota.

Finally, the Commission noted that, if there are significant uncertainties, the most reasonable way forward may be to phase in and structure the initial deployment of the LFA sonar system so as to (1) minimize the risk of possible large-scale, long-term adverse effects; and (2) help obtain the information

needed to resolve the uncertainties. That is, to use the system initially only in areas where there is good information on the natural history and demography of the marine mammals and other biota that could be affected, while conducting monitoring programs designed to resolve the uncertainties and to detect possible unforeseen effects early enough to stop or modify operations before the effects reach unacceptable levels.

### **Recommended Consultations with Relevant Experts**

It is clear from the previously noted documents that available information often is insufficient to judge, *a priori*, whether and at what distances underwater explosions and sounds from various anthropogenic sources will kill, injure, or adversely affect the vital behavior of different species and age/size classes of marine mammals. Likewise, existing marine mammal and habitat monitoring programs generally are insufficient to detect mortalities, injuries, and behavioral disruptions or changes caused by underwater explosions and sounds from various anthropogenic sources, either independently or cumulatively. Further, there currently are no standard protocols for measuring or reporting the levels and other characteristics of underwater explosions and sounds that directly or indirectly affect marine mammals adversely. Consequently, it often is not clear —

- what sound-producing human activities are likely to result in taking of marine mammals and thus require authorization under the Marine Mammal Protection Act;
- what taking authorization is required by, and can be provided under, the Act (*e.g.*, scientific research permits, waiver of the moratorium on taking, incidental small-take authorizations);
- what terms and conditions for reporting and monitoring should be included in small-take authorizations, *etc.* to verify that marine mammals are taken only in the ways and in the numbers authorized; and
- how possible cumulative and synergistic effects can be assessed and addressed.

By letter of 6 December 1996 the Commission, in consultation with its Committee of Scientific Advisors, advised the National Marine Fisheries Service that, to identify and determine how the most critical uncertainties might best be resolved, it would be desirable to consult experts in matters such as (1) the propagation, measurement, and modeling of sound transmissions in water and in air; (2) data, standards, and methods used to assess the effects of different types and levels of sound on humans; (3) the natural history, habitat requirements, and critical habitats of various classes of marine mammals; (4) the types of sounds produced and used by different species and age/size classes of marine mammals to communicate, navigate, sense their environment, and locate and capture prey; (5) the sources and characteristics of underwater explosions and anthropogenic sounds that could kill, injure, or disrupt vital behavior of different species and age/size classes of marine mammals; and (6) assessment of risks, particularly those involving possible cumulative and synergistic effects.

The Commission noted that such consultations might best be accomplished in a well-designed workshop. To illustrate this point, the Commission provided possible terms of reference for a workshop on assessing the effects of anthropogenic sounds on marine mammals. The Commission recommended that the Service take such steps as necessary to organize and convene such a workshop as soon as possible. Further, the Commission recommended that a small steering group be constituted to guide organization of the workshop, identify possible participants and the optimal mix of participants, and help identify and compile relevant background information.

In partial response to the Commission's recommendations, the National Marine Fisheries Service proposed establishing an interagency working group — comprised of representatives of the Service, the Commission, the Navy, the Minerals Management Service, and the Coast Guard — to consider ways that the agencies might work together to resolve the aforementioned uncertainties most cost-effectively. The working group is expected to meet early in 1997.

## Chapter VIII

# OUTER CONTINENTAL SHELF OIL AND GAS EXPLORATION AND DEVELOPMENT

Exploration and development of coastal and offshore oil, gas, and hard mineral resources may adversely affect marine mammals and their habitat. Under the Outer Continental Shelf Lands Act, the Department of the Interior's Minerals Management Service is responsible for assessing, detecting, and mitigating the adverse effects of these activities in offshore waters beyond state jurisdiction. Under the Marine Mammal Protection Act and the Endangered Species Act, the National Marine Fisheries Service and the Fish and Wildlife Service are responsible for reviewing proposed actions and advising the Minerals Management Service and other agencies on measures needed to ensure that those actions will not have adverse effects on marine mammals or endangered or threatened species. The Commission reviews relevant policies and activities of these agencies and recommends actions that appear necessary to protect marine mammals and their habitats. The Commission's activities in this regard in 1996 are discussed below.

Section 101(a)(5) of the Marine Mammal Protection Act directs the Secretaries of the Interior and Commerce to authorize, in certain instances, the unintentional taking of small numbers of marine mammals by U.S. citizens incidental to activities other than commercial fishing operations. Such authorizations related to offshore oil and gas exploration and development are also discussed in this chapter.

### Proposed Offshore Lease Sales

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, reviews

and comments on environmental impact statements and other matters concerning proposed outer continental shelf oil, gas, and hard mineral lease sales. During 1996 the Commission commented to the Minerals Management Service on draft environmental impact statements concerning proposed lease sales in the Gulf of Alaska/Yakutat Bay and the central and western Gulf of Mexico. In addition, the Commission provided comments to the Army Corps of Engineers on its intent to prepare an environmental impact statement on proposed oil and gas development in the Beaufort Sea. Known as the Northstar project, this proposed activity is the first planned production of oil and gas in Federal waters off Alaska.

### Oil & Gas Lease Sale #158, Gulf of Alaska/Yakutat Bay

Proposed lease sale #158, scheduled for May 1997, involves 977 blocks (approximately 5.31 million acres) of submerged lands in the Gulf of Alaska. In December 1995 the Minerals Management Service issued a draft environmental impact statement on the proposed sale and distributed it to the Marine Mammal Commission and others for review.

The draft statement indicated that 11 species of non-endangered marine mammals are resident or occur seasonally in the Gulf of Alaska. The species include the sea otter, Pacific harbor seal, northern fur seal, northern elephant seal, killer whale, minke whale, gray whale, beluga whale, Dall's porpoise, harbor porpoise, and Pacific white-sided dolphin. In addition, seven marine mammal species that occur in the planning area are listed as endangered or threat-

ened under the Endangered Species Act. The species are the Steller sea lion, blue whale, fin whale, humpback whale, right whale, sei whale, and sperm whale.

The draft impact statement considered the possible impacts on the environment should a hypothetical oil spill of 29,000 barrels occur in the lease sale area. It concluded that, if such a spill occurred, the effects on non-endangered and non-threatened marine mammals would include the loss of several hundred animals, particularly resident species such as sea otters and harbor seals. Regional or migrant populations of non-endangered marine mammals were not expected to be significantly affected. With respect to endangered species of whales, the draft statement concluded that effects would be negligible. Steller sea lions most likely would experience temporary, sub-lethal effects although exposure to an oil spill could result in the mortality of fewer than 100 Steller sea lions.

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, reviewed the draft statement and on 1 May 1996 commented to the Service. The Commission noted that, while the conclusions put forth in the draft statement may be valid, the draft statement did not provide data, analyses, or references to support all of them.

In addition, the Commission noted that the draft statement did not provide a thorough assessment of information concerning marine mammals that occur in the planning area. For instance, it provided only limited information on the abundance, distribution, and habitat-use patterns of marine mammals known to occur in the Gulf of Alaska and adjacent waters. Further, it did not identify critical uncertainties concerning the natural history, demography, and the essential habitats and habitat components of the marine mammals that could be affected or how they might be affected, both directly and indirectly by the proposed lease sale.

In its letter, the Commission recognized that available information may be insufficient to accurately determine possible direct and indirect effects of the proposed action. Consequently, some requirements of the Marine Mammal Protection Act and other legislation might best be met by designing and conducting

post-lease sale monitoring programs to detect possible adverse effects before they reach significant levels.

In this regard, the Commission noted that section 20 of the Outer Continental Shelf Lands Act, as amended, requires the Service to conduct post-lease monitoring to detect and determine the cause of environmental change possibly resulting from oil and gas exploration and development. The Commission recommended that the statement be expanded to more fully describe what is being done to meet the monitoring requirements of the Outer Continental Shelf Lands Act and to ensure that lessees are aware of the Marine Mammal Protection Act's prohibition on taking marine mammals and the requirements for obtaining a small-take exemption.

### **Oil & Gas Lease Sales #166 and #168, Central and Western Gulf of Mexico**

Proposed lease sale #166, tentatively scheduled for March 1997, involves 5,649 blocks (about 30.3 million acres) of submerged lands in the central Gulf of Mexico. Proposed lease sale #168, tentatively scheduled for August 1997, involves 5,135 blocks (approximately 28.2 million acres) in the western Gulf. In May 1996 the Minerals Management Service issued a draft environmental impact statement on the proposed lease sales and distributed it to the Marine Mammal Commission and others for review.

The draft statement noted that 30 marine mammal species, including 28 cetacean species, the West Indian manatee and the California sea lion, occur in the proposed lease sale areas. Of these, six cetacean species (right, blue, fin, sei, humpback and sperm whales), as well as the manatee, are listed as endangered under the Endangered Species Act. The draft statement concluded that "the impact of the proposed action on marine mammals is expected to result in primarily sublethal effects (behavioral effects and non-fatal exposure to or intake of OCS-related contaminants or debris) that are both chronic and sporadic."

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, reviewed the draft statement and by letter of 21 August 1996 provided comments to the Service. In its letter, the

Commission noted that the draft statement did a good job of (1) summarizing what is known about marine mammals in the Gulf, (2) identifying the possible direct and indirect effects of the proposed action on marine mammals, and (3) noting significant uncertainties. However, some of the conclusions were not clear and did not follow from the data and analyses presented in the draft statement. Furthermore, the vagueness of the conclusions suggested that there is much uncertainty concerning the possible effects, particularly the possible indirect food-chain effects, of oil and gas exploration and development on marine mammals in the area.

In its letter, the Commission noted, as it has in commenting on earlier lease sales, that it would be prohibitively costly, if not impossible, to obtain sufficient data to resolve all of the uncertainties. It also reiterated its view that it would be more cost-effective to design and conduct post-lease sale monitoring programs to verify that the conclusions regarding possible effects are correct, rather than to delay further exploration and development activities until the uncertainties are resolved. In this regard, the Commission recommended that the final environmental impact statement clearly identify the uncertainties and the steps that have been or will be taken by the Service to resolve them or to ensure that any unforeseen adverse effects on marine mammals are detected early enough so that operations can be stopped or modified before such effects reach significant levels.

On a related point, the Commission noted that, while the sections of the draft statement assessing possible cumulative impacts identified the sources of possible other than the proposed action, they did not provide assessments of the possible additive and synergistic effects of the combined sources. In the Commission's view, the conclusions regarding cumulative impacts were essentially the same as those in the sections assessing the impacts of the proposed action. Therefore, the Commission recommended that the Service review its research and monitoring programs and conservation strategies to ensure that they appropriately take into account the natural history and ecology of important marine mammal prey species.

The draft environmental impact statement indicated that manatees are infrequently found as far west as the

proposed lease sale areas. Therefore, this species was excluded from the analyses. In its letter, the Commission noted that, while it is true that few manatees are seen outside Florida, it does not necessarily follow that manatees rarely venture into the proposed lease sale area. Based on opportunistic sightings and recent strandings, it appears that at least small numbers of manatees migrate or disperse northward from Mexico and westward from Florida into areas shoreward of the proposed lease sale areas. Vessels traveling to and from the lease sale areas also could pose a threat to any manatees inhabiting or migrating through the northern Gulf of Mexico. Likewise, oil spills and other contaminants introduced into the environment in or near the lease sale areas could pose a threat.

The Commission pointed out that perhaps the greatest threat to manatees would be a large oil spill occurring in or near the lease sale areas, with the oil being transported by wind and water currents to major manatee concentrations and habitats. The Commission recommended that the environmental impact statement be revised to indicate the distribution, relative abundance, and status of manatees along the rim of the Gulf of Mexico and to provide an assessment of the possible direct and indirect effects of a major oil spill on manatee distribution and abundance in known habitat areas.

### **Proposed Oil and Gas Development In the Beaufort Sea (Northstar Project)**

Exploration carried out by the oil and gas industry indicate that there may be commercial quantities of oil reserves in the Alaskan Beaufort Sea. As a result, BP Exploration (Alaska) Inc. is interested in developing a site west of Prudhoe Bay for oil extraction. This is significant in that it is the first time that an oil company has proposed moving from the exploratory to the production phase of oil and gas development in Federal waters off Alaska. Unlike oil and gas exploration activities, which have been conducted primarily during summer months, oil production activities will be year-round.

The proposed Northstar project would take place at a site roughly 60 square miles in size, located two to eight miles offshore. Portions of the site lie in both

Federal and State waters. Development options being considered include enlarging existing artificial islands and placing bottom-mounted structures in the area. Production facilities would include water and/or gas injection facilities, oil separation facilities, and pipelines linking the production structures to shore.

The National Environmental Policy Act requires that an environmental impact statement be prepared for any Federal action could significantly affect the human environment. Recognizing that the Northstar project could have significant adverse impacts, the U.S. Army Engineer District, Alaska (Corps), announced in March 1996 its intent to prepare an environmental impact statement for the project. As part of the scoping process mandated by the Act, the Corps requested information on issues that should be addressed in the impact statement.

By letter of 11 June 1996 the Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, provided information and comments on factors that should be considered in assessing the possible effects of the proposed action on marine mammals and their habitat, and on the availability of marine mammals for taking by Alaska Natives for subsistence purposes. In its letter the Commission noted that it is likely that the proposed activity would result in the taking of at least small numbers of marine mammals, including the endangered bowhead whale. If so, the taking would require authorization under the Marine Mammal Protection Act and, if endangered bowhead whales could be taken, under the Endangered Species Act.

The Commission noted that at least eight species of marine mammals are known to occur, at least seasonally, in the vicinity of the Northstar site. They are Pacific walrus, polar bears, ringed, bearded, and spotted seals, and bowhead, beluga, and gray whales. Due to their distribution and habitat use patterns, bowhead whales, ringed seals, and polar bears are the marine mammal species of greatest concern.

The Commission pointed out that the environmental impact statement should assess the possible indirect (*e.g.*, food chain) effects, as well as the possible direct effects, of the proposed action on these species and stocks. It also pointed out that the impact state-

ment should identify how the availability of marine mammals for subsistence hunting by Alaska Natives might be affected by production-related changes in marine mammal distribution, movements, and abundance, and how Natives might be affected by exposure to contaminants through consumption of contaminated marine mammals.

Marine mammal populations potentially affected by oil and gas production in the Northstar area could also be affected by human activities elsewhere. Therefore, the Commission recommended that the environmental impact statement identify and assess the possible cumulative effects of (1) offshore oil and gas exploration and development throughout the ranges of the potentially affected species, (2) the take by indigenous people; incidental take in fisheries, and (3) other human activities that may affect the various species, their habitats, and their prey. Further, the Commission advised that any uncertainties regarding the extent of the disturbances, the character of the effects, or the consequences of potential additive or cumulative effects should be identified clearly.

As noted above, the Northstar project is the first oil and gas production effort in Federal waters offshore of Alaska. Therefore, in its letter, the Commission recommended that the impact statement provide an assessment of differences in potential environmental impacts between exploration and production activities. As noted earlier, one such difference is that production operations will be year-round, and thus could have effects additional to those expected to occur in summer months when most exploration activities have been conducted. For example, winter darkness and severe weather conditions can seriously hamper efforts to contain and recover spilled oil. In addition, moving ice can damage drilling platforms, pipelines, and tankers, and open leads in the ice can concentrate spilled oil along the migratory paths of a number of marine mammal species. Further, techniques for containing and recovering oil trapped beneath ice have yet to be developed. The Commission advised that the environmental impact statement identify what would be done to prepare for oil spills that could occur and assess the likelihood that containment and clean-up of a spill could be accomplished effectively in ice and under potentially adverse weather and sea conditions.

In a related action, the National Marine Fisheries Service published a *Federal Register* notice on 28 May 1996 announcing receipt of a request by BP Exploration (Alaska) Inc. for authorization under the Marine Mammal Protection Act to take small numbers of marine mammals incidental to conducting seismic surveys within the Northstar site. The species for which the small-take authorization was requested were bowhead, gray, and beluga whales, and ringed, spotted, and bearded seals.

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, reviewed and on 27 June 1996 provided comments to the National Marine Fisheries Service on the request and the proposed marine mammal monitoring program submitted by BP Exploration. Actions with respect to the small-take request are described below.

### Small-Take Authorizations

Section 101(a)(5) of the Marine Mammal Protection Act directs the Secretaries of the Interior and Commerce to authorize, in certain instances, the unintentional taking of small numbers of marine mammals by U.S. citizens incidental to activities other than commercial fishing operations. This provision was added to the Act in 1981 to eliminate the need to obtain a waiver of the Act's moratorium on taking marine mammals, which is procedurally burdensome, in those instances when the number of animals likely to be affected is small and the impacts are likely to be negligible. The provision was amended in 1986 to allow the taking of small numbers of depleted, as well as non-depleted, marine mammals. All forms of incidental taking, including lethal taking, may be authorized under section 101(a)(5)(A). A new provision, section 101(a)(5)(D), was added by the 1994 Marine Mammal Protection Act amendments to provide a streamlined mechanism for authorizing the incidental take of small numbers of marine mammals when only taking by harassment is involved.

Authorizations under section 101(a)(5)(A) are issued through a two-step process. If the Secretary, through notice-and-comment rulemaking, determines that taking incidental to a specific activity in a specific

geographical area will have a negligible impact on the affected species or stock, and will not have an unmitigable adverse impact on the availability of the species or stock for taking by Alaska Natives for subsistence use, the Secretary is to prescribe regulations setting forth permissible methods of taking and requirements for monitoring and reporting the take. [See Appendix B, Swartz and Hofman 1991, for an assessment of the reporting and monitoring requirements.] The regulations are to be designed so as to ensure that the authorized taking has the least practicable adverse impact on the species or stock and its habitat. Taking authorized by the regulations also must have the least practicable adverse impact on the availability of such species for subsistence use by Alaska Natives.

The second step in authorizing small takes under section 101(a)(5)(A) is issuance of a letter of authorization. A letter of authorization is issued if the Secretary determines that the type and level of taking likely to result from the proposed activities are consistent with the findings made for the class of activities under the regulations. The letter must specify the period of validity and may include additional terms and conditions tailored to the specific request. While the public has an opportunity to comment on small-take regulations before they are issued, the issuance of individual letters of authorization generally is not subject to prior public review.

The authorization of incidental harassment under section 101(a)(5)(D) does not require the issuance of regulations for specific activities. Rather, the Secretary, within 45 days of receiving an application that makes the required showings, is to publish a proposed authorization for public comment in the *Federal Register* and in newspapers and appropriate electronic media in the locally affected area. After a 30-day comment period, the Secretary has 45 days in which to make a final determination on the application. Authorizations under section 101(a)(5)(D) may be issued for periods of no more than one year, but may be renewed annually.

On 31 May 1995 the National Marine Fisheries Service published proposed regulations to implement 101(a)(5)(D). In response to Congressional expectations that this new authority would be available to authorize small takes by harassment incidental to oil-

and gas-related activities in the Arctic Ocean, the Service published interim regulations, applicable only to activities in Arctic waters, on 10 April 1996. The Service expects to publish final regulations, applicable to activities in all areas, in 1997. As of the end of 1996, the Fish and Wildlife Service had yet to publish proposed implementing regulations.

Small-take authorizations related to OCS activities are discussed below. Authorizations for other activities are discussed in Chapter X.

### Authorizations under Section 101(a)(5)(A)

Prior to enactment of section 101(a)(5)(D) in 1994, section 101(a)(5)(A) was the least burdensome mechanism available under the Marine Mammal Protection Act for authorizing the taking of small numbers of marine mammals incidental to oil- and gas-related activities. With the availability of streamlined procedures for authorizing takes by harassment, however, it is expected that most future requests for authorization will be made under the new provision. Five-year authorizations issued by rulemaking will remain an available option for those instances in which taking other than by harassment is anticipated. As discussed below, all current authorizations under section 101(a)(5)(A) were issued prior to enactment of the 1994 amendments.

**Incidental Take of Walruses and Polar Bears —** Regulations governing the take of walruses and polar bears incidental to oil and gas operations in and adjacent to the Beaufort Sea were issued by the Fish and Wildlife Service on 16 November 1993. Rather than authorizing incidental takes for a five-year period as allowed by the Marine Mammal Protection Act, these regulations were effective for only 18 months (until 16 June 1995). During this period, the Service committed itself to developing and beginning to implement a strategy for the identification and protection of important polar bear habitats, in part to foster compliance with the 1973 Agreement on the Conservation of Polar Bears. Extension of the rule beyond the initial 18-month period was made contingent on the development and implementation of the strategy.

As discussed in the previous annual report, the Service published and the Commission provided

comments on a draft habitat conservation strategy for polar bears in the first half of 1995. Because of extensive public comment on the draft, the Service was unable to complete the final strategy by 16 June, when the incidental-take regulations were to expire. It therefore extended the effectiveness of the incidental-take regulations for an additional 60 days to enable it to complete the final habitat conservation strategy. On 17 August 1995 the Service issued its final habitat conservation strategy and published regulations extending the incidental-take regulations through 15 December 1998.

Rather than adopt specific protective measures, as many commenters suggested, the Service in the final strategy preferred to address habitat conservation on a case-by-case basis. Those seeking letters of authorization are advised to submit information as to whether the planned activities will occur in or near areas identified as important habitat, to describe how the habitat might be affected, and describe the steps planned to prevent or minimize such impacts. Based on such information, the Service may include conditions in any authorization it issues to prohibit certain activities in certain areas or at certain times of the year, establish buffer zones, *etc.*

The Service noted in the final habitat conservation strategy that no incidental taking of polar bears would be permissible without an authorization regardless of whether or not it occurred in an area identified as important habitat. However, because of the greater likelihood that polar bears would be taken in important habitat areas, the Service considered making a letter of authorization mandatory before oil and gas activities could be conducted in those areas. It concluded, however, that the habitat conservation strategy did not provide proper authority for such a requirement. Instead, the Service indicated that it would consider requiring letters of authorization for activities in important habitat areas through a separate rulemaking or amendment of the Marine Mammal Protection Act. As of the end of 1996 the Service had not taken any further action to require companies to obtain a letter of authorization prior to conducting oil- and gas-related activities in certain areas.

During 1995 the Fish and Wildlife Service issued nine letters of authorization to companies engaged in

oil and gas exploration under these regulations. Six of these authorizations covered exploration activities occurring in 1996. Seven letters of authorization were issued in 1996 for incidental taking occurring as a result of oil and gas exploration in the Beaufort Sea. In addition, the Service issued two letters of authorization in December 1996 to BP Exploration (Alaska) Inc., one allowing the taking of polar bears and walrus incidental to oil and gas development activities, and the other allowing taking incidental to oil and gas production.

As discussed in previous annual reports, similar regulations governing the take of walrus and polar bears incidental to oil and gas exploration activities in the Chukchi Sea were published by the Fish and Wildlife Service in 1991. These regulations, valid for a five-year period, expired on 14 June 1996. No letters of authorization had been issued under these regulations since 1991.

**Taking Incidental to On-Ice Seismic Activities —** In 1982, 1987, and again in 1993 the National Marine Fisheries Service issued regulations to authorize the taking of small numbers of ringed seals incidental to on-ice seismic activities associated with oil and gas exploration in the Beaufort Sea. The current authorization expires at the end of 1997.

As noted in the previous annual report, letters of authorization were issued by the Service on 1 December 1995. These letters covered on-ice seismic activities conducted by BP Exploration, Western Geophysical, and Geco-Prakla between 1 January and 31 May 1996. Three letters of authorization were issued by the Service during 1996. These authorize the taking of ringed seals incidental to on-ice seismic activities conducted by Northern Geophysical of America, Western Geophysical, and BP Exploration between 1 January and 31 May 1997.

**Removal of Oil- and Gas-Related Structures in the Gulf of Mexico —** In 1989 the American Petroleum Institute, representing operators who remove offshore oil and gas drilling and production structures and related facilities in the Gulf of Mexico, sought a small-take authorization from the National Marine Fisheries Service. The American Petroleum Institute estimated that 670 structures will be removed from

Gulf waters during the first five years and that about 5,500 structures will be removed within a 35-year period. Explosives used to sever pilings, well conductors, and supporting structures as part of the removal process may expose dolphins and other marine mammals to sound and pressure waves that, depending on an animal's distance from the explosion, may result in harassment, injury, or death.

The Service published a proposed rule on 17 June 1993 proposing to authorize the incidental taking of bottlenose and spotted dolphins over a five-year period. The Commission's comments on that proposal are discussed in previous annual reports.

The Service published a final rule authorizing the requested incidental taking of bottlenose and spotted dolphins on 12 October 1995. The authorization remains valid through 13 November 2000 and allows the taking by harassment of up to 200 dolphins per year. The final rule limits the explosives that may be used to remove structures to a pressure level equivalent to that generated by a 50-pound charge. In addition, detonations are limited to daylight hours and are prohibited whenever visibility prevents a pre-detonation survey of the area to be conducted within a specified timeframe.

Only one letter of authorization was issued under these regulations during 1995. During 1996, 17 letters authorizing the taking of small numbers of bottlenose and spotted dolphins incidental to rig removal activities were issued by the Service.

### **Authorizations Under Section 101(a)(5)(D)**

As discussed in the previous annual report, the only small-take authorization for oil- and gas-related activities issued during 1995 under this new authority was for seismic surveys in the Santa Barbara Channel. That authorization expired at the end of 1995 and no renewal was sought. With the expiration of small-take regulations applicable to oil and gas exploration in the Beaufort Sea in 1995, it was expected that some companies would seek authority for incidental take by harassment under section 101(a)(5)(D). One such authorization was issued during 1996. It is discussed below. As other authorizations under section 101(a)(5)(A) expire, there are likely to be additional requests

under the streamlined procedures applicable to small takes by harassment.

#### **Offshore Seismic Activities in the Beaufort Sea**

— On 18 March 1996 BP Exploration (Alaska) Inc. applied for authorization to take six species of marine mammals (bowhead, gray, and beluga whales and ringed, spotted, and bearded seals) by harassment incidental to seismic surveys to be conducted during the open-water season (approximately 20 July-20 October 1996) at its Northstar site in the Beaufort Sea. A notice of that proposal and proposed authorization was published by the National Marine Fisheries Service on 28 May 1996.

The Service preliminarily concluded that the proposed seismic surveys would “result, at worst, in a temporary modification in behavior by certain species of cetaceans” and that any such modifications would have negligible impacts on the animals. The Service anticipated no taking that would result in the injury or death of a marine mammal. The Service’s conclusions were premised, in part, on mitigation measures proposed by BP Exploration, including placement of marine mammal observers aboard the seismic vessel and the “powering down” of the seismic source if pinnipeds are sighted within 150 meters or cetaceans are sighted within 650 meters of the source. In addition, the Service proposed to require the applicant to “ramp-up” the power source from an initial level of no more than 160 dB to enable marine mammals to detect and move away from the source before it reached its full power.

As required by section 101(a)(5)(D), the Service also considered the possible effects of the proposed seismic surveys on the availability of marine mammals for Native subsistence uses. The species of primary concern are bowhead whales, ringed seals, and bearded seals, all of which are important to coastal North Slope communities. The Service concluded that most bowhead whales will not have entered the ensonified area until they have passed through the area used by whalers from the village of Nuiqsut. Further, it believed that aerial surveys, planned to begin on 1 September, when bowhead whales start to arrive in the area on their migration from Canadian waters, would likely detect any adverse effects on the availability of this species in time for mitigation measures

to be taken. In concluding that adverse effects on seal hunting were unlikely, the Service noted that the peak sealing season occurs in the winter months, summer sealing occurs mainly in areas to the west and inshore of the Northstar site, and the zone in which seals or beluga whales are likely to be affected by seismic noises is fairly small.

The Service also described the proposed monitoring program that would be used to assess impacts to marine mammals from the proposed seismic surveys. In addition to the shipboard observers and aerial surveys noted above, the applicant proposed to conduct 10 days of acoustical studies to measure the levels and characteristics of the sound source, sound loss at various distances and frequencies, and ambient noise levels. Additional data on ambient noise and the characteristics of the seismic pulses near sighted whales would be obtained from sonobuoys to be deployed by aircraft conducting surveys. The Service indicated that the monitoring plan would be subject to peer-review by a panel of technical experts prior to formal acceptance.

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, provided comments to the Service by letter of 27 June 1996. While the Commission generally concurred with the Service’s proposed determination and rationale, it noted that some conclusions had not been fully supported or were based on unstated assumptions that may or may not be valid. For example, the Service seemed to assume that noise from the airguns would be the only potential source of harassment. Sounds produced by the seismic vessel and other vessels and aircraft that would be used to support or conduct the activities apparently were not considered. Also, the Service appeared to assume that there was no risk of marine mammals being hit and killed or injured by any of the vessels or becoming entangled and being killed or injured in the airgun arrays.

The Commission noted that if marine mammals could be taken by harassment by means other than operation of the airgun arrays, such taking would need to be included in the authorization and the monitoring program would need to be revised to provide information required to estimate the number of marine mammals taken incidental to these other operations.

Inasmuch as authorizations under section 101(a)(5)(D) are limited to taking by harassment, the Commission recommended that the Service specify that the authorization be automatically suspended if a marine mammal is killed or possibly killed incidentally.

The Commission concurred that the proposal to suspend seismic operations if pinnipeds are observed within 150 meters or if cetaceans are observed within 650 meters of the seismic vessel was a reasonable measure to prevent possible hearing damage. However, the Commission questioned the ability of the observers to detect all marine mammals within the designated safety radii under all circumstances. It also was not clear to the Commission how the observers would measure or estimate when marine mammals are within the designated distances, inasmuch as the airgun array was to be towed and operated behind the source vessel. The Commission therefore recommended that the Service consult with the applicant to ensure that the observers would be able to see marine mammals within the designated safety radii around the airgun arrays whenever the arrays are operating.

In making its proposed determinations, the Service seemed tacitly to have concluded that the proposed marine mammal monitoring program would be adequate to verify that (1) only small numbers of marine mammals are taken, (2) the taking is by harassment only, (3) the impacts on the affected species and stocks are negligible, and (4) the taking has no unmitigable adverse effects on the availability of marine mammals for subsistence uses. The Commission agreed generally that the proposed monitoring program was well-conceived and conceptually sound, but noted that it was not possible to fully evaluate the adequacy of the proposed program with the information provided. Also, because ship-based observers may not be able to ensure that no marine mammals are present within the designated safety radii around the airguns and, at the same time, locate and watch animals in front and to the sides of the source vessel to determine how and at what distances their behavior changes as they are approached, the Commission cautioned that the monitoring program might produce underestimates of the numbers of the different species taken incidental to the seismic surveys. The Commission recommended that the peer-review panel that would examine the adequacy of the monitoring

program include individuals with expertise in marine acoustics, statistics, and experimental design, as well as those with expertise in the natural history, population dynamics, and behavior of the marine mammal species that could be affected by the acoustic surveys and related activities. The Commission further recommended that the panel be asked to consider whether the proposed monitoring program would meet all four of the purposes noted above and, if not, identify changes that would be required to do so.

The National Marine Fisheries Service published a notice of issuance of an incidental harassment authorization to BP Exploration on 25 July 1996. As originally proposed by the Service, the authorization allowed the taking of six marine mammal species. The authorization covered activities occurring between 18 July and 1 November 1996.

The final authorization included certain changes from the proposed authorization. Information provided by the applicant indicated that the proposed "ramp-up" of the sound source was not technologically feasible. As a result, the Service instead directed that, when initiating surveys, the operators fire the smallest airgun first, adding additional guns in sequence until the full array is firing. The Service acknowledged that noise from seismic and support vessels and aircraft may also result in harassment and, as recommended by the Commission, included such taking in the authorization. The Service believed that the monitoring plan adequately addressed potential taking from such sources.

Modifications to the proposed monitoring plan were made in response to public comments, advice of the peer-review panel, and comments received at a meeting of representatives of the National Marine Fisheries Service, BP Exploration, the North Slope Borough, the Minerals Management Service, and the Alaska Eskimo Whaling Commission. The applicant and subsistence users also concluded a plan of cooperation to identify and resolve possible conflicts between the proposed seismic surveys and the availability of marine mammals for subsistence purposes.

The Service committed to investigate any whales struck by vessels and to take "appropriate action" if vessel strikes occur, but declined to incorporate the

Commission's recommendation regarding automatic suspension of the authorization if a marine mammal is killed in the course of the seismic activities. In this regard, the Service concluded that the potential for a vessel striking and killing a marine mammal was exceedingly small. Also, because the applicant intended to use airguns deployed on the ocean bottom cable rather than airguns towed behind the survey vessel, the Service concluded that there was virtually no possibility of an injury or death resulting from entanglement in or contact with the array.

The Service also declined to adopt fully the Commission's recommendation that the Service and applicant take steps to ensure that observers would be able to see marine mammals within the designated safety radii whenever the arrays are operating. The Service believed that few, if any marine mammals would approach the survey vessel and, therefore, limiting surveys at night or during inclement weather was not warranted.

On August 29 and 30 1996 the Service received two letters from BP Exploration requesting modifica-

tion of its incidental harassment authorization. The first letter indicated that BP Exploration wanted to relocate seismic operations westward due to ice conditions in and around the Northstar site. The second letter notified the Service that the results of the transmission loss test required under the original authorization indicated that the safety ranges around the seismic array should be increased by 100 meters to 250 meters for pinnipeds and 750 meters for cetaceans.

The Service published a notice in the *Federal Register* on 19 September 1996 that the incidental harassment authorization had been modified to incorporate the changes proposed by BP Exploration. With respect to relocation of seismic activities, the Service noted that operations would be moved farther away from the area used for bowhead whale hunting and that the change was supported by the Alaska Eskimo Whaling Commission. The Service also indicated that moving the operations to this adjacent area was not expected to increase the number or kinds of marine mammals that would be taken.

## Chapter IX

### RESEARCH AND STUDIES PROGRAM

The Marine Mammal Protection Act requires that the Marine Mammal Commission maintain a continuing review of research programs conducted or proposed to be conducted under 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 research on marine mammals; reviews research plans and programs and recommends steps that should be taken to prevent unnecessary duplication and improve the quality of research conducted or supported by the National Marine Fisheries Service, the Fish and Wildlife Service, the Minerals Management Service, and other Federal agencies; convenes meetings and workshops to review, plan, and coordinate marine mammal research; and contracts for studies to help identify, define, and develop solutions to domestic and international problems affecting marine mammals and their habitats so as to facilitate and complement activities of other agencies.

#### **Survey of Federally-Funded Marine Mammal Research**

Research on marine mammals and their habitats is conducted or supported by a number of Federal departments and agencies. To determine the nature of this research, and assess ways in which it can best be coordinated and used to facilitate marine mammal conservation, each year the Commission requests information on the marine mammal and related research being conducted, supported, and planned by these departments and agencies.

In November 1995 the Commission requested information from 20 Federal agencies, departments, and offices. They were the Department of Agriculture; the Department of the Air Force; the Department of the Army; the Department of Commerce's Coastal Ocean Office, National Marine Fisheries Service, National Sea Grant College Program, Office of Ocean Resources Conservation and Assessment, and Sanctuaries and Reserves Division; the Department of Energy; the Department of the Interior's Fish and Wildlife Service, Minerals Management Service, National Biological Service, and National Park Service; the Department of the Navy; the Department of State; the Department of Transportation; the Environmental Protection Agency; the National Aeronautics and Space Administration; the National Institutes of Health; and the National Science Foundation. The Commission also requested information from the Smithsonian Institution, a trust instrumentality of the United States.

The information obtained is summarized in the Commission-sponsored report "Survey of Federally-Funded Marine Mammal Research and Studies FY74 - FY95," available from the National Technical Information Service (see Appendix B, Waring 1981 through 1996 for this and previous survey reports).

#### **Marine Mammal Workshops and Planning Meetings**

In 1996 the Marine Mammal Commission provided comments and recommendations to other Federal agencies on a broad range of issues involving the conservation of endangered, threatened, depleted, and non-depleted marine mammal stocks; marine mammal-

fisheries interactions; marine mammals in display facilities; the possible effects of offshore oil and gas exploration and development on marine mammals and their habitats; marine mammal strandings and die-offs; scientific research permit applications; and requests for authorization to take small numbers of marine mammals incidental to a variety of Navy and other agency activities.

Members of the Commission, its Committee of Scientific Advisors and staff also were involved in organizing and/or participated in meetings and workshops to —

- assess and refine research and management actions within the Hawaiian monk seal recovery program;
- coordinate regional implementation of the recovery programs for humpback whales and right whales off the Northeast and Southeast United States;
- assess the effectiveness and possible adverse effects of sounds used to deter marine mammals from fishing gear and fish pens;
- identify management actions needed to reduce the incidental take of harbor porpoises in sink gillnet fisheries off New England and southeast Canada;
- identify research and management actions needed to reduce the incidental take of right whales and other large whale species in gillnets and lobster traps along the U.S. Atlantic coast;
- review and coordinate international conservation efforts in the Arctic and the Antarctic;
- develop a national contingency plan for response to unusual marine mammal mortality events;
- review and evaluate the Acoustic Thermometry of Ocean Climate Program Marine Mammal Research Program;
- estimate the rate of calf mortality in North Pacific humpback whale populations;
- identify and recommend additional actions necessary to determine the cause of the unusual die-off of West Indian manatees in southeast Florida;
- coordinate Federal agency programs related to reducing or eliminating sources of marine debris pollution;
- review and revise the standards for the humane handling, care, treatment, and transportation of marine mammals maintained in captivity;
- review and provide recommendations for improving the marine mammal research program at the

National Marine Fisheries Service's Southeast Fisheries Science Center;

- prepare for and participate in the 1996 meetings of the International Whaling Commission and its Scientific Committee;
- define the key elements of the National Marine Fisheries Service's 5-year strategic plan;
- evaluate the adequacy of and efforts to implement the manatee recovery program in the southeastern United States; and
- develop government and Native agreements to cooperatively manage polar bear and walrus populations shared by the United States and the Russian Federation.

### **Commission-Sponsored Research and Study Projects**

As noted above, the Marine Mammal Commission convenes workshops and contracts for research and studies to help identify, define, and evaluate threats to marine mammals and their habitat. It also supports other research to further the purposes and policies of the Act. Since it was established, the Commission has contracted for more than 1,000 projects ranging in amounts from several hundred dollars to \$150,000.

Occasionally the Commission's investment in research 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 Department of State. When such funds are transferred from the Commission to another agency, the Commission provides detailed scopes of work describing precisely what the agency is to do or to have done, as well as the requirements for reporting on progress to the Commission. In many instances, this 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 essential to maintain agency involvement to the greatest extent possible and that such transfers provide a useful means of doing so.

Research and studies supported by the Commission in 1996 are described below. Final reports from most

Commission-sponsored studies are available from the National Technical Information Service; they are listed in Appendix B. Papers and reports resulting entirely or in part from Commission-sponsored activities and which have been published elsewhere are listed in Appendix C.

## **WORKSHOPS, REVIEWS, AND ANALYSES**

### **Workshop to Develop Strategies to Reduce the Number of Ship Collisions with Right Whales (Scott D. Kraus, New England Aquarium, Boston, Massachusetts)**

The endangered northern right whale is one of the world's rarest large whale species. Its inability to recover from over-exploitation may be a product of human-caused mortality, including entanglement in fishing gear and collisions with ships. More than one-third of the documented right whale mortalities in the Northwest Atlantic are from ship strikes, occurring in part because right whales occur where ship traffic is heavy. In 1995 and 1996 alone, collisions with ships caused three right whale deaths. To identify possible additional means for reducing ship strikes, the Commission provided partial support for this workshop to (a) review what is known about how and why the ship/whale collisions occur; (b) review and evaluate the measures that are in place to reduce ship strikes; and (c) identify additional actions that might be taken to further reduce collision-related mortalities. The workshop, planned for April 1997, will include representatives of the shipping industry, military, Coast Guard, port authorities, and Federal and state agencies. The workshop report, expected to be available during 1997, will be provided to agencies and groups working to avert this serious problem.

### **Assessment of Data Concerning Right Whale Mortality Along the East Coast of North America (Amy R. Knowlton, New England Aquarium, Boston, Massachusetts)**

As noted above, entanglement in fishing gear, collisions with ships, and other human activities appear to be the greatest threats to right whales. Evidence suggests that human-caused right whale mortality

has increased in recent years. To better understand and reduce the mortality incidental to human activities, accurate information on the circumstances surrounding, and the causes of, right whale deaths is needed. This contract provides support for the preparation of a report that summarizes and assesses data on the number, age, and gender of right whales found dead along the east coast of the United States, along with the locations, dates, and causes of the deaths. The report will describe any temporal changes in the principal causes and locations of known deaths. It is expected to identify actions needed to obtain more reliable information on when, where, how, and how many right whales are killed each year as a result of human activity. Whether the apparent increase in mortality is related to an increased effort to locate and report floating carcasses will be addressed by an analysis of the number of carcasses which were first found floating versus those which were first found on beaches. The report, expected to be completed by mid-1997, will provide important groundwork for developing a strategy to reduce the level of human-caused mortality, and in so doing, contribute to efforts to recover the species.

### **Assessment of Data Concerning Right Whale Entanglement in Fishing Gear Along the East Coast of North America (Eleanor M. Dorsey, Conservation Law Foundation, Boston, Massachusetts)**

Entanglement in fishing gear is a source of right whale mortality that can and should be averted. Reducing entanglement requires reliable information on the types of gear, where and when it was set, and the age and sex classes of whales being entangled. This contract provided support for the preparation of a report assessing data on right whale entanglement in fishing gear in the Northwest Atlantic in the last 25 years. The report is to (a) summarize data indicating when, where, how, and how many right whales, both alive and dead, have been observed entangled in fishing gear; (b) assess the times of year, geographic locations, and types of fishing gear in which right whales are most likely to get entangled; and (c) identify actions necessary to obtain more reliable information on the locations, times of year, and gear types in which right whales are most likely to be entangled. More than 30 known entanglements and

post-entanglement sightings of identified individuals will be the basis of the review. The report is to be completed by mid-1997, and the Commission will make it available to agencies, organizations, and groups working to reduce human-caused mortality.

**Comprehensive Review of State and Federal Responses to the 1996 Manatee Die-off in Florida (J. Ross Wilcox, Ph.D., Palm Beach Gardens, Florida)**

As discussed in Chapter II, in spring 1996, more than 150 manatees died in an epizootic along the southwest coast of Florida. Personnel at the Florida Department of Environmental Protection coordinated the investigation of the event, with assistance from numerous collaborating organizations and individuals. Although the response was generally good in what proved to be very challenging circumstances, it was not clear that everything necessary was being done, and in the most effective ways possible, to identify the source of, and to collect and disseminate information about, the die-off. This contract provided for a comprehensive review of the 1996 manatee die-off to identify lessons learned from the event and to develop recommendations for improving the response to future die-offs both of manatees and, as appropriate, of other marine mammal species. A report of the review was completed late in 1996 and it was transmitted by the Commission to the acting director of the Fish and Wildlife Service in a letter dated 31 December 1996. A more complete discussion of the review and the Commission's recommendations regarding the die-off can be found in the section on manatees in Chapter II.

**New and Developing Technologies for the Study of Marine Mammals (Andrew J. Read, Ph.D., Duke University Marine Laboratory, Beaufort, North Carolina)**

As noted in last year's annual report, the Commission provided support in 1995 for the identification and assessment of existing and possible next-generation technologies that might be useful in the study and conservation of marine mammals. The assessment is to include a discussion of emerging technologies that might be used, among other things, to better determine the abundance, movements, and habitat-use

patterns of marine mammals; marine mammal feeding habits, diets, and commonly used feeding grounds; the genetic relatedness among individuals; and the general health of individuals. Expert peer review of a draft report submitted in May 1996 indicated that there were more potentially applicable technologies than were anticipated when the study was initiated. Therefore, the Commission augmented the contract in 1996. The final report is expected to be completed by mid-1997. It will introduce students, researchers, and administrators to methods perhaps unknown to them, and in so doing, improve the study and conservation of marine mammal populations.

**GENERAL**

**Report on the Third Conference of the Parties to the Convention on Biological Diversity (Col. Milton M. Kaufmann, Monitor International, Gaithersburg, Maryland)**

The Convention on Biological Diversity was adopted in 1992 in Rio de Janeiro. The Convention's contracting parties affirmed the importance of global biological diversity and acknowledged that human activities were reducing biological diversity. To further conservation of biodiversity, programmatic linkages have been sought between the Convention and the United Nations Environment Programme's Caribbean Environment Programme. To assist in these efforts the Commission provided support to enable the contractor, who has been active in this area, to participate in and prepare a summary report on the third annual meeting of the parties to the Convention on Biological Diversity in Buenos Aires on 4-13 November 1996. At the meeting, decisions were made that will, in all likelihood, result in a Memorandum of Cooperation between the Secretariat of the Convention on Biological Diversity and the Caribbean Environment Programme. It is hoped that this agreement will, among other things, encourage Caribbean Environment Programme countries to promptly ratify the Cartagena Convention Protocol Concerning Specially Protected Areas and Wildlife, described in previous Commission annual reports. When ratified, the Protocol will, among other things, designate the entire Wider Caribbean region as a cetacean sanctuary.

**Survey of Federally-Funded Marine Mammal Research**

**(George H. Waring, Ph.D., Southern Illinois University, Carbondale, Illinois)**

The Marine Mammal Protection Act requires that the Marine Mammal Commission conduct a continuing review of marine mammal research conducted or supported by Federal agencies. As noted above, information concerning marine mammal research conducted or supported by other Federal agencies in fiscal year 1996 and planned for fiscal year 1997 was

requested from agencies in November 1996. The agency responses will be forwarded to the contractor, who will provide a draft report synthesizing the information provided. The draft will be sent to the responding agencies to verify the accuracy of the information they provided. The final report is expected to be completed by mid-1997. It will be provided to the responding agencies and will be available through the National Technical Information Service (see Appendix B, Waring 1981 to 1996 for reports from previous years).



## Chapter X

# PERMITS AND AUTHORIZATIONS TO TAKE MARINE MAMMALS

The Marine Mammal Protection Act places a moratorium, with certain exceptions, on the taking and importing of marine mammals and marine mammal products. One exception provides for the issuance of permits by either the Secretary of Commerce or the Secretary of the Interior, depending on the species of marine mammal involved, for the taking or importation of marine mammals for purposes of scientific research, public display, or enhancing the survival or recovery of a species or stock. Provisions enacted in 1994 also allow the issuance of permits to authorize the taking of marine mammals in the course of educational or commercial photography and the importation of bear trophies from sport hunts conducted in Canada. Permit-related activities other than those involving polar bear trophies are discussed in this chapter. Activities with respect to authorizing imports of polar bear trophies are discussed in Chapter V. A related topic, the export of marine mammals to foreign facilities, is discussed in Chapter XI.

Other provisions of the Marine Mammal Protection Act allow the Secretaries of Commerce and the Interior to authorize the take of small numbers of marine mammals incidental to activities other than commercial fisheries, provided the taking will have only a negligible impact on the affected stocks. Small-take authorizations are discussed later in this chapter. Small-take authorizations concerning oil- and gas-related activities are discussed in Chapter VIII.

### Permit-Related Regulations

As discussed in previous annual reports, the National Marine Fisheries Service initiated a review of its permit program in 1988. In the course of its review, the Service published a discussion paper for public comment and solicited additional input at a

series of public meetings on various permit-related issues. The review culminated in the publication of a proposed rule in 1993 that would have made extensive revisions to the Service's permit regulations. Some of the Service's proposals, particularly those with respect to public display permits, were nullified by the 1994 amendments to the Marine Mammal Protection Act. However, other portions of the proposed rule were either unaffected by the 1994 amendments or affected only to a minor extent. The Service therefore determined that it could proceed with issuing final regulations for some elements of its permit program based on the 1993 proposal, but would need to publish a new proposed rule for others.

The Service issued a final rule on 10 May 1996 instituting several changes to its permit regulations. The rule revises the procedures for submitting and reviewing permit applications and the criteria to be used for issuing or denying permits. These procedures include a provision for waiving the otherwise-applicable 30-day public review period when delaying issuance of a scientific research permit could result in injury to a species, stock, or individual animal or in the loss of unique research opportunities. This expedited process, included in the 1994 Marine Mammal Protection Act amendments to increase the flexibility of the permitting system, has yet to be used.

The rule also sets forth several general permit conditions and reporting requirements applicable to all marine mammal permits. In addition, the rule specifies other conditions and reporting requirements applicable only to research and enhancement permits. Among other things, holders of research and enhancement permits are required to submit annual and final reports summarizing their activities and findings.

The rule adds new provisions applicable to permit amendments. Major amendments are those that would change the number or species of marine mammals covered by a permit, result in an increased level of take or risk of adverse impact, change the location from which marine mammals may be taken or imported or to which they may be exported, or extend the period of validity of a permit by more than 12 months. Proposed major amendments are to be provided to the Commission for review, and a notice of such amendments is to be published in the *Federal Register* inviting public comment.

The 10 May rule did not include requirements specific to permits for educational or commercial photography. It also did not reflect many of the 1994 amendments pertaining to public display. These issues will be addressed in subsequent rulemakings. Until new regulations are issued, the Service will process applications for public display and photography permits and implement public display provisions using existing regulations, interim guidelines, and the applicable statutory provisions.

In addition to providing for the issuance of permits for scientific research, public display, enhancement, and educational and commercial photography, the Act, as amended in 1994, establishes a general authorization for scientific research that involves taking only by Level B harassment — *i.e.*, any act of pursuit, torment, or annoyance that has the potential to disturb but not injure a marine mammal or marine mammal stock in the wild. Interim regulations implementing this provision were issued by the National Marine Fisheries Service on 3 October 1994. Researchers conducting investigations on marine mammals involving aerial surveys, photo-identification, and other non-invasive techniques typically would be covered under the general authorization and are no longer required to obtain a permit. Researchers still must obtain permits for activities involving marine mammals listed as endangered or threatened under the Endangered Species Act. The Commission understands that the National Marine Fisheries Service is working on final general authorization regulations that would address comments submitted by the Commission and others on the 1994 interim regulations.

Authorization to conduct research under the general authorization was granted by the National Marine Fisheries Service to two researchers in 1994, 16 researchers in 1995, and 15 researchers in 1996. The availability of the general authorization for certain types of research has substantially alleviated the delay experienced by some researchers in obtaining permits.

As discussed in previous annual reports, the Commission wrote to the Fish and Wildlife Service in 1990, recommending that it work with the National Marine Fisheries Service to ensure consistent interpretation and implementation of the permit provisions of the Marine Mammal Protection Act and related legislation. The Fish and Wildlife Service subsequently informed the Commission, most recently at the Commission's 1994 annual meeting, that it intended to defer adoption of revised permit regulations until the National Marine Fisheries Service had published its revised regulations. At such time, the Fish and Wildlife Service expected to propose its own regulations, drawing on the National Marine Fisheries Service's regulations as appropriate. As of the end of 1996, the Fish and Wildlife Service had yet to propose revisions to its Marine Mammal Protection Act permit regulations or publish regulations implementing the general authorization for scientific research.

The Fish and Wildlife Service did, however, publish a proposed rule on 5 September 1995 to amend its general permitting procedures to provide uniform rules and procedures for submitting applications, and for the issuance, denial, suspension, and revocation of permits issued by the Service. The proposed regulatory changes would apply to permits issued under a variety of wildlife statutes, including the Marine Mammal Protection Act and the Endangered Species Act.

## Permit Application Review

Whether for a scientific research, public display, species enhancement, or photography permit, the application review process involves the same four stages: (1) receipt and initial review of the application by either the Department of Commerce or the Department of the Interior; (2) publication in the *Federal*

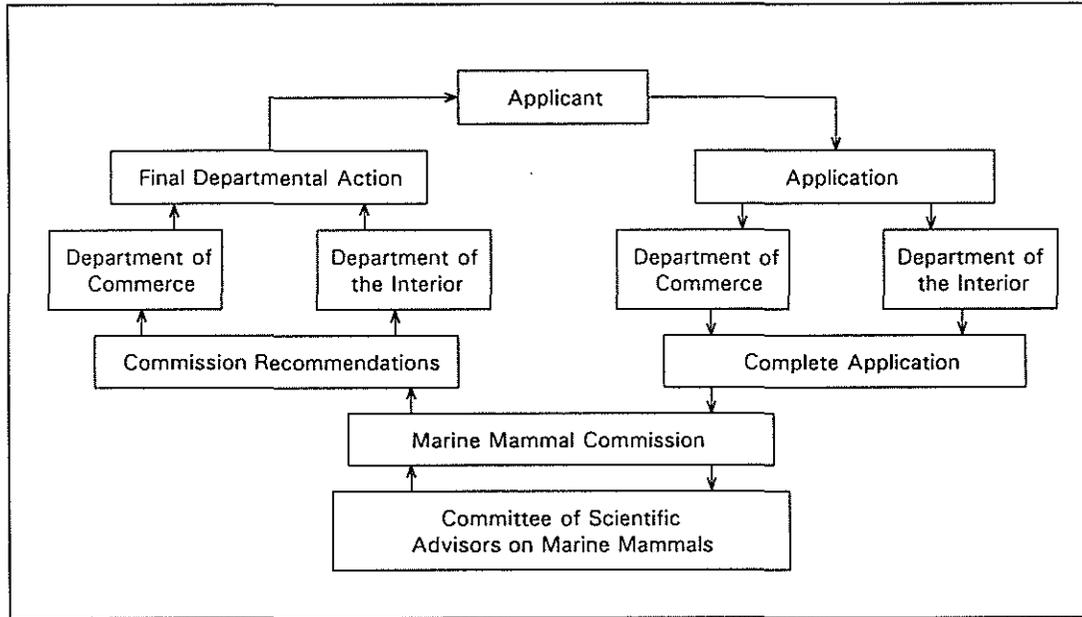


Figure 6. Process by which permit applications to take marine mammals are reviewed

*Register* of a notice of the application, inviting public review and comment, and transmittal to the Marine Mammal Commission; (3) review of the application by the Commission, in consultation with its Committee of Scientific Advisors, and transmittal of its recommendation to the department; and (4) final departmental action on the application, including consideration of comments and recommendations made by the Commission and the public, and, if captive maintenance of animals is involved, the views of the Animal and Plant Health Inspection Service on the adequacy of facilities and transportation. Figure 6 illustrates this process.

Once a permit has been issued, it can be amended by the responsible agency, provided the proposed amendment meets statutory and regulatory requirements. In some cases, an amendment is subject to the same notice, review, and comment procedures as a permit application. A major amendment of an existing permit, including a request for extension of a permit by more than 12 months beyond its original term, or a request for authorization to continue activities under a permit are subject to review by the Commission.

The total review time for a permit (from initial receipt of an application at the Service until final departmental action is taken) depends on many factors, including the completeness of the information provided by the applicant, any special requirements that must be satisfied before the application can be processed, and the efficiency of the review process in the agencies.

During 1996 the Commission, in consultation with its Committee of Scientific Advisors, provided recommendations on 19 permit applications submitted to the Department of Commerce and 6 applications submitted to the Department of the Interior. Of these, 9 awaited final action by the Department of Commerce and 2 awaited final action by the Department of the Interior at the end of 1996. The Commission's average review time for the 25 applications on which it commented in 1996 was 25 days (range: 9-42 days). The Commission also made recommendations on 50 requests to amend permits in 1996. The average time required for Commission review of these requests was 20 days.

The Department of Commerce took final action on 22 permit applications during 1996, including 7

applications that were received in 1995. The average processing time, from the date the application was received by the Department until final action was taken, was 128 days (range: 60-280 days). The Department of the Interior took final action on 7 permit applications during 1996, including 3 applications that were received in 1995. The average processing time, from the date the application was received by the Department of the Interior until final action was taken, was 120 days (range: 47-264 days). If calculated from the date the department considered an application to be complete, the average processing times for the Departments of Commerce and the Interior were 114 and 105 days, respectively, compared to 99 and 80 days in 1995.

### **Human Interactions with Marine Mammals in the Wild**

In recent years a number of commercial operators have begun advertising tours that include human-marine mammal interaction activities in the wild. Judging from the number of such advertisements, this appears to be a growing industry. Although encounters such as these that result in taking marine mammals are prohibited under the Marine Mammal Protection Act, the National Marine Fisheries Service has been reluctant to bring enforcement actions under such circumstances. The Commission believes that swimming with, feeding, and other types of interactions with marine mammals in the wild can be dangerous for both the humans and the marine mammals involved. Even when no immediate injury results, marine mammals may become habituated to such interactions, emboldening the animals and exposing them to risks that they might not otherwise face.

The Commission wrote to the National Marine Fisheries Service on 20 December 1996 regarding the apparent proliferation of recreational and commercial ventures featuring interactions with marine mammals in the wild in the southeastern United States and Hawaii. The Commission noted that feeding constitutes a take under the Marine Mammal Protection Act, and that the Service had published regulations specifying that feeding marine mammals in the wild is a form of taking. The Commission recommended that the

Service take the necessary steps to make it clear to the public and tour operators that taking marine mammals without proper authorization is against the law. Further, the Commission prompted the head of the Service to instruct its enforcement personnel to heighten their attention to these violations.

The Commission also wrote to the Fish and Wildlife Service on 9 May 1996 about human-manatee interactions in the wild, specifically with regard to the increase of recreational divers in Florida's Crystal River National Wildlife Refuge. The Commission noted that divers were causing frequent and, in some cases, blatant harassment of manatees. The Commission also wrote the Fish and Wildlife Service on 20 December regarding the need to strengthen regulations and enforcement of diver-manatee interactions in and near Kings Bay, Florida. The Commission recommended that the Service develop further guidance as to what constitutes harassment of manatees by swimmers and divers and that the Service coordinate with the National Marine Fisheries Service on what constitutes a take and what enforcement actions to undertake, should a take occur.

### **Small-Take Authorizations**

Section 101(a)(5) of the Marine Mammal Protection Act directs the Secretaries of the Interior and Commerce to authorize the taking of small numbers of marine mammals by U.S. citizens incidental to activities other than commercial fishing operations when certain conditions are met. As noted in Chapter VIII, this provision was added to the Act in 1981 to eliminate the burdensome procedure for obtaining a waiver of the Act's moratorium on taking marine mammals when only small numbers of animals are likely to be affected and the effects are likely to be negligible. Also as noted in Chapter VIII, this provision was amended in 1986 to allow the Secretaries to authorize the taking of small numbers of depleted, as well as non-depleted marine mammals, provided the taking would not have an unmitigable adverse impact on the availability of the affected species or stock for taking by Alaska Natives for subsistence and handicraft uses.

All forms of incidental taking, including lethal taking, may be authorized by regulations promulgated under section 101(a)(5)(A) of the Act. A new provision, section 101(a)(5)(D), was added in 1994 to provide a streamlined mechanism for authorizing the incidental take of small numbers of marine mammals when the taking would have a negligible effect and be by harassment only. Authorization of incidental harassment under this new section does not require the promulgation of regulations. Rather, the Secretary, within 45 days of receipt of an application that provides the required information, is to publish a proposed authorization for public comment in the *Federal Register* and in newspapers and appropriate electronic media where the taking would occur. After a 30-day comment period, the Secretary has 45 days in which to make a final determination concerning the application. Incidental harassment authorizations under section 101(a)(5)(D) may be issued for periods of no more than one year but may be renewed.

Requests for small-take authorizations that relate to offshore oil and gas activities and that were considered in 1996 are described in Chapter VIII. Other requests for small-take authorizations considered in 1996 are described below.

### **Rocket Launches from Vandenberg Air Force Base**

Under section 101(a)(5)(D) of the Marine Mammal Protection Act, the U.S. Air Force has requested a series of one-year authorizations to take marine mammals by harassment incidental to planned rocket launches from Vandenberg Air Force Base on the central California coast. The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, has reviewed and provided comments to the National Marine Fisheries Service on the Air Force requests. The requests considered in 1996 are described below.

**McDonnell Douglas Aerospace Delta II Launches** — As noted in the Commission's previous annual report, the Air Force applied to the National Marine Fisheries Service on 12 July 1995 for authorization to harass small numbers of harbor seals and possibly other pinniped species incidental to launches of

McDonnell Douglas Aerospace Delta II vehicles from Vandenberg Air Force Base. The Commission, in consultation with its Committee of Scientific Advisors, provided comments on the application to the Service by letter of 18 September 1995. Among other things, the Commission questioned whether the monitoring program proposed by the Service was capable of verifying that the authorized harassment, by itself and in combination with harassment from other vehicle launches from Vandenberg Air Force Base, would have negligible effects on marine mammals stocks. Noting that launches of a variety of vehicles from Vandenberg were likely to continue for an indefinite period of time, the Commission recommended that the Service consult with the Air Force to determine whether it would make more sense to seek a collective five-year authorization for harassment and perhaps other types of taking pursuant to section 101(a)(5)(A) of the Marine Mammal Protection Act.

The requested authorization was issued by the Service on 19 September 1995. The authorization reflected some, but not all, of the recommendations made by the Commission. The Service concurred with the Commission's recommendation that the Air Force should be consulted to determine whether it might be preferable to seek a single five-year authorization for launches of all vehicles from Vandenberg Air Force Base, rather than a series of one-year authorizations for each type of vehicle.

On 23 February 1996 the Service published a *Federal Register* notice indicating that (1) it had received a request from the Air Force on 24 January 1996 to amend the incidental-take authorization by removing the requirement for recording launch noises at coastal harbor seal haul-out sites; and (2) on 31 January 1996 it had amended the authorization as requested. The notice indicated that sound levels recorded at various distances during the first launch of a Delta II vehicle from Vandenberg Air Force Base under the incidental harassment authorization were similar to sound levels recorded at the same distances during a Delta II launch in July 1992 from Kennedy Space Center in Florida. The recorded sound levels corresponded closely with those that were predicted. This close correspondence led the Air Force to conclude, and the National Marine Fisheries Service to concur, that there was no further need to record

launch noises to determine the noise levels to which seals may be exposed.

The requested modification of the incidental harassment authorization was judged by the Service to have little likelihood of altering how or how many seals might be harassed, provided the presence and activities of seals at the haul-out sites are monitored as required by the authorization. Therefore, neither the public nor the Marine Mammal Commission had an opportunity to comment on the modification request.

On 29 August 1996 the National Marine Fisheries Service published in the *Federal Register* a notice of receipt and proposal to approve another request from the Air Force for a one-year authorization to harass small numbers of harbor seals in the vicinity of Vandenberg Air Force Base incidental to launches of the McDonnell Douglas Aerospace Delta II vehicle. The Commission, in consultation with its Committee of Scientific Advisors, provided comments and recommendations on the request and proposed action to the Service by letter of 26 September 1996.

The Commission concurred with the Service's determination that small numbers of harbor seals were likely to be taken incidentally by harassment during some of the anticipated Delta II launches and that the harassment likely would have negligible effects on harbor seal populations in the area. The Commission noted that it was not clear from the information available whether past and future launches of Delta II and other vehicles from Vandenberg Air Force Base have caused or would cause cumulative adverse effects on the range, size, or productivity of the affected harbor seal population. The Commission recommended that, before issuing the authorization, the Service review the results of the monitoring studies that have been done to determine (1) if there may have been cumulative effects on the haul-out patterns, abundance, or productivity of harbor seals in the Vandenberg area, and (2) whether the current monitoring program is sufficient to detect cumulative effects.

The Commission noted its understanding that, consistent with past Commission recommendations (see below), the Service was consulting with the Air Force concerning the preparation of a request pursuant to section 101(a)(5)(A) of the Marine Mammal Protec-

tion Act to authorize the taking of marine mammals for a period of five years incidental to launches of all types of vehicles from Vandenberg Air Force Base.

The National Marine Fisheries Service published a notice in the *Federal Register* on 21 November 1996 that it had issued the requested incidental harassment authorization on 13 November 1996 and that the authorization was effective until 13 November 1997. The Service acknowledged the Commission's recommendation that, before issuing the requested authorization, the results of the monitoring done to date be reviewed to determine if cumulative adverse effects on harbor seals had occurred and whether the current monitoring program was sufficient to detect possible cumulative effects. However, the Service rejected the Commission's recommendation. As the basis for the rejection, the *Federal Register* notice stated that —

By limiting incidental harassment authorizations to a single year as opposed to multi-year authorizations for Letters of Authorization (LOAs) issued under section 101(a)(5)(A) of the MMPA, NMFS does not believe that Congress intended NMFS to make negligible impact assessments on activities for periods greater than the period of the authorization, nor to require holders of IHAs to monitor for periods greater than that authorization.

The Service also noted that, while its interpretation of the Act prevents it from requiring monitoring to assess impacts beyond those that might be caused by the particular activity for which the small-take authorization has been granted, in cases such as this, where holders of incidental harassment authorizations request continuing authorization, "monitoring, over time and in conjunction with other measurements of population trends and abundances, provides information sufficient to make the necessary negligible impact determinations under section 101(a)(5)(D) of the MMPA."

The *Federal Register* notice also indicated that the Air Force recognized the uncertainty concerning possible cumulative effects and was designing a research program to assess possible long-term effects of launch noises and sonic booms on the physiology, behavior, and survival of pinnipeds. The notice indicated that this research, to be conducted under a

scientific research permit, was expected to begin within a year.

**Titan II and Titan IV Launches** — On 15 March 1996 the National Marine Fisheries Service published in the *Federal Register* a notice of receipt and a proposal to issue to the Air Force a one-year authorization to take small numbers of harbor seals, California sea lions, northern elephant seals, and northern and Guadalupe fur seals incidental to launches of Titan II and Titan IV vehicles from Vandenberg Air Force Base. The Commission, in consultation with its Committee of Scientific Advisors, commented to the Service on the application and proposal on 17 April.

The Commission concurred with the Service's determination that small numbers of pinnipeds were likely to be taken incidentally by harassment during some of the anticipated launches and that the harassment likely would have negligible effects. The Commission noted that the application indicated that monitoring done during previous Titan IV launches had shown that marine mammals in certain areas could be startled by noise produced by the vehicles, but that there had been no indications of mortality or reduced reproduction as a result of the disturbance.

The Commission also noted that neither the nature nor the results of the monitoring programs were described in the application and that, in the absence of information on the monitoring program, it was difficult to determine whether the conclusions were justified. Further, the Commission pointed out that, without such information, it was not possible to judge whether the proposed monitoring program would be sufficient to verify that the harassment resulting from anticipated launches of Titan II and Titan IV vehicles during the next year has a negligible effect on the survival and productivity of the affected marine mammals. The Commission requested that the Service provide the data from the previous monitoring programs and the Service's assessment as to whether those data supported the conclusion that launches of Titan II and Titan IV vehicles were not likely to affect the survival or productivity of any marine mammal.

The Commission also pointed out that any authorization issued pursuant to section 101(a)(5)(D) of the Act should make it clear that the authorization is

automatically rescinded if a marine mammal is injured or killed as a result of the activity. The Commission recommended that the incidental harassment authorization require that the death or injury of any animals incidental to Titan II or Titan IV launches be reported immediately to the Service. The Commission also repeated a prior recommendation, made with respect to other rocket launches from Vandenberg, that the Service consult with the Air Force to determine whether it would make more sense to seek a collective five-year authorization for all possible types of taking resulting from launches of all types of vehicles from Vandenberg Air Force Base under section 101(a)(5)(A) of the Act, rather than separate, one-year authorizations for harassment only for each type of vehicle under section 101(a)(5)(D) of the Act.

The National Marine Fisheries Service published a notice in the *Federal Register* on 4 December 1996, indicating that the requested small-take authorization had been issued on 27 November 1996 and would be effective through 27 November 1997. The notice did not address the comments or recommendations provided by the Commission on 17 April 1996.

**Lockheed Vehicle Launches** — On 2 May 1996 the National Marine Fisheries Service published in the *Federal Register* a notice of receipt and its proposal to approve a request from the Air Force for continued authority to harass small numbers of harbor seals incidental to launches of Lockheed vehicles from Vandenberg Air Force Base. The Commission, in consultation with its Committee of Scientific Advisors, provided comments on the application and the proposed action to the Service by letter of 4 June 1996.

The Commission noted that information provided indicated that harbor seals had been startled, as predicted, by the first launch of the Lockheed vehicle and that no long-term effects had been detected. The Commission pointed out that it was not evident what was meant by "long-term effects." The Commission also pointed out that neither the nature nor the results of the monitoring studies were described in sufficient detail to determine the effects that could have been detected. The Commission recommended that the Service, if it had not already done so, obtain and assess the monitoring results to determine whether the conclusions in the application were justified. The

Commission requested that it be informed of the nature and results of the monitoring study and the Service's assessment of them.

The Commission also pointed out that it appeared the Air Force and others expected to continue launching a variety of vehicles from Vandenberg Air Force Base for an indefinite period of time. Further, the Commission pointed out that, while individual launches were likely to have negligible effects, it was not clear that the cumulative effects would be negligible or that the on-going or planned monitoring programs were adequate to detect possible non-negligible cumulative effects. The Commission once again recommended that the Service, if it had not already done so, consult with the Air Force to determine whether it would be more appropriate to obtain authorization to take marine mammals incidental to vehicles launches from Vandenberg Air Force Base under section 101(a)(5)(A) of the Marine Mammal Protection Act rather than under section 101(a)(5)(D).

On 24 July 1996 the Service published a notice in the *Federal Register* that it had issued the requested small-take authorization. The notice indicated that the Air Force was preparing an application for a small-take authorization under section 101(a)(5)(A) of the Act. The notice did not address the Commission's question as to whether past and planned monitoring programs would be able to detect possible cumulative adverse effects.

**Launches of Taurus Vehicles** — On 25 September 1996 the National Marine Fisheries Service published in the *Federal Register* a notice of receipt and proposed approval of a request from the Air Force for authorization to harass for a period of one year small numbers of harbor seals and possibly California sea lions and northern elephant seals incidental to launches of Taurus vehicles from Vandenberg Air Force Base. The Commission, in consultation with its Committee of Scientific Advisors, provided comments and recommendations on the request and the proposed action to the National Marine Fisheries Service by letter of 30 October 1996.

The Commission concurred with the Service's determination that small numbers of harbor seals were likely to be taken incidentally by harassment during

some of the launches and that the harassment was likely to have negligible effects on the affected populations. The Commission indicated its continuing view that, because of possible cumulative effects, the Air Force should obtain a single authorization under section 101(a)(5)(A) of the Act to cover all possible taking of marine mammals incidental to all vehicle launches from Vandenberg Air Force Base. The Commission recommended that, before issuing the requested authorization, the Service review the results of the monitoring done during previous launches from Vandenberg Air Force Base to determine (1) if there may have been cumulative effects on the haul-out patterns or productivity of harbor seals in the Vandenberg area, and (2) whether the current monitoring programs are sufficient to detect such effects.

Final action on this request was not taken before the end of 1996.

### **Physical Oceanography Experiment in Haro Strait, Puget Sound, Washington**

On 28 March and 9 April 1996 the National Marine Fisheries Service published a *Federal Register* notice concerning an application for a small-take authorization from a scientist at the Massachusetts Institute of Technology, Cambridge. The application sought authority to incidentally harass small numbers of harbor porpoises, killer whales, Dall's porpoises, and harbor seals in Haro Strait, Puget Sound, Washington, during the course of an experiment using sound to study the flow field and mixing of waters in Haro Strait.

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, provided comments on the application to the National Marine Fisheries Service by letter of 6 May 1996. The Commission concurred with the Service's determination that the experiment could have short-term effects on the behavior of several species of marine mammals and that any population-level effects were likely to be negligible. To help verify this determination, the Commission recommended that the Service consult members of the Northwest Regional Marine Mammal Stranding Network to obtain information on the numbers and species of dead marine mammals found

previously in the area in the months of June and July when the experiment was to be conducted, and to request that the network members immediately report any dead or injured marine mammals found in the area during the experiment or in the week or two following it. In this context, the Commission noted that it should be made clear that the authorization would be rescinded automatically if a marine mammal was killed or injured incidental to the experiment.

The Commission pointed out that, while the *Federal Register* notice indicated that thousands of similar acoustic devices were in use daily in U.S. waters, it was not clear whether the Service had considered the possible cumulative effects of all sound sources that could be operating when and where the proposed experiment was to be conducted. The Commission therefore recommended that the Service, if it had not already done so, consider whether sounds to be used in the proposed experiment, combined with sounds from other sources, could have non-negligible effects on marine mammals in Puget Sound.

On 13 June 1996 the Service published a notice in the *Federal Register* indicating that the requested small-take authorization had been issued on 7 June 1996. The authorization included a number of provisions to ensure that the experiment would have negligible effects on marine mammals. Although the notice made no mention of the Commission's comments and recommendations, they were appropriately reflected in the authorization.

### **SEAWOLF Submarine Shock Tests**

On 14 June 1996 the National Marine Fisheries Service published in the *Federal Register* a notice of receipt from the U.S. Navy of a petition pursuant to section 101(a)(5)(A) of the Marine Mammal Protection Act for authorization to take small numbers of marine mammals incidental to shock tests required to determine whether the new SEAWOLF class submarine meets operational specifications. On 2 August 1996 the Service published a request for comments on proposed regulations to authorize and govern the requested taking. The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, provided comments and recommendations to the National Marine Fisheries Service by letter of

16 September 1996 on both the Navy's request and the Service's proposed regulations. As noted in Chapter VII, the Commission had previously reviewed and on 12 August 1996 provided comments to the Navy on its draft environmental impact statement for shock-testing the SEAWOLF submarine. The Commission enclosed a copy of its 12 August letter to the Navy with its 16 September letter and asked that its comments be incorporated by reference.

The Commission noted that measures proposed to ensure that no marine mammals were present in the area where they could be killed or injured when the tests were conducted were likely to be successful in ensuring that the tests have negligible effects on the distribution, size, and productivity of the potentially affected marine mammal species and population stocks. The Commission also noted that the number of animals that could be killed, injured, or harassed incidental to the tests could be greater than estimated. The Commission pointed out that, if this were the case, and the number of animals killed, injured, or harassed during the initial testing exceeded the numbers authorized, the Navy would be required to stop the testing before it was completed, even though the effects on the distribution, size, and productivity of the affected populations could still be negligible. The Commission recommended that the Service carefully examine the data, assumptions, and methods used to estimate the numbers of animals that might be killed, injured, or harassed incidental to the shock tests, and that the number of animals authorized to be taken be increased if the assessment indicated that it would be desirable and appropriate to do so.

The Navy's request for a small-take authorization introduced a new criterion — acoustic discomfort — for determining how and how many marine mammals may be harassed by anthropogenic sounds in the marine environment. The Commission pointed out that this criterion appeared to be based on the assumption that, because the sounds and pressures produced by the explosives used in the tests would be brief, any behavioral change elicited would be similarly brief and therefore would not constitute Level B harassment as defined in section 3(18)(c) of the Marine Mammal Protection Act. The Commission questioned this apparent assumption. The Commission also noted that it was not clear what, if anything, the Navy planned

to do to verify that no more than the authorized numbers of animals are harassed. The Commission recommended that the Service take such steps as necessary to ensure that the number of marine mammals that potentially could be harassed incidental to the planned tests is not underestimated and that the monitoring program planned by the Navy is adequate

to verify that any disruption of vital behavior is momentary and that no more than the authorized number of animals are harassed.

By the end of 1996 the National Marine Fisheries Service had not yet issued the requested regulations.

## Chapter XI

# MARINE MAMMALS IN CAPTIVITY

Under the Marine Mammal Protection Act, permits to take marine mammals may be issued by the Secretary of Commerce or the Secretary of the Interior, depending on the species of marine mammal involved, for several purposes, including public display, scientific research, or enhancing the survival or recovery of a species or stock. Such permits may, among other things, authorize the maintenance of marine mammals in captivity. Since its inception, the Marine Mammal Commission has worked with the responsible agencies to ensure the safety and well-being of marine mammals in captivity.

Amendments to the Marine Mammal Protection Act enacted in 1994 greatly limited the authority of the National Marine Fisheries Service and Fish and Wildlife Service over marine mammals once they are removed from the wild. While no corresponding amendments to the Animal Welfare Act were enacted, the practical effect was an increase in the prominence of the Department of Agriculture's Animal and Plant Health Inspection Service in matters concerning the care and maintenance of captive marine mammals. Prior to passage of the amendments, the Service published a notice in the *Federal Register* soliciting comments on the need to review and revise the regulations governing the care and maintenance of captive marine mammals. Activities with respect to that review are discussed below.

Also discussed in this chapter are issues involving the export of marine mammals from the United States to foreign facilities and efforts concerning the release of long-term captive marine mammals to the wild.

### Care and Maintenance Standards

The Animal and Plant Health Inspection Service regulates the humane handling, housing, care, treat-

ment, and transportation of marine mammals and other animals under the Animal Welfare Act. Standards applicable to marine mammals were adopted in 1979 and amended in 1984. They have not been updated since then to reflect advances in animal husbandry and marine mammal science. Therefore, on 29 May 1990 the Marine Mammal Commission invited representatives of the Animal and Plant Health Inspection Service, the National Marine Fisheries Service, and the Fish and Wildlife Service to meet to discuss the need to revise the standards. All agreed that a review of the standards was desirable and that an interagency approach should be followed. As a first step, the Commission provided the Animal and Plant Health Inspection Service with a comprehensive discussion paper on 31 July 1991 identifying shortcomings in the current standards and raising questions to be addressed in reviewing those standards.

In response, the Animal and Plant Health Inspection Service published an advance notice of proposed rulemaking on 23 July 1993, indicating that it was considering revising its marine mammal standards. Based in part on the Commission's discussion paper, the Service solicited comments on certain elements of the standards, including water quality, water and air temperatures, noise levels, the allowance of swim-with-the-dolphin programs, record-keeping requirements with regard to husbandry, and maintaining marine mammals in isolation. The Commission provided comments on 5 October 1993, reiterating the suggestions made in its 31 July 1991 letter.

The Animal and Plant Health Inspection Service subsequently indicated its intention to use negotiated rulemaking to review and revise its marine mammal standards and guidelines. The first meeting of the negotiated rulemaking advisory committee was held on 25-26 September 1995. The Committee comprised representatives of the public display and animal

welfare communities as well as government agencies. The Commission, the National Marine Fisheries Service, and the Fish and Wildlife Service participated as non-voting observers. At the initial meeting, the participants established an organizational protocol to guide the negotiations and, in anticipation that additional meetings might not be funded, discussed in broad terms the key topics to be considered. These included requirements related to space, isolation/separation, water quality, noise, temperature, transportation, record-keeping, food preparation, necropsies, personnel qualifications and training, lighting, petting and feeding pools, and traveling exhibits.

Sufficient funding was available in 1996 for the Service to hold an additional negotiating meeting on 1-3 April. In preparation for that meeting, the Animal and Plant Health Inspection Service prepared a discussion paper in the form of a draft revision of its "Specifications for the Humane Handling, Care, Treatment, and Transportation of Marine Mammals," based on discussions at the first meeting and previously submitted comments.

The second meeting adjourned with the understanding that it was probably the final meeting due to funding constraints. However, at the prompting of several members of the negotiated rulemaking committee, the Department of Agriculture made available to the Animal and Plant Health Inspection Service sufficient funding to convene an additional meeting during fiscal year 1996. The Commission, aware of the limited resources available for advisory committee activities, commended the Department of Agriculture in a 15 May 1996 letter for providing additional support for the valuable work of the committee. The third meeting was held on 8-10 July 1996.

As a result of the three negotiating sessions in 1995 and 1996, consensus language was reached regarding 12 of the 18 sections in the current standards. The committee reached agreement on the following sections: feeding; sanitation; employees/attendants; transportation; veterinary care; facilities general; section (a) of space requirements; and separation. However, consensus was not reached on some of the most contentious and potentially costly issues, including special considerations regarding compliance and/or variances; indoor facilities (which includes provisions

concerning ambient temperatures, ventilation, and lighting); outdoor facilities (which includes temperature and shelter requirements); space; and water quality. The agreed-upon language will form the basis for a proposed rule to be published by the Animal and Plant Health Inspection Service. The voting members of the rulemaking committee are not allowed to comment negatively or in opposition to any of the consensus language. Observers such as the Marine Mammal Commission are not restrained in how they may comment.

After considering the projected cost associated with convening additional negotiating sessions and the likelihood of the committee reaching consensus on the remaining issues, the Animal and Plant Health Inspection Service decided not to hold any additional negotiating meetings. Rather, the Service intends to draft a proposed rule to address the remaining sections itself. The Service is also considering publication of separate proposed rules for those parts of the regulations on which the committee reached consensus and on those sections drafted by the Service independently. Whether as a single proposed rule or as two separate parts, the proposed regulations will be published in the *Federal Register* for public comment.

In a separate rulemaking initiated in 1995, the Animal and Plant Health Inspection Service proposed to regulate swim-with-the-dolphin programs which, prior to the 1994 Marine Mammal Protection Act amendments, had been regulated by the National Marine Fisheries Service. As discussed in the previous annual report, the Commission commented by letter of 17 March 1995, recommending several changes to the proposed rule. As of the end of 1996, final regulations had yet to be issued by the Service.

## **Exports of Marine Mammals to Foreign Facilities**

Section 102(a)(4) of the Marine Mammal Protection Act, as amended in 1994, prohibits the export of marine mammals taken in violation of the Act or for any purposes other than public display, scientific research, or species enhancement. Marine mammals may be exported from U.S. facilities as long as the

receiving facility meets requirements comparable to those applicable to U.S. facilities. To obtain marine mammals from the United States for public display, a facility must meet comparable standards with respect to education or conservation programs, Animal and Plant Health Inspection Service licensure, and public accessibility. Because foreign facilities are not subject to licensing or registration requirements under the Animal Welfare Act, it is only through the Marine Mammal Protection Act's comparability requirement that adequate care of marine mammals transferred to foreign facilities can be assured. There is some disagreement among the responsible agencies and the public display industry as to how such findings are to be made and for what period the facility must remain comparable. The National Marine Fisheries Service believes that its responsibilities and those of the receiving facility under the Marine Mammal Protection Act do not end once an animal has been exported. The Service continues to require the foreign government with jurisdiction over the facility to provide a certification that includes a comity statement to enable the Service to enforce the comparability provisions of the Marine Mammal Protection Act once the animals have been exported. The public display industry believes that there is no continuing U.S. jurisdiction after an animal is exported, *i.e.*, that the comparability requirement is applicable only at the time of export. Therefore, it believes that a comity statement is not required.

By letter of 26 August 1994 the Animal and Plant Health Inspection Service requested the Commission's comments on a document outlining the information to be submitted by a foreign facility to enable the Service to determine that comparable standards have been met. By letter of 8 September 1994 the Commission provided its views on the determinations that must be made before marine mammals can be exported to foreign facilities. The Commission noted that marine mammals may only be exported to foreign facilities that meet requirements comparable to those applicable to U.S. facilities. The Commission concluded that such determinations can only reliably be made by conducting an inspection of the foreign facility, as is required for U.S. facilities.

In 1995 the National Marine Fisheries Service requested the Commission's comments on four appli-

cations from foreign facilities requesting authorization to export unreleasable stranded marine mammals from the United States for purposes of public display. The Commission wrote to the Service on 26 May 1995 stating its continued belief that an onsite inspection, conducted by a qualified individual (*e.g.*, an Animal and Plant Health Inspection Service inspector or an independent inspector, approved by the Animal and Plant Health Inspection Service, who is familiar with marine mammals), is the only reliable way to ensure that a facility meets comparable standards. The Commission noted that, while the Animal and Plant Health Inspection Service does not have authority under the Animal Welfare Act to compel a foreign facility to consent to an inspection, it is within the authority of the National Marine Fisheries Service and the Animal and Plant Health Inspection Service to require a foreign facility to submit to such an inspection as a condition of obtaining animals under the Marine Mammal Protection Act. Thus, for a facility wishing to obtain marine mammals from the United States, inspection could be made mandatory. The Commission further noted that it would not be difficult to imagine circumstances in which an animal would be better off being euthanized than being transferred to an unacceptable foreign facility.

Following its annual meeting in November 1996, the Commission, by letter of 18 December 1996, again wrote to the Animal and Plant Health Inspection Service regarding the export of marine mammals from the United States. The Commission noted that the Animal and Plant Health Inspection Service continues to base its comparability determinations for foreign facilities solely on written submissions. Although the Animal and Plant Health Inspection Service does not have jurisdiction under the Animal Welfare Act to require a foreign facility to submit to an inspection by U.S. authorities, the Commission reiterated its view that the Marine Mammal Protection Act provides sufficient authority to require that a foreign facility allow and pay for an inspection as a condition of obtaining marine mammals from the United States.

The Commission also wrote to the National Marine Fisheries Service on 18 December 1996 regarding exports of marine mammals. The Commission believes that, given the current requirements of section 104 of the Marine Mammal Protection Act,

the Service has little choice but to require a comity statement or to implement some other mechanism to ensure continuing jurisdiction over foreign facilities that receive marine mammals from the United States. Nevertheless, the Commission noted that it is unrealistic to assume that the Service will be able to monitor compliance by foreign facilities adequately or take remedial actions if problems are detected. The Commission therefore suggested that it might make sense if the Marine Mammal Protection Act were amended to eliminate continuing jurisdiction over marine mammals once they are exported but to strengthen the mechanisms for ensuring comparability prior to authorizing an export.

### **Release of Captive Marine Mammals to the Wild**

Over the past few years, there has been increased interest in returning long-term captive marine mammals to the wild. The feasibility of such releases and the best procedures to follow to prepare animals for release are still experimental. As such, it is generally thought that release of long-term captive animals should be pursued only in accordance with an appropriate research protocol, pursuant to a scientific research permit.

Three dolphins were transferred to a Florida facility in 1994 under a public display permit. The facility intended to seek a scientific research permit under which preparation for release, the actual release, and post-release monitoring would occur. Prior to submitting a permit application, however, the facility operators took matters into their own hands. On 23 May 1996, despite warnings from the National Marine Fisheries Service that such action would constitute a violation of the Marine Mammal Protection Act, two of the dolphins were transported offshore Key West and were deliberately released into open waters without authorization. The facility contended that this was not a violation of the Act.

Inasmuch as the dolphins had not been sufficiently prepared for release, they suffered extremely adverse effects. The animals likely would have died, had they not been rescued by the National Marine Fisheries

Service. As demonstrated by this experience, releasing marine mammals before they are properly prepared clearly has the potential to injure the released animals. It also potentially exposes wild marine mammals to risks from disease. Therefore, the Commission believes the unauthorized release of captive marine mammals constitutes harassment, as defined under the 1994 amendments to the Marine Mammal Protection Act.

The National Marine Fisheries Service and the Animal and Plant Health Inspection Service have each pursued enforcement actions against the facility. The Animal and Plant Health Inspection Service suspended the facility's Animal Welfare Act license, which provided a partial basis for the National Marine Fisheries Service to seize a third dolphin maintained at the facility. The Animal and Plant Health Inspection Service concluded its enforcement action in 1996, imposing, but suspending collection of, a \$10,000 fine. The National Marine Fisheries Service expects to conclude its enforcement action against the facility in 1997.

In a separate incident, two dolphins being held at another facility in Florida in anticipation of seeking a permit authorizing their reintroduction to the wild were apparently released from their pen by vandals. Although the facility had intended to obtain a scientific research permit authorizing the release of these dolphins, the dolphins had yet to be prepared for eventual release. To date, there have been no confirmed sightings of these dolphins and their fate remains unknown.

The Commission, by letter of 30 November 1994 to the National Marine Fisheries Service, recommended that the Service refrain from considering any permit application seeking authority to release marine mammals to the wild until objective, generally accepted criteria for judging when release is feasible and appropriate had been developed. The Commission reiterated this recommendation in a letter to the Service on 6 December 1996. The Commission further recommended that the Service publish an unequivocal policy statement or, if deemed necessary, regulations to specify that releasing captive marine mammals to the wild without proper authorization has the potential to injure marine mammals and is consid-

ered an illegal taking. The Commission further recommended that, if the Service does not believe it has sufficient authority to prevent unauthorized releases, it seek amendment of the Marine Mammal Protection Act to obtain explicit authority, *e.g.*, by specifically prohibiting unauthorized releases, allowing recovery of costs for recapture efforts, and giving the Service clearer authority to obtain an injunction against those who indicate an intention to release animals or otherwise violate the Act.

The Commission on 6 December 1996 also wrote the Animal and Plant Health Inspection Service regarding the issue of release. The Commission noted that the Animal Welfare Act (9 C.F.R. Section 3.101(a)) requires that "facilities" for marine mammals shall be structurally sound and shall be maintained in good repair, to protect the animals from to contain the animals, and to restrict entrance of unwanted animals. The Commission noted that despite

the clear requirement that marine mammals be contained in an enclosure, some facilities have been allowed to permit animals to venture outside the primary enclosure. While this may be appropriate in certain situations (*e.g.*, open-water training of marine mammals by the Navy), such exceptions should be authorized only if necessary and only if safeguards are in place to ensure that the animals will be returned to their primary enclosure. The Commission further recommended that the Animal and Plant Health Inspection Service work with the National Marine Fisheries Service and the Fish and Wildlife Service to review their respective authorities and consider the need for more decisive enforcement of existing statutory provisions and regulations, issuance of policy statements, and regulatory amendments. If the agencies determine that they have authority to respond to, but not prevent, unauthorized releases, the Commission recommended that the agencies seek statutory authority to prevent releases.



## APPENDIX A

### MARINE MAMMAL COMMISSION RECOMMENDATIONS IN 1996

- 11 January Commerce, modification of scientific research permit, James H.W. Hain.
- 11 January Commerce, modification of scientific research permit, University of Hawaii.
- 11 January Commerce, modification of scientific research permit, National Marine Mammal Laboratory.
- 11 January Commerce, commenting to the National Marine Fisheries Service on a proposal to change the listing of Steller sea lions under the Endangered Species Act; recommending, among other things, that the Service list the western stock of Steller sea lions as endangered and the eastern stock as threatened under the Endangered Species Act; further recommending that the Service set aside funding for the Recovery Team to conduct necessary program reviews, with priority on an examination of plans for satellite telemetry studies and foraging ecology research, and an update of the Recovery Plan; and recommending that the Service, in consultation with the Recovery Team, convene a panel of independent experts to evaluate and make recommendations on the full range of fishery management practices that may be useful for reversing the decline of Steller sea lions.
- 16 January Commerce, commenting to the National Oceanic and Atmospheric Administration on the Hawaiian Islands Humpback Whale National Marine Sanctuary Draft Environmental Impact Statement/Management Plan; recommending, among other things, that the Sanctuaries and Reserves Division proceed with efforts to designate and implement the preferred boundary alternative as described in the draft environmental impact statement and implement management practices taking into account that (a) the management activities should continue year-round, (b) it is desirable to operate the sanctuary from a field office, (c) research and education programs would provide a complementary mixture of leadership and support, and (d) the sanctuary should assist in enhancement of the National Marine Fisheries Service's enforcement efforts; further recommending that the Division take the necessary steps to include Hawaiian monk seals as a resource of national significance for special protection within the sanctuary.
- 17 January Commerce, scientific research permit, Southwest Fisheries Science Center.
- 18 January Commerce, modification of scientific research permit, Robin Brown.
- 23 January Commerce, modification of scientific research permit, Deborah A. Glockner-Ferrari and Mark J. Ferrari.
- 25 January Interior, public display permit, Cincinnati Zoo.
- 5 February Commerce, scientific research permit, James Darling.
- 12 February Commerce, commenting to the National Marine Fisheries Service on whether a Florida marine mammal facility meets the standards of the Animal Welfare Act; recommending that the Service immediately initiate consultations with the Animal and Plant Health Inspection Service to determine whether the facility continues to meet the Animal Welfare Act requirements for licensing as an

- exhibitor, and, if not, that the Service exercise its authority under section 104(c)(2)(D) to compel relocation of the animals.
- 14 February Commerce, modification of scientific research permit, National Marine Mammal Laboratory.
- 20 February Commerce, modification of scientific research permit, Southwest Fisheries Science Center.
- 23 February Defense, commenting to the Department of the Navy on right whale mortalities off the southeast coast of the United States; noting the possible relationship between right whale mortality and the gunnery practice and recommending that the gunnery practice stop, that the situation be evaluated, and that an assessment of planned gunnery practice and related activities be done before practice resumes.
- 29 February Commerce, modification of scientific research permit, Andrew W. Trites.
- 29 February Commerce, scientific research permit, Donald B. Siniff.
- 4 March Commerce, modification of scientific research permit, William A. Watkins.
- 4 March Commerce, modification of scientific research permit, Janice Straley.
- 4 March Commerce, modification of scientific research permit, Fred Sharpe.
- 5 March Commerce, modification of scientific research permit, Craig O. Matkin.
- 6 March Agriculture, commenting to the Office of the General Counsel on the qualifications of the veterinarian at a Florida marine mammal facility; recommending that the Animal and Plant Health Inspection Service require the facility to obtain a qualified veterinarian immediately as required under the Animal Welfare Act.
- 6 March State, commenting to the Bureau of Oceans and International, Environmental, and Scientific Affairs on the fourth draft of the report of the Third Ministerial Conference on the Protection of the Arctic Environment and the second draft of the Inuvik Declaration to establish an intergovernmental Arctic council; and providing general and specific recommendations on how to amend the documents.
- 6 March Commerce, modification of scientific research permit, Randall W. Davis.
- 8 March Defense, commenting to the Department of the Navy on a March 1996 message to the Atlantic Fleet on the possible relationship between right whale mortalities and Navy activities; recommending that archived sound series data be retrieved and examined, that short- and long-term monitoring be intensified, that a comprehensive assessment/monitoring/warning program be developed in close consultation with the National Marine Fisheries Service and the Southeastern Right Whale Implementation Team.
- 12 March Commerce, commenting to the National Marine Fisheries Service on Paul H. Forestell's letter of intent to conduct scientific research under the general authorization on several species of small cetaceans offshore Hawaii; and noting that the applicant does not provide specific information to conclude, among other things, that the taking will be by level B harassment only, or to conclude that the activities would constitute bona fide research.
- 12 March Commerce, modification of scientific research permit, James T. Harvey.
- 20 March Commerce, modification of scientific research permit, Norihisa Baba.

- 20 March Commerce, modification of scientific research permit, Bruce R. Mate.
- 20 March Commerce, modification of scientific research permit, Moss Landing Marine Laboratories.
- 20 March Commerce, modification of scientific research permit, Glacier Bay National Park.
- 20 March Commerce, modification of scientific research permit, Southwest Fisheries Science Center.
- 22 March Defense, commenting to the Department of the Navy on actions to minimize risk to right whales; recommending that no Navy exercises be carried out at night and that a protocol for intensive monitoring for right whale presence be completed and put in place immediately.
- 29 March Interior, public display permit, San Diego Zoological Society.
- 29 March Interior, public display permit, Hofstra University.
- 29 March Commerce, scientific research permit, Alaska Department of Fish and Game.
- 1 April Commerce, commenting to the National Marine Fisheries Service on amendment 9 to the fishery management plan for the crustacean fisheries of the western Pacific region; recommending that the Service modify amendment 9 to prohibit lobster fishing at French Frigate Shoals until critical uncertainties are resolved regarding the availability and relative importance of lobsters and octopuses in the Hawaiian monk seal diet; further recommending that the Service take no action to adopt amendment 9 or a lobster fishery quota for the Northwestern Hawaiian Islands until a biological opinion pursuant to section 7 of the Endangered Species Act has been completed; and further recommending that a provision for retaining all lobsters be made a requirement rather than an option and that within-season harvest adjustments be retained as a management option.
- 1 April Commerce, commenting to the National Marine Fisheries Service on amendment 9 to the fishery management plan for the crustacean fisheries of the Western Pacific Region, and requesting that the Service advise the Commission as to (a) what the economic impact would be on the fishery if French Frigate Shoals were closed to lobster fishing, and (b) why the Service has concluded that this closure is not a reasonable, precautionary measure to protect the French Frigate Shoals Hawaiian monk seal colony.
- 10 April State, commenting on documents distributed during meetings of senior Arctic affairs officials and the ministers of the eight Arctic nations held in Inuvik, Canada, on 18-21 March 1996; recommending, pursuant to section 202(d) of the Marine Mammal Protection Act, that the Department of State take such steps as necessary to ensure that U.S. positions regarding formation of the Arctic Council, sustainable development and utilization of Arctic resources, and other similarly sensitive Arctic issues are developed in consultation with, and are cleared by, those Federal agencies with related interests and responsibilities; further recommending that the U.S. delegation to the 18-21 April 1996 negotiating session in Ottawa be instructed to (1) reserve the U.S. position on any provisions and language not previously cleared through the interagency process, and (2) insist that the report of the negotiating session be completed and adopted before the conclusion of the negotiating session, rather than following the meeting.
- 11 April Interior, commenting to the Fish and Wildlife Service on the Draft Environmental Assessment for the Proposed Refuge Logistics and Operations Support and Public Use Program at Midway Atoll National Wildlife Refuge; and recommending that the Service's agreement with the cooperating facility manager incorporate provisions to assure that the Service has the flexibility and means necessary to modify or withdraw initial commitments regarding levels of use, or institute such other limitations, steps, or changes necessary to protect atoll wildlife and historic resources.

- 17 April Commerce, commenting to the National Marine Fisheries Service on the request from the U.S. Air Force for authority under section 101(a)(5)(D) of the Marine Mammal Protection Act to harass, for a period of one year, small numbers of harbor seals, California sea lions, northern elephant seals, northern fur seals, and Guadalupe fur seals in the vicinity of Vandenberg Air Force Base, California, and the Northern Channel Islands incidental to launches of the Titan II and Titan IV launch vehicles; recommending, among other things, that in light of potential cumulative effects of many one-year permits, the Service consult with the Air Force regarding seeking a collective, five-year authorization for harassment, and perhaps other types of taking, resulting from launches of all types of rockets from the facility under section 101(a)(5)(A), rather than separate permits for each type of rocket launched.
- 18 April Commerce, modification of scientific research permit, Institute of Marine Science, University of California, Santa Cruz.
- 19 April Interior, modification of scientific research permit, National Biological Service.
- 19 April Commerce, modification of scientific research permit, Scripps Institution of Oceanography.
- 19 April Commerce, commenting to the National Marine Fisheries Service on the proposed amendment 7 to the northeast multispecies fishery management plan; recommending the adoption of amendment 7, and that the New England Fishery Management Council's Harbor Porpoise Review Team meet in time to provide advice for the summer-fall fishing season off the coast of central and northern Maine, and that the Council consider expanding the effective dates for the mid-coast closure to include the months of September through December and April through May; further recommending that the Service either expand amendment 7 or take separate action under authority of the Endangered Species Act and the Marine Mammal Protection Act to prohibit gillnets from April through June in the Great South Channel area designated as critical habitat for right whales, and that the Service consult with appropriate officials in Massachusetts to develop measures for gillnets and other fishing gear that could entangle right whales in their critical habitat.
- 26 April Agriculture, commenting to the Animal and Plant Health Inspection Service on the quality of animal care at a Florida marine mammal facility; noting previous recommendations to (1) initiate enforcement proceedings against the facility, (2) consider temporary suspension or revocation of its license, and (3) consult with the National Marine Fisheries Service regarding seizure of the animals under the Marine Mammal Protection Act; further noting that the situation continues to deteriorate, and recommending that the Service take action.
- 26 April Commerce, modification of scientific research permit, Southwest Fisheries Science Center.
- 30 April Commerce, modification of scientific research permit, Southwest Fisheries Science Center.
- 1 May Commerce, general authorization for scientific research, Andrew Byatt.
- 1 May Interior, commenting to the Minerals Management Service on the draft environmental impact statement for the Gulf of Alaska/Yakutat Oil and Gas Lease Sale 158; recommending, among other things, that the environmental impact statement be expanded to more fully describe what is being or will be done to meet the monitoring requirements of section 20 of the Outer Continental Shelf Lands Act and to ensure that lessees are aware of the Marine Mammal Protection Act's provisions for obtaining a small-take authorization or waiver of the Act's moratorium on taking marine mammals, and that the environmental impact statement be further expanded to provide a more thorough assessment of how the proposed action might affect the marine mammal populations in the Gulf of Alaska and adjacent waters; further recommending that the Minerals Management Service (1) obtain copies of stock assessment reports for the marine mammal species and populations that occur in the Gulf of Alaska and adjacent waters, and (2) revise and expand this section of the environmental impact statement to

(a) ensure that it incorporates the best available information on the natural history, size, status, and sources and levels of human-related mortality of the marine mammal stocks that potentially could be affected, and (b) describe any uncertainties regarding natural history and what is being planned to resolve them.

- 6 May Commerce, modification of scientific research permit, National Marine Mammal Laboratory.
- 6 May Commerce, commenting to the National Marine Fisheries Service on a request to take by harassment small numbers of harbor porpoises, killer whales, Dall's porpoises, and harbor seals in conjunction with an experiment to be conducted in Haro Strait, Puget Sound, Washington; recommending that the Service consult with the local marine mammal stranding network to obtain information on the numbers and species of dead marine mammals that have been found previously in June and July in the area where the experiment is to be conducted and request that network members immediately report any dead or injured marine mammals found in the experimental area during and two weeks thereafter; and recommending that the Service consider assessing whether sounds to be used in the proposed experiment, combined with sounds from other sources, could have non-negligible effects on marine mammals in Puget Sound.
- 7 May Commerce, modification of scientific research permit, Brent Stewart.
- 9 May Interior, commenting to the Fish and Wildlife Service on the increase of recreational divers in the area of the Crystal River National Wildlife Refuge in Florida, causing frequent and, in some cases, blatant harassment of manatees; recommending, among other things, that the Service immediately re-examine its system of manatee sanctuaries and take steps to designate the Three Sisters Spring and perhaps other sites in Kings Bay and the Homosassa River as new manatee sanctuaries, and if it cannot be done in a timely fashion under normal rulemaking procedures, that it be done under emergency procedures; further recommending that the Service, in consultation with the Florida Department of Environmental Protection, examine alternative approaches to strengthening enforcement to prevent manatee harassment.
- 10 May Interior, recommending to the Fish and Wildlife Service that it undertake a comprehensive retrospective review of the manatee die-off in Southwestern Florida and enclosing a recommended outline for the review.
- 20 May Commerce, modification of scientific research permit, Stephen J. Insley.
- 23 May Interior, public display permit, Carnegie Museum of Natural History.
- 23 May Commerce, modification of scientific research permit, National Marine Mammal Laboratory.
- 29 May Commerce, modification of scientific research permit, North Gulf Oceanic Society.
- 31 May Commerce, modification of scientific research permit, Sherman C. Jones.
- 4 June Commerce, commenting to the National Marine Fisheries Service on the request from the U.S. Air Force under section 101(a)(5)(D) of the Marine Mammal Protection Act for continued authority to harass small numbers of harbor seals in the vicinity of Vandenberg Air Force Base and the Channel Islands, California, incidental to launches of Lockheed aerospace vehicles; recommending approval provided that the Service obtain and assess the monitoring results and that the Service require an immediate report following any marine mammal mortalities or serious injuries resulting from the proposed activities; further recommending that the Service consult with the Air Force to determine if monitoring programs are adequate to detect possible non-negligible cumulative effects and whether authorization under section 101(a)(5)(A) would be more appropriate.

- 5 June Commerce, modification of scientific research permit, Pacific Whale Foundation.
- 5 June Commerce, modification of scientific research permit, John Calambokidis.
- 7 June Commerce, modification of scientific research permit, Daniel P. Costa and Michael Goebel.
- 7 June Commerce, modification of scientific research permit, James Darling.
- 10 June Commerce, scientific research permit, Kimberlee Beckmen.
- 10 June Commerce, modification of scientific research permit, Robin W. Baird.
- 11 June Defense, commenting to the U.S. Army Engineer District, Alaska, on preparation of an environmental impact statement of the Beaufort Sea Oil and Gas Development/Northstar Project; recommending that the Army Corps of Engineers consult with the Fish and Wildlife Service to ensure that the project is consistent with the polar bear conservation plan and habitat conservation strategy; recommending that (a) the environmental impact statement provide an assessment of the differences in potential environmental impacts between oil and gas exploration and production activities, (b) the environmental impact statement describe the monitoring programs that will be required to verify that there are no non-negligible, long-term effects on marine mammals or their habitat, and (c) the environmental impact statement identify additional steps needed to avoid or minimize possible adverse effects; recommending that the Corps identify measures that would be taken to plan for the clean-up of oil spills that could result from extraction and transportation activities, and the likelihood that a spill could be cleaned up effectively in ice and under potentially adverse weather and sea conditions; further recommending that the environmental impact statement identify and assess the possible cumulative effects of (a) offshore oil and gas exploration and development throughout the ranges of the potentially affected species, (b) the take by indigenous people, (c) incidental take in fisheries, and (d) other human activities that may affect the various species, their habitats, and their prey; and recommending that the Army Corps of Engineers and its cooperating agencies consult with the Alaska Department of Fish and Game, the potentially affected Native communities, and other appropriate organizations to identify and describe in the environmental impact statement the long-term monitoring programs necessary to ensure that the proposed activities do not have unacceptable impacts as described in the Marine Mammal Protection Act, the Endangered Species Act, and the National Environmental Policy Act.
- 12 June Defense, commenting to the Naval Facilities Engineering Command on the draft report to Congress on the U.S. Naval Ship Solid Waste Management Plan for MARPOL Annex V Special Areas and the accompanying draft environmental impact statement on disposal of U.S. Navy shipboard solid waste; recommending that glass and metal waste generated by ships operating in special areas be processed, stored, and returned to port for recycling; further recommending that the Navy incorporate dedicated space for waste storage and processing equipment into the design of new ships to enable retention of all glass and metal, as well as plastic wastes, and that the Navy plan for the installation of incinerators on all large vessels constructed for the Navy between now and such time as alternative technological solutions are developed.
- 14 June Interior, scientific research permit, Center for Coastal Physical Oceanography.
- 27 June Commerce, commenting to the National Marine Fisheries Service on the request to take small numbers of marine mammals incidental to conducting seismic surveys during the 1996 open-water season within the Northstar Unit in the Beaufort Sea; recommending that, if marine mammals could be taken by harassment by means other than operation of the airgun arrays, such taking be included in the authorization and that the marine mammal monitoring program be revised as necessary to provide the information required to estimate the number of marine mammals taken incidental to these other operations; recommending that it be made clear to the applicant that the authorization is automatically

suspended if a marine mammal is hit and killed or possibly killed by a cable boat, seismic source vessel, or research vessel, or if a marine mammal is entangled and killed or possibly killed in an airgun array; further recommending that the Service consult with the applicant to ensure that the observers will be able to see marine mammals within the designated safety radii around the airgun arrays whenever the arrays are operating; and recommending that a peer-review panel include individuals with expertise in marine acoustics, statistics, and experimental design, as well as individuals with expertise in the natural history, population dynamics, and behavior of the marine mammal species that could be affected.

- 1 July  
Commerce, scientific research permit, Glen F. Cota.
- 2 July  
Commerce, scientific research permit, Scott D. Kraus.
- 5 July  
Interior, commenting to the Fish and Wildlife Service on its report to Congress on the status of U.S. implementation of the 1973 international Agreement on the Conservation of Polar Bears; providing several technical revisions and clarifications as well as specific drafting comments to be incorporated into the report before it is provided to Congress.
- 11 July  
Commerce, modification of scientific research permit, Fred Sharpe.
- 15 July  
Commerce, scientific research permit, Scott D. Kraus.
- 24 July  
Commerce, modification of scientific research permit, Dan R. Salden.
- 24 July  
Interior, recommending to the Fish and Wildlife Service that it incorporate suggestions made by the South Florida Management District on the recommended review of the 1996 die-off of manatees in southwest Florida.
- 31 July  
Commerce, scientific research permit, Cynthia Riseling.
- 2 August  
Commerce, scientific research permit, Hubbs-Sea World Research Institute.
- 7 August  
Commerce, modification of scientific research permit, National Marine Mammal Laboratory.
- 8 August  
Commerce, modification of scientific research permit, Donald B. Siniff.
- 9 August  
Commerce, modification of scientific research permit, National Marine Mammal Laboratory.
- 12 August  
Commerce, scientific research permit, David R. Young.
- 13 August  
Commerce, commenting to the National Marine Fisheries Service and recommending approval of the transfer of four captive bottlenose dolphins from the U.S. Navy, San Diego, California, to Dolphin Quest, Tahiti, French Polynesia.
- 21 August  
Interior, commenting to the Minerals Management Service on the draft environmental impact statement for Gulf of Mexico Sales 166 and 168: Central and Western Planning Areas; recommending, among other things, that the final environmental impact statement identify the uncertainties regarding the impacts of oil and gas exploration and development on marine mammals and the steps necessary to resolve them or to ensure that any unforeseen adverse effects are detected early so that operations can be stopped or modified before they reach significant levels; recommending that the Minerals Management Service review its research and monitoring programs to ensure that they assess the possible additive and synergistic effects of the combined sources; further recommending that the final

environmental impact statement indicate the distribution, relative abundance, and status of manatees along the rim of the Gulf of Mexico and in known concentration areas, and provide assessments of the possible effects of a major oil spill on seagrasses on which manatees feed.

- 11 September Transportation, commenting to the U.S. Coast Guard on a draft environmental impact statement concerning an initiative to protect living marine resources along the U.S. Atlantic coast; recommending that the Coast Guard expand the conservation program described in the draft environmental impact statement to consider actions for developing vessel management measures to prevent collisions between commercial vessels and right whales, and that the Coast Guard include plans for a review of domestic and international authorities that might be used to ensure that commercial vessel-related injury and mortality of right whales is minimized.
- 11 September Defense, commenting to the Department of the Navy on recent right whale deaths; recommending that the Navy continue its ongoing consultations with the National Marine Fisheries Service and the Marine Mammal Commission to review directives and measures to protect right whales from potentially adverse activities this coming winter off Florida and Georgia; specifically recommending that the Navy (a) continue to participate in the "early warning system," (b) consider extending the geographic coverage for the critical habitat to include waters out to 30 miles from shore between Brunswick, Georgia, and Mayport, Florida, (c) consider advice with regard to the specific routes for crossing the high-use right whale habitat and for proceeding at night and/or under poor weather conditions, (d) make an effort to minimize ship departures or arrivals that would require crossing critical habitat areas at night, (e) improve the training program for vessel lookouts and procedures for relaying whale sighting reports to and from the early warning system network, (f) reinstitute the measures to minimize adverse effects from gunnery exercises in place for the 1995-1996 winter whale season, and (g) modify proposed schedules for dropping live ordnance off Florida's east coast and reschedule such exercises either for other areas or other times of the year.
- 11 September Commerce, scientific research permit, Catherine Schaeff.
- 16 September Commerce, commenting to the National Marine Fisheries Service on (1) the Department of the Navy's request for a letter of authorization to take small numbers of marine mammals incidental to shock testing the SEAWOLF submarine, and (2) the Service's proposed regulations to authorize and govern the requested taking; recommending that the Service carefully examine the data, assumptions, and methods used to estimate the numbers of animals that might be killed, injured, and harassed to ensure that the estimates appropriately reflect any possible sources of error or bias, that the numbers are overestimates not underestimates, and that the number of animals authorized to be taken be increased if it is determined that (1) present estimates do not adequately reflect errors or biases and (2) possible effects on the distribution, size, and productivity of the potentially affected species and population stocks would remain negligible; recommending that the planned monitoring program is adequate to verify that any disruption of vital behavior is momentary and that no more than the authorized number of animals are harassed; further recommending that the Service (1) consider whether monitoring and comparing marine mammal vocalizations before and after detonation of charges would provide a reasonable means for validating the apparent assumption that any disruption of behavior beyond the "acoustic discomfort" range will be momentary, and (2) if judged reasonable, require that the monitoring program be revised accordingly, or, if not reasonable, that the letter of authorization specify other means of monitoring; and finally recommending that the reporting requirement be revised to require that the results of the monitoring program be provided to the Service following each of the five tests, rather than 120 days after the last test, and that the letter of authorization make it clear that the authorization is automatically revoked if marine mammals are taken in ways or in numbers not authorized.
- 16 September Transportation, commenting to the U.S. Coast Guard on the draft environmental impact statement for the U.S. Coast Guard Atlantic Protected Living Marine Resources Initiative; recommending that the

- proposed action be implemented immediately; and recommending that the Coast Guard expand guidance in operations procedures to further clarify that less than 15 knots would constitute a safe vessel speed to reduce potential collisions between whales and ships.
- 17 September Commerce, scientific research permit, Randall W. Davis.
- 23 September Commerce, scientific research permit, James T. Harvey and Jenifer Hurley.
- 23 September Interior, modification of scientific research permit, California Department of Fish and Game.
- 24 September Interior, commenting to the Fish and Wildlife Service on the draft revision of the Southern Sea Otter Recovery Plan; providing general and specific comments on the draft and recommending that appropriate representatives of the various agencies be asked to endorse the revision.
- 26 September Commerce, commenting to the National Marine Fisheries Service on the request from the U.S. Air Force for authority under section 101(a)(5)(D) of the Marine Mammal Protection Act to harass, for a period of one year, small numbers of harbor seals in the vicinity of Vandenberg Air Force Base, California, incidental to launches of the McDonnell Douglas Aerospace Delta II; recommending that before issuing the requested authorization, the Service review the results of the monitoring done to date to determine (1) if there may have been cumulative effects on the haul-out patterns, abundance, or productivity of harbor seals that reside in the area, and (2) whether the current monitoring program is sufficient to detect such effects.
- 26 September Commerce, modification of scientific research permit, Northwest and Alaska Fisheries Science Center.
- 26 September Commerce, modification of scientific research permit, Donald B. Siniff.
- 26 September Commerce, modification of scientific research permit, Dena Matkin.
- 26 September Commerce, modification of scientific research permit, University of Hawaii.
- 8 October Commerce, commenting to the National Oceanic and Atmospheric Administration on the taking of two bowhead whales by Canadian Natives under licenses issued by Canada's Minister of Fisheries and Oceans without consultation with the International Whaling Commission; recommending that the Secretary of Commerce certify to the President under the Pelly Amendment to the Fishermen's Protective Act that the taking of bowhead whales by Canadian nationals diminishes the effectiveness of the International Whaling Commission's conservation programs.
- 10 October Commerce, recommending to the National Marine Fisheries Service that it approve a request to transfer two bottlenose dolphins from the Navy's facility in San Diego, California, to the Dolphin Connection in Duck Key, Florida, for public display.
- 11 October Commerce, commenting to the National Marine Fisheries Service on the New England Right Whale and Humpback Whale Recovery Plan Implementation Team's letter regarding actions to reduce the death and injury of northern right whales and humpback whales by entanglement in fishing gear; recommending that the Service develop rules to seasonally prohibit certain fishing gear on designated critical habitat in both the Great South Channel and the right whale calving grounds; further recommending that the Service, in consultation with the Department of State, contact officials in the Canadian Department of Fisheries and Oceans to (a) advise them of efforts to restrict potentially hazardous fishing gear in key right whale habitat in U.S. waters, and (b) request information on the possibility of establishing comparable measures for important right whale habitats in Canadian waters; and recommending that the Service investigate means of modifying lobster gear and gillnets to reduce whale entanglement hazards.

- 15 October Commerce, scientific research permit, National Museum of Natural History, Smithsonian Institution.
- 15 October Commerce, scientific research permit, Madonna L. Moss.
- 15 October Commerce, modification of scientific research permit, Southwest Fisheries Science Center.
- 30 October Commerce, commenting to the National Marine Fisheries Service on the request from the U.S. Air Force for authority under section 101(a)(5)(D) of the Marine Mammal Protection Act to harass, for a period of one year, small numbers of harbor seals, and possibly California sea lions and northern elephant seals, in the vicinity of Vandenberg Air Force Base, California, incidental to launches of the Taurus space launch vehicles; recommending that, before issuing the requested authorization, the Service review the results of the monitoring done to date to determine (1) if there may have been cumulative effects on the haul-out patterns, abundance, or productivity of harbor seals that reside in the area, and (2) whether the current monitoring programs are adequate to detect possible cumulative adverse effects.
- 20 November Interior, commenting to the U.S. Geological Survey on the research and management activities under the Florida Manatee Recovery Program; noting, among other things, that the Sirenia Project is instrumental in providing data on which to base informed management decisions for manatees and manatee habitats; recommending that the U.S. Geological Survey provide a base funding level for the project of at least \$460,000 in fiscal year 1997.
- 20 November Interior, commenting to the Fish and Wildlife Service on the response by individuals and agencies to the die-off of manatees in southwestern Florida; and recommending that the Service meet its long-standing obligation to produce a contingency plan to deal with future manatee die-offs.
- 29 November Defense, commending the Department of the Navy on its efforts to protect endangered right whales off the eastern United States and Canada.
- 4 December Defense, commending the Fleet Area Control and Surveillance Facility and the U.S. Navy's Atlantic Fleet on its efforts to protect endangered northern right whales on calving grounds off Florida and Georgia and emphasizing that continued efforts are vital.
- 5 December Commerce, modification of scientific research permit, Continental Shelf Associates, Inc.
- 5 December Commerce, scientific research permit, D. Ann Pabst.
- 6 December Commerce, commenting to the National Marine Fisheries Service on requests for authorizations, pursuant to section 101(a)(5) of the Marine Mammal Protection Act, to take small numbers of marine mammals incidental to a variety of activities in areas under U.S. jurisdiction; recommending that the Service take such steps as necessary to organize and convene a workshop on assessing the effects of anthropogenic sounds on marine mammals; further recommending that a small steering group be constituted immediately to guide organization of the workshop, identify possible participants, and help identify and compile relevant background information.
- 6 December Interior, public display permit, Brookfield Zoo.
- 6 December Commerce, scientific research permit, Southwest Fisheries Science Center.
- 6 December Agriculture, commenting to the Animal and Plant Health Inspection Service on the release criteria for stranded marine mammals being developed by the National Marine Fisheries Service; recommending that the Animal and Plant Health Inspection Service work with the National Marine Fisheries Service

and the Fish and Wildlife Service to review their respective authorities and take actions to ensure that unauthorized releases of marine mammals from captive facilities do not occur.

- 6 December Commerce, commenting to the National Marine Fisheries Service on the release of captive marine mammals to the wild; reiterating an earlier recommendation that applicants seeking authority to return marine mammals to the wild be deferred until the criteria for releasing stranded marine mammals are developed or until criteria are developed specifically for long-term captive marine mammals; further recommending that the Service seek amendment of the Marine Mammal Protection Act to obtain explicit authority to specifically prohibit unauthorized releases, allow recovery of costs for recapture efforts, and give the Service clearer authority to obtain an injunction against those who indicate an intention to release animals or otherwise violate the Act.
- 6 December Commerce, modification of scientific research permit, Bruce R. Mate.
- 6 December Commerce, commenting to the National Marine Fisheries Service on the continued decline of the western stock of Steller sea lions; and recommending that the Service conduct a comprehensive review, consistent with recommendations by the Steller Sea Lion Recovery Team, of current fishery management practices and how they may be affecting Steller sea lions.
- 10 December Commerce, modification of scientific research permit, Dan R. Salden.
- 10 December Commerce, modification of scientific research permit, James Darling.
- 11 December Commerce, commenting to the National Marine Fisheries Service on issues related to harbor porpoise bycatch; recommending that additional personnel be provided to assist with both the data entry and analysis tasks; further recommending that assessment of the design of the sea sampling program which places observers on fishing vessels to collect data on harbor porpoise and other bycatch be funded and that no major changes in the management systems, particularly the trip log books, be made until Northwest Fisheries Science Center scientists have had an opportunity to fully examine the data and determine the data's strengths and weaknesses; and recommending that the feasibility of placing such radio transmitters on vessels be investigated, particularly for those times and in those regions where harbor porpoise or other marine mammal bycatch is highest.
- 11 December Commerce, modification of scientific research permit, Donald B. Siniff.
- 12 December Commerce, commenting to the National Marine Fisheries Service on the status of northern right whales and related recovery efforts; recommending that the Service explore ways to develop a long-term funding base for right whale recovery work such as a right whale trust fund, and, in the coming year, the Service seek a right whale recovery budget of at least \$1.25 million, pending the establishment of a trust fund or other independent funding sources; and further recommending that the Service either seek a supplemental budget request or in some way obtain additional funding to support right whale recovery activities such as (a) establishing a full-time right whale coordinator position on staff, (b) establishing a long-term telemetry program, (c) conducting annual population surveys of each of the five known high-use right whale habitats, (d) supporting studies to design and test fishing gear modifications, (e) analyzing vessel traffic in the winter calving grounds, and (f) identifying trends by developing a population model using the photo-identification catalog and comparing the model with past aerial survey data.
- 12 December Commerce, modification of scientific research permit, Southwest Fisheries Science Center.
- 12 December Commerce, scientific research permit, Southwest Fisheries Science Center.

- 16 December Transportation, commenting to the U.S. Coast Guard regarding the method of disposal of narcotics confiscated at sea; recommending that all seized narcotics be returned to the United States for proper disposal in order to prevent the ingestion of narcotics by marine organisms at sea.
- 18 December Agriculture, commenting to the Animal and Plant Health Inspection Service on the procedure used to determine foreign facility compliance with the Animal Welfare Act; and encouraging both the National Marine Fisheries Service and the Animal and Plant Health Inspection Service to require that a foreign facility allow and pay for an on-site inspection as a condition of obtaining marine mammals from the United States.
- 18 December Commerce, commenting to the National Marine Fisheries Service on the requirements of the Marine Mammal Protection Act regarding the export of marine mammals and the steps the Service is taking to make the required determinations; recognizing that it can be difficult to monitor foreign facilities and take remedial actions if a problem is encountered, and thus recommending that the Service seek amendment of the Marine Mammal Protection Act to eliminate continuing jurisdiction over marine mammals once they are exported, and to strengthen the mechanisms for ensuring comparability prior to authorizing an export.
- 20 December Interior, commenting to the Fish and Wildlife Service regarding the need to strengthen regulation and enforcement of diver-manatee interactions in and near Kings Bay, Florida; recommending that the Service develop further guidance as to what constitutes harassment of manatees by swimmers and divers; and further recommending that the National Marine Fisheries Service and the Fish and Wildlife Service coordinate their views on what constitutes take by harassment and what enforcement actions to undertake while keeping in mind biological and behavioral differences of the different species.
- 20 December Commerce, commenting to the National Marine Fisheries Service on the proliferation of recreational and commercial ventures featuring interactions with marine mammals in the wild in the southeastern United States and Hawaii; and recommending that the Service take steps to make it clear to the public and tour operators that taking marine mammals without proper authorization is against the law and to instruct its enforcement personnel to heighten their attention to such violations.
- 20 December Interior, commenting to the Fish and Wildlife Service on the draft environmental assessment on the development of a U.S./Russia Bilateral Agreement for the Conservation of Polar Bears in the Chukchi/Bearing Seas; and providing general and specific comments on the environmental assessment.
- 31 December State, commenting to the Bureau of Oceans and International, Environmental, and Scientific Affairs on current U.S. Arctic policies and initiatives as relating to marine mammals; recommending that a thorough review of the terms of reference and operation of the existing Arctic Environmental Protection Strategy working groups be undertaken by the Interagency Arctic Policy Group before the United States takes any position on the continuation, termination, reorganization, or future activities of the existing working groups, and/or the formation of other working groups to facilitate the work of the Arctic Council; and conveying an outline and table indicating the range of tasks meriting consideration and the working groups that might reasonably be assigned lead and subsidiary responsibilities for the various tasks.
- 31 December Commerce, commenting to the National Oceanic and Atmospheric Administration on the December 1996 review of the Southeast Fisheries Science Center's Marine Mammal Research Program; recommending, among other things, that the National Marine Fisheries Service (1) delay possible formation of a take reduction team for bottlenose dolphins pending completion of a comprehensive bottlenose dolphin conservation plan, and (2) immediately undertake completion of the conservation plan; further recommending that the Service undertake a review to determine whether additional staff is necessary for the Southeast Fisheries Science Center to reasonably meet its marine mammal research

responsibilities, and that the Service give strong consideration to placing the marine mammal program coordinator somewhere other than in Miami, Florida.

31 December Interior, forwarding to the Fish and Wildlife Service the results of the Commission's comprehensive review and analysis of the die-off of Florida manatees on the west coast of Florida during March and April 1996; recommending that a contingency plan for manatee die-offs be developed by February 1997; recommending that the contingency plan set forth necessary steps to, among other things, establish clear lines of interagency authority in die-off management; facilitate cooperation with the Working Group on Unusual Marine Mammal Mortality Events; improve the timeliness of Working Group activation; build a multidisciplinary response team of broad competence; ensure collection of appropriate specimen materials for life history studies; and take into account potential impacts of infectious agents on public health and safety.



## APPENDIX B

### REPORTS OF COMMISSION-SPONSORED ACTIVITIES AVAILABLE FROM THE NATIONAL TECHNICAL INFORMATION SERVICE (NTIS)<sup>1</sup>

- Ainley, D.G., H.R. Huber, R.P. Henderson, and T.J. Lewis. 1977. Studies of marine mammals at the Farallon Islands, California, 1970-1975. Final report for MMC contract MM4AC002. NTIS PB-274 046. 42 pp. (A03)
- Ainley, D.G., H.R. Huber, R.P. Henderson, T.J. Lewis, and S.H. Morrell. 1977. Studies of marine mammals at the Farallon Islands, California, 1975-1976. Final report for MMC contract MM5AC020. NTIS PB-266 249. 32 pp. (A03)
- Ainley, D.G., H.R. Huber, S.H. Morrell, and R.R. LeValley. 1978. Studies of marine mammals at the Farallon Islands, California, 1976-1977. Final report for MMC contract MM6AC027. NTIS PB-286 603. 44 pp. (A03)
- Allen, S.G. 1991. Harbor seal habitat restoration at Strawberry Spit, San Francisco Bay. Final report for MMC contract MM2910890-9. NTIS PB91-212332. 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 PB80-176910. 31 pp. (A03)
- Anderson, D.M., and A.W. White. 1989. Toxic dinoflagellates and marine mammal mortality: Proceedings of an expert consultation held at Woods Hole Oceanographic Institution. Final report for MMC contract T6810848-1. NTIS PB90-160755. 71 pp. (A04)
- Baker, C.S., J.M. Straley, and A. Perry. 1990. Population characteristics of humpback whales in southeastern Alaska: summer and late-season, 1986. Final report for MMC contract MM3309822-5. NTIS PB90-252487. 23 pp. (A03)
- Balcomb, K.C., J.R. Boran, R.W. Osborne, and N.J. Haenel. 1980. Observations of killer whales (*Orcinus orca*) in greater Puget Sound, State of Washington. Final report for MMC contract MM1300731-7. NTIS PB80-224728. 42 pp. (A03)
- Baur, D.C. 1995. Reconciling the legal mechanisms to protect and manage polar bears under United States laws and the international agreement for the conservation of polar bears. Final report for MMC contract T94071388. NTIS PB95-272092. 103 pp. (A07)
- Baur, D.C. 1996. Legal ramifications of the GATT panel reports on the United States' ban on the importation of yellowfin tuna products. Final report for MMC contract T94071375. NTIS PB97-104756. 102 pp. (A06)
- Bean, M.J. 1984. 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. 56 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 PB80-206105. 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. 14 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. Schonewald, 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. Cattanch. 1990. Review of current population abundance estimates of small cetaceans in the Black Sea. Final report for MMC contract T75133135. NTIS PB91-137257. 5 pp. (A02)
- Carr, T. 1994. The manatees and dolphins of the Miskito Coast Protected Area, Nicaragua. Final report for MMC contract T94070376. NTIS PB94-170354. 19 pp. (A03)
- Chapman, D.G., L.L. Eberhardt, and J.R. Gilbert. 1977. A review of marine mammal census methods. Final report for MMC contract MM4AC014. NTIS PB-265 547. 55 pp. (A04)
- Contos, S.M. 1982. Workshop on marine mammal-fisheries interactions. Final report for MMC contract MM207934-1-0. NTIS PB82-189507. 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 MM6A-C003. NTIS PB 291 570. 24 pp. (A03)
- Dayton, P.K., B.D. Keller, and D.A. Ven Tresca. 1980. Studies of a nearshore community inhabited by sea otters. Final report for MMC contracts MM6AC026 and MM13-00702-9. NTIS PB81-109860. 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 PB80-150097. 43 pp. (A03)
- Dedina, S., and E. Young. 1995. Conservation and development in the gray whale lagoons of Baja California Sur, Mexico. Final report for MMC contract T10155592. NTIS PB96-113154. 56 pp. (A04)
- Dohl, T.P. 1981. Remote laser branding of marine mammals. Final report for MMC contract MM4AC011. NTIS PB81-213449. 34 pp. (A03)
- Dowling, T.E., and W.M. Brown. 1992. Population structure of the Atlantic bottlenose dolphin as determined by restriction endonuclease analysis of mitochondrial DNA.

<sup>1</sup> Price codes for printed reports (including postage) are shown in parentheses at the end of each citation. The key to the codes and ordering information can be found at the end of Appendix B.

- Final report for MMC contract MM3309818-6. NTIS PB93-128411. 46 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)
- 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 T68108850. NTIS PB91-100479. 186 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. 66 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 Wageningen, 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 PB82-174335. 35 pp. (A03)
- Fox, W.W., Jr., et al. 1990. Statement of concerned scientists on the reauthorization of the Magnuson Fishery Conservation and Management Act. NTIS PB91-127647. 6 pp. (A02)
- Fraker, M.A. 1994. California sea lions and steelhead trout at the Chittenden Locks, Seattle, Washington. Final report for MMC contract T10156766. NTIS PB94-188059. 42 pp. (A05)
- Freeman, J., and H. Quintero. 1990. The distribution of West Indian manatees (*Trichechus manatus*) in Puerto Rico: 1988-1989. Final report for MMC contract T5360348-3. NTIS PB91-137240. 38 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-275 295. 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 PB83-262949. 23 pp. (A03)
- Gilbert, J.R., V.R. Schurman, and D.T. Richardson. 1979. Grey 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. 36 pp. (A03)
- Gold, J. 1981. Marine mammals: a selected bibliography. Final report for MMC contract MM1801254-3. NTIS PB 82-104282. 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 PB82-123571. 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 PB82-169772. 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)
- Hain, J.H.W. 1992. Airships for marine mammal research: evaluation and recommendations. Final report for MMC contract T68108863. NTIS PB92-128271. 37 pp. (A03)
- Hain, J.H.W., S.L. Ellis, and P.E. Seward. 1994. Characterization of vessel traffic at the St. Johns and St. Marys channel entrances, northeast Florida, January 1993. Final report for MMC contract T94070460. NTIS PB94-204229. 56 pp. (A04)
- Hatfield, B.B. 1991. Summary report of observations of coastal gill and trammel net fisheries in central California - October 1, 1984 - March 31, 1985. Final report for MMC contract MM2910891-2. NTIS PB91-191908. 17 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. 30 pp. (A03)
- Herman, L.M., P.H. Forestell, and R.C. Antinaja. 1980. The 1976/77 migration of humpback whales into Hawaiian waters: composite description. Final report for MMC contracts MM7AC014 and MM1300907-2. NTIS PB80-162332. 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)
- Hoover-Miller, A. 1992. Assessment of the possible use of a cooperative/coordinated geographic information system (GIS) to facilitate access to, and integration and analysis of, data bearing upon the conservation of marine mammals in Alaska. Final report for MMC contract T75136297. NTIS PB93-128429. 59 pp. (A04)
- Hoover-Miller, A.A. 1994. Harbor seal (*Phoca vitulina*) biology and management in Alaska. Final report for MMC contract T75134749. NTIS PB95-166195. 45 pp. (A03)
- Hoover-Miller, A. 1995. Report of the workshop on enhancing methods for locating, accessing, and integrating population and environmental data related to marine resources in Alaska. Final report for MMC contract T10155550. NTIS PB95-199097. 93 pp. (A06)
- 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 PB81-167082. 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 PB80-178197. 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 PB80-111602. 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-288444. 25 pp. (A03)
- Irvine, A.B., M.D. Scott, R.S. Wells, J.H. Kaufmann, and W.E. Evans. 1979. A study of the activities and movements of the Atlantic bottlenosed dolphin, *Tursiops truncatus*, including an evaluation of tagging techniques. Final report for MMC contracts MM4AC004 and MM5AC018. NTIS PB-298 042. 54 pp. (A04)
- Jameson, G.L. 1986. Trial systematic salvage of beach-cast sea otter, *Enhydra lutris*, carcasses in the central and southern portion of the sea otter range in California: one year summary of results: October 1983-September 1984. Final report for MMC contract MM2629849-8. NTIS PB87-108288. 60 pp. (A04)
- Jefferson, T.A., and B.E. Curry. 1994. Review and evaluation of potential acoustic methods of reducing or eliminating marine mammal-fishery interactions. Final report for MMC contract T10155628. NTIS PB95-100384. 59 pp. (A05)
- Jeffries, S.J. 1986. Seasonal movement and population trends of harbor seals (*Phoca vitulina richardsi*) in the Columbia River and adjacent waters of Washington and Oregon, 1976-1982. Final report for MMC contract MM2079357-5. NTIS PB86-200243. 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. 70 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 PB82-109661. 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 PB83-159715. 53 pp. (A04)
- Jones, M.L., and S.L. Swartz. 1986. Demography and phenology of gray whales and evaluation of human activities in Laguna San Ignacio, Baja California Sur, Mexico, 1978-1982. Final report for MMC contract MM2324713-8. NTIS PB86-219078. 69 pp. (A05)
- Jones, M.L., S.L. Swartz, and M.E. Dahlheim. 1994. Census of gray whale abundance in San Ignacio lagoon: a follow-up study in response to low whale counts recorded during an acoustic playback study of noise-effects on gray whales. Final report for MMC contract MM2911023-0. NTIS PB94-195062. 32 pp. (A03)
- 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 PB81-171357. 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 novae-angliae*): 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 PB82-257932. 10 pp. (A02)
- Kraus, S.D. 1985. 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 PB86-154143. 61 pp. (A04)

- Kraus, S.D., and R.D. Kenney. 1991. Information on right whales (*Eubalaena glacialis*) in three proposed critical habitats in United States waters off the western North Atlantic Ocean. Final report for MMC contracts T75133740 and 75133753. NTIS PB91-194431. 65 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. 36 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-269 709. 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)
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- 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 PB82-201039. 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)
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- Marine Mammal Commission. 1986. Annual report of the Marine Mammal Commission, calendar year 1985. Report to Congress. NTIS PB86-216 249. 180 pp. (A09)
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- Marine Mammal Commission. 1987. Annual report of the Marine Mammal Commission, calendar year 1986. Report to Congress. NTIS PB87-154092. 193 pp. (A09)
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- Marine Mammal Commission. 1989. Preliminary assessment of habitat protection needs for West Indian manatees on the east coast of Florida and Georgia. Final report for MMC contracts T6223950-5, T6223954-7, T6223970-9, and T6224008-6. NTIS PB89-162 002. 120 pp. (A06)
- Marine Mammal Commission. 1989. Annual report of the Marine Mammal Commission, calendar year 1988. Report to Congress. NTIS PB89-166 524. 237 pp. (A11)
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## APPENDIX C

### SELECTED LITERATURE PUBLISHED ELSEWHERE RESULTING FROM COMMISSION-SPONSORED ACTIVITIES

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