MARINE MAMMAL COMMISSION

Annual Report to Congress

2001

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

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INTRODUCTION

This is the 29th Annual Report of the Marine Mammal Commission, covering the period 1 January through 31 December 2001. 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 reviewing and making recommendations on domestic and international actions and policies of all federal agencies with respect to marine mammal protection and conservation and with carrying out a research program.

The purpose of this report is to provide timely information on management issues and events under purview of the Marine Mammal Commission in 2001. The report is provided to Congress, federal and state agencies, public interest groups, the academic community, private citizens, and the international community. When combined with past reports, it describes the evolution and progress of U.S. policies and programs to conserve marine mammals and their habitats. To ensure accuracy, report drafts were reviewed by federal and state agencies and knowledgeable individuals.

Personnel

The Commission consists of three members nominated by the President and confirmed by the Senate. The Marine Mammal Protection Act requires that Commissioners be knowledgeable in marine ecology and resource management. At the end of 2001 the Commissioners were John E. Reynolds, III, Ph.D. (Chairman), Eckerd College, St. Petersburg, Florida, and Mote Marine Laboratory, Sarasota, Florida; Paul K. Dayton, Ph.D., Scripps Institution of Oceanography, La Jolla, California; and Vera Alexander, Ph.D., University of Alaska, Fairbanks.

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Chapter II

REAUTHORIZATION OF THE MARINE MAMMAL PROTECTION ACT

The Marine Mammal Protection Act was enacted in 1972. Since then, it has been amended and reauthorized several times. The most recent authorization, enacted in 1994, extended appropriation authority for carrying out the provisions of the Act through fiscal year 1999. Although the Act has not been reauthorized since, its provisions remain in effect and Congress continues to appropriate funds to carry out its mandates.

As a matter of course, Congress examines the implementation of the Act during the reauthorization process, and it is not uncommon for amendments to be made at such intervals. For example, major amendments were enacted in 1984, 1988, and 1994, the last three times the Act was reauthorized. The Act may also be amended at other times, as it was in 1997 when changes were made to the Act's tuna-dolphin provisions (see Chapter IV). Most recently, the Act was amended by enactment of the Marine Mammal Rescue Assistance Act of 2000, enacted as Title II of Public Law 106-555. This Act created the John H. Prescott Marine Mammal Rescue Assistance Grant Program and directed the Secretary of Commerce to initiate a study of the environmental and biological factors that may be contributing to the increase in mortality events involving the eastern North Pacific stock of gray whales. The grant program is discussed in Chapter VI of this report.

Background

Congress began the process to reauthorize the Marine Mammal Protection Act in 1999. As discussed in previous annual reports, the Subcommittee on Fisheries Conservation, Wildlife, and Oceans of the House Resources Committee held an initial hearing on 29 June 1999. The Marine Mammal Commission and the other federal agencies with primary responsibilities under the Act testified on implementation of the 1994 amendments and identified problems that may warrant additional legislation. The statement submitted by the Commission provided a comprehensive review of the 1994 amendments, described the steps taken to implement those amendments, and identified those provisions that had yet to be fully implemented. The statement also identified particular areas where further amendments may be useful and on which Congress may want to focus attention as it considers reauthorizing the Act. A summary of the Commission's recommendations and the full text of the Commission's statement were included in the 1999 annual report.

Further hearings were held in April 2000 before the House subcommittee. The Chairman of the Commission testified at the first of two hearings. That hearing examined implementation of section 118 of the Marine Mammal Protection Act, the regime to govern the taking of marine mammals incidental to commercial fisheries enacted in 1994. The Commission's testimony summarized the requirements of the applicable statutory provisions and actions taken to establish take reduction teams to address the most significant sources of marine mammal mortalities and serious injuries. The Commission noted that the existing statutory framework was fundamentally sound, but offered suggestions as to how the process might be improved. Further discussion of the Commission's recommendations and the full text of its statement can be found in the 2000 annual report.

The second hearing, at which representatives of the National Marine Fisheries Service, the Fish and Wildlife Service, and Alaska Native organizations testified, examined efforts to conclude and implement cooperative agreements between the Services and Alaska Natives under section 119 of the Marine Mammal Protection Act. All participants in that hear-ing identified shortcomings regarding the existing provisions and recommended that the Act be amended to authorize the parties to enter into enforceable agree-

ments that would allow for the management of subsistence harvests before designation of the affected marine mammal stock as depleted. As discussed in the previous annual report, the two Services, along with the Commission, met with representatives of Alaska Native organizations following that hearing to fashion a proposal for Congressional consideration that would expand the existing authority for cooperative agreements to enable the parties to set harvest limits for both depleted and nondepleted species.

The joint proposal on co-management of subsistence taking by Alaska Natives was a central element of a proposed bill transmitted to Congress by the Secretaries of Commerce and the Interior during the 2000 legislative session. That bill also would have authorized appropriations for the Marine Mammal Commission, the Department of Commerce, and the Department of the Interior to carry out their responsibilities under the Act through fiscal year 2005. Further, the bill recommended extensive revisions to the Act to address various problems that had arisen since the last reauthorization and to clarify certain provisions of the 1994 and 1997 amendments.

Among other things, the proposed bill would have amended the Act to clarify the purposes for which marine mammals may be exported from the United States, streamline the process for permitting the import of polar bear trophies from Canada, prohibit the display of cetaceans in traveling exhibits, expand the coverage of section 118 to include incidental taking by certain recreational fishermen, eliminate the requirement to prepare a take reduction plan for those strategic stocks for which fishery-related mortality and serious injury are negligible, increase the available penalties under the Act, authorize funding for research grants under section 110 of the Act, and revise the statutory definition of the term harassment. The full text of the amendments proposed in 2000, along with the statement of purpose and need prepared at that time, can be found on the National Marine Fisheries Service's web page (http://www.nmfs.noaa.gov).

Activities in 2001

Early in 2001 a new session of Congress began and a new administration took office. With these changes came a need to revisit the proposal that had been transmitted to Congress by the Departments of Commerce and the Interior in 2000. The interagency process that had led to development of the earlier proposal was reinitiated. The Commission's staff worked closely with counterparts at the other involved agencies, primarily the National Marine Fisheries Service and the Fish and Wildlife Service, to review and revise the earlier proposal. Based on those discussions, the Department of Commerce prepared a new draft Administration proposal, which was submitted for clearance in late October 2001. That proposal was still undergoing interagency review as of the end of the year. Thus, the Commission is unable to discuss in this report the specifics of any proposed amendments that might be offered by the Administration during the upcoming reauthorization of the Act.

On 11 October 2001 the Subcommittee on Fisheries Conservation, Wildlife, and Oceans of the House Resources Committee held a day-long oversight hearing on the Marine Mammal Protection Act to consider a broad range of topics bearing on reauthorization and possible amendments. The Commission's Chairman participated on a panel of government agencies and, along with the heads of the National Marine Fisheries Service and the Fish and Wildlife Service, provided an assessment of the implementation of the 1994 amendments to the Act and identified areas where amendments would be useful. A representative of the Department of State also participated on that panel, presenting testimony concerning the bilateral polar bear agreement concluded between the United States and the Russian Federation in October 2000. Other panels focused on issues related to ocean noise and the deployment of Navy sonar systems, marine mammal–fishery interactions, cooperative efforts between Alaska Natives and federal agencies to manage subsistence hunting of marine mammals, public

display permits, and the conservation of California sea otters. The text of the Commission's testimony can be found in Appendix D of this report. The statements of many of the other witnesses who testified at the hearing can be found at the House Resources Committee's web site (http://resourcescommittee.house.gov/).

The Commission's testimony focused on updating the subcommittee on recent actions that had been taken to implement the 1994 amendments, identifying those actions that had yet to be completed, and calling attention to those areas where amendments might be warranted. Although the full text of the Commission's statement is provided as an appendix to this report, a summary is provided below.

With respect to the incidental taking of marine mammals in commercial fisheries, the Commission noted that efforts to reduce the mortality and serious injury of Gulf of Maine harbor porpoises to below the stock's potential biological removal level apparently have been successful. The Commission explained that much of this reduction had resulted from measures instituted under applicable fishery management plans, which could be changed without due regard to the impact on marine mammals, and noted the need to consolidate these take reduction gains under the Marine Mammal Protection Act authority. The testimony also discussed the establishment of a new take reduction team to address the incidental taking of bottlenose dolphins in various fisheries along the Atlantic coast. The Commission indicated that the process for convening take reduction teams, translating the team's recommendations into final take reduction plans, and implementing those plans could be improved. Among the possible refinements to the process identified by the Commission were appointing a technical liaison to each team and requiring the National Marine Fisheries Service, once it had formulated proposed implementing regulations, to consult with the take reduction team to explain and solicit advice concerning any deviations from the draft plan recommended by the team. Other fishery-related issues raised by the Commission included the need to (1) abolish the requirement for preparing a take reduction plan for all strategic stocks, even when mortality and serious injury from fisheries are inconsequential, (2) clarify that a vessel owner participating in a category I or II fishery without having registered constitutes a violation of the Act regardless of whether incidental takes occur, (3) specify that the Act's observer requirements apply to all vessels participating in category I and II fisheries whether they are registered or not, (4) factor any mortality or serious injury of California sea otters into determinations regarding the categorization of fisheries and the placement of observers even though incidental taking of this stock is not authorized under section 118 of the Act, (5) consider expansion of the incidental take regime to include non-commercial fishermen that fish in areas and use gear that is identical or similar to that used by their commercial counterparts, and (6) explore options to increase funding for observer programs. The Commission also focused on the Act's zero mortality and serious injury rate goal, which was to have been achieved by April 2001. Although the National Marine Fisheries Service was to have reported to Congress in 1998 on the progress made toward meeting that goal, completion of that report is still pending. The Commission recognized that achieving the goal within seven years, as mandated in the 1994 amendments, may have been overly ambitious. Nevertheless, the Commission believed that completion of a report remained a worthwhile undertaking and encouraged Congress to adopt a revised schedule for its submission. The Commission further recommended that Congress adopt a revised schedule for meeting the zero mortality and serious injury rate goal and provide sufficient resources to enable the agencies and the affected fishermen to adhere to that schedule.

The Commission's testimony also called the subcommittee's attention to the reports submitted by the National Marine Fisheries Service concerning pinniped-fishery interactions in Gulf of Maine aquaculture operations and the impacts of California sea lions and Pacific harbor seals on salmonid stocks and Pacific coast ecosystems. Although no specific recommendations were made by the Commission, it indicated its willingness to work with legislators as they consider whether amendments are needed to address these issues.

The Commission provided a summary of actions that had been taken by the responsible agencies to implement the extensive revisions to the Act's permit provisions included in the 1994 amendments. In this regard, the Commission noted that the Fish and Wildlife Service had concentrated its efforts on implement-

ing the provision authorizing the importation of polar bear trophies from Canada, but had yet to amend its other permit regulations to reflect any of the 1994 amendments. In contrast, the National Marine Fisheries Service had issued new regulations implementing several of the amended provisions and was in the process of revising its regulations on public display permits.

The Commission's testimony also identified several permit-related provisions in need of review. In light of the prohibition on exporting marine mammals added to the Act in 1994, an amendment to provide specific authority for issuing export permits should be considered. Also, the Commission explained that little purpose is served by the existing notice and comment requirements as they apply to polar bear trophy import permits and that considerable savings could be realized if they were eliminated. Two other pressing issues flagged by the Commission were the risks associated with returning captive marine mammals to the wild and the appropriateness of permitting traveling marine mammal exhibits, particularly those displaying cetaceans. Questions involving the maintenance of polar bears in a traveling exhibit touring Puerto Rico (see Chapter X for further information on this issue) were also discussed in the Commission's testimony.

The export prohibition added to the Act in 1994 created other problems. First, the wording of the provision resurrected an enforcement problem originally rectified in 1981 that requires the government to demonstrate that the underlying taking of a marine mammal was in violation of the Act when pursuing an action for illegal transport, purchase, sale, or export. Second, because the prohibition was enacted as part of a suite of permit-related amendments, it did not comprehensively consider all purposes for which exports should be authorized. The Commission indicated that the legislation under consideration within the Administration likely would make specific suggestions to address these issues.

The Commission also noted that the definition of the term "harassment," added to the Act in 1994, had created difficulties related to interpretation and enforcement. However, no specific solutions to these problems were proposed.

A 1994 amendment to section 113 of the Act called on the Secretary of the Interior, acting through the Secretary of State and in consultation with the Marine Mammal Commission and the State of Alaska, to consult with appropriate Russian officials in an effort to develop and implement enhanced cooperative research and management programs for conserving the shared population of polar bears. The Commission noted that, pursuant to this directive, the United States had negotiated a bilateral agreement with the Russian Federation for these purposes. The Commission further noted that the advice and consent of the Senate is needed before the agreement enters into force. This being the case, ratification documents and proposed implementing legislation were being prepared for transmission to Congress. (See the polar bear section in Chapter III for further discussion of the agreement.)

The Commission's testimony also provided information on the status of cooperative agreements between Alaska Native organizations and federal agencies under section 119 of the Marine Mammal Protection Act and on efforts to develop proposed legislation to address the shortcomings in the existing statutory authority. Although consensus language had been developed in 2000, it was being reviewed by the Commission and other agencies in the context of developing a new Administration proposal.

The Commission recommended that the provisions authorizing appropriations under the Act be reauthorized for a five-year period. In addition, the Commission identified a need to expand the authority under section 405 to enable the Department of Commerce to allocate generally appropriated funds to unusual mortality event responses. Currently, only donations and specifically earmarked monies can be placed in the response fund.

Other issues identified by the Commission as meriting attention during the reauthorization process included (1) the desirability of increasing the Act's penalty provisions to reflect changed economic circumstances since they were originally enacted in 1972, (2) the elimination of a provision severely limiting the amount the Commission can spend on outside experts and consultants, (3) a provision to allow the National Marine Fisheries Service to use penalties collected for violations of the Act to further the conservation of species under its jurisdiction (the Fish and Wildlife Service already has such authority), (4) possible ways to improve compliance with and enforcement of the

Act, and (5) a review of research projects under section 110 of the Act to focus on pressing, broad-scale issues.

On 9 November 2001 the Commission was sent a series of follow-up questions from members of the subcommittee. Those questions focused on four issues — ocean noise, the Act's definition of harassment, polar bear sport hunting, and problems associated with the maintenance of polar bears at a traveling exhibit in Puerto Rico. The Commission drafted its responses to these questions and submitted them for review within the Administration before transmittal to Congress. As of the end of the year, the Commission was still waiting for comments from several of the reviewing agencies.

It is expected that Congress will again turn its attention to the reauthorization of the Marine Mammal Protection Act during the 2002 session. Representative Wayne T. Gilchrest, Chairman of the Subcommittee on Fisheries Conservation, Wildlife, and Oceans, has stated that reauthorization of the Act, along with reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act, will be top priorities of the subcommittee during 2002.

Chapter III

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, to make recommendations to the Department of Commerce, the Department of the Interior, and other agencies on actions needed to conserve marine mammals. To meet this charge, the Commission devotes special attention to particular species and populations that are vulnerable 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 2001 special attention was directed to a number of endangered, threatened, or depleted species or populations. As discussed below, these include North Atlantic and North Pacific right whales, humpback whales in Alaska, the western North Pacific stock of gray whales, mid-Atlantic coastal bottlenose dolphins, Cook Inlet beluga whales, Hawaiian monk seals, Steller sea lions, southern sea otters, Florida manatees, and dugongs in Okinawa. Other species not so listed, but which received special attention, include eastern North Pacific gray whales, killer whales in the eastern North Pacific, Gulf of Maine harbor porpoises, bottlenose dolphins (other than the mid-Atlantic coastal bottlenose dolphins), Pacific walruses, harbor seals in Alaska, polar bears, and sea otters in Alaska.

North Atlantic Right Whale (*Eubalaena glacialis*)

The North Atlantic right whale is one of three right whale species. As a group, right whales were the first large whales to be hunted commercially — as early as the tenth century off Japan and the eleventh century along the coast of Europe. Right whales were so named centuries ago because they were considered the "right" whales to kill — they yielded large amounts of high-quality oil and baleen, they were slow and easy to catch, and they tended to float when killed.

Sought relentlessly throughout the centuries, all of the world's right whale populations were in danger of extinction by the end of the 1800s. In 1935 most whaling nations agreed to ban the hunting of right whales, making them the first of the great whales to receive international protection from whaling. Although the 1949 Convention for the Regulation of Whaling extended the ban to all whaling nations, right whales continued to be killed illegally or for authorized scientific research until the early 1970s. Today North Atlantic right whales are less numerous than pandas, gorillas, and most tigers, and are among the world's most endangered animals. Their recovery poses perhaps the greatest and most urgent challenge facing marine mammal management in U.S. waters.

The first scientific descriptions of right whales in the eighteenth and nineteenth centuries used skull morphology and geographic distribution to distinguish two species: northern right whales (*E. glacialis*), found in the North Atlantic and North Pacific Oceans, and southern right whales (*E. australis*), found in the South Atlantic, South Pacific, and Antarctic Oceans. This was the accepted taxonomic classification in 1973 when the U.S. Endangered Species Act was adopted, and both northern and southern right whales were listed as endangered on the list of endangered and threatened species. Recent genetic studies, however, reveal that right whales in the North Atlantic and North Pacific Oceans are two distinct species — *E. glacialis* and *E. japonica,* respectively. Unlike past annual reports, this report therefore treats them as separate species.

Table 1. Marine mammals 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 2001

Common Name	Scientific Name	Status	Range
Manatees and Dugongs			
West Indian manatee	*Trichechus manatus*	E/D	Caribbean Sea and North Atlantic from southeastern United States to Brazil; and Greater Antilles Islands
Amazonian manatee	*Trichechus inunguis*	E/D	Amazon River basin of South America
West African manatee	*Trichechus senegalensis*	T/D	West African coast and rivers; Senegal to Angola
Dugong	*Dugong dugon*	E/D	Northern Indian Ocean from Madagascar to Indonesia; Philippines; Australia; southern China; Palau
Otters			
Marine otter	*Lutra felina*	E/D	Western South America; Peru to southern Chile
Southern sea otter	*Enhydra lutris nereis*	T/D	Central California coast
Seals and Sea Lions			
Caribbean monk seal	*Monachus tropicalis*	E/D	Caribbean Sea and Bahamas (probably extinct)
Hawaiian monk seal	*Monachus schauinslandi*	E/D	Hawaiian Archipelago
Mediterranean monk seal	*Monachus monachus*	E/D	Mediterranean Sea; northwest African coast
Guadalupe fur seal	*Arctocephalus townsendi*	T/D	Baja California, Mexico, to southern California
Northern fur seal	*Callorhinus ursinus*	D	North Pacific Rim from California to Japan
Western North Pacific Steller sea lion	*Eumetopias jubatus*	E/D	North Pacific Rim from Japan to Prince William Sound, Alaska, to California (west of 144°W longitude)
Eastern North Pacific Steller sea lion	*Eumetopias jubatus*	T/D	North Pacific Rim from Prince William Sound, Alaska, to California (east of 144°W longitude)
Saimaa seal	*Phoca hispida saimensis*	E/D	Lake Saimaa, Finland
Whales, Porpoises, and Dolphins			
Baiji	*Lipotes vexillifer*	E/D	Changjiang (Yangtze) River, China
Indus River dolphin	*Platanista minor*	E/D	Indus River and tributaries, Pakistan
Vaquita	*Phocoena sinus*	E/D	Northern Gulf of California, Mexico
Northeastern offshore spotted dolphin	*Stenella attenuata*	D	Eastern tropical Pacific Ocean
Eastern spinner dolphin	*Stenella longirostris orientalis*	D	Eastern tropical Pacific Ocean
Mid-Atlantic coastal bottlenose dolphin	*Tursiops truncatus*	D	Atlantic coastal waters from New York to Florida
Cook Inlet beluga whale	*Delphinapterus leucas*	D	Cook Inlet, Alaska
Northern right whale	*Eubalaena glacialis*	E/D	North Atlantic, North Pacific Oceans; Bering Sea
Southern right whale	*Eubalaena australis*	E/D	South Atlantic, South Pacific, Indian, and Southern Oceans
Bowhead whale	*Balaena mysticetus*	E/D	Arctic Ocean and adjacent seas
Humpback whale	*Megaptera novaeangliae*	E/D	Oceanic, all oceans
Blue whale	*Balaenoptera musculus*	E/D	Oceanic, all oceans
Finback or fin whale	*Balaenoptera physalus*	E/D	Oceanic, all oceans
Western Pacific gray whale	*Eschrichtius robustus*	E/D	Western North Pacific Ocean
Sei whale	*Balaenoptera borealis*	E/D	Oceanic, all oceans
Sperm whale	*Physeter macrocephalus*	E/D	Oceanic, all oceans

Source: 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.

Separate populations of North Atlantic right whales are believed to have occurred historically in the eastern and western North Atlantic Ocean. Excessive whaling, however, has all but eliminated the eastern population. Its recovery — if any members still survive — is highly unlikely. Over the past 50 years, published records report perhaps 10 reliable right whale sightings off southwestern Europe, including only one cow/calf pair, seen off Portugal in February 1995. Some, if not all, of those sightings may have involved wandering whales from the western North Atlantic.

The western North Atlantic population, numbering about 300 whales, occurs mainly in coastal waters off eastern North America from Florida to southeastern Canada. Over the past 20 years, scientists from many groups and government agencies have photographed, identified, and catalogued almost all whales in this population using unique patterns of scars and callosities (i.e., raised patches of rough skin on a whale's head). Resighting histories recorded in the catalogue enable researchers to assess movements, calving rates, survivorship, and other life history parameters that are vital for monitoring population status and trends.

From early spring through fall, most of the population is found off New England and southeastern Canada where four principal feeding habitats have been identified (see Fig. 1): (1) Cape Cod Bay, used principally between February and April; (2) the Great South Channel and northern edge of Georges Bank east of Cape Cod, used mainly from April through June; (3) the lower Bay of Fundy, just north of the U.S.-Canadian border, used most intensively in August and September; and (4) the Roseway Basin off the southern tip of Nova Scotia, used in late summer and fall. Other potentially important feeding areas may include Jeffreys Ledge off New Hampshire; Block Island Sound off southern New England; coastal waters east of Halifax, Nova Scotia; and the Gulf of St. Lawrence, Canada. In general, females with nursing calves seem to prefer the more protected inshore areas (e.g., Cape Cod Bay and the Bay of Fundy).

In winter, pregnant females, along with other adults and a few juveniles, migrate south to coastal waters off Georgia and northern Florida. From January through March, these areas are the population's only known calving grounds. Where the remaining adults and juveniles overwinter is largely unknown. The frequent occurrence of whales between January and April in Cape Cod Bay, however, indicates that some whales remain in northern waters year-round.

The population has shown little evidence of recovery over the past 20 years and may be declining. Recent modeling studies suggest that its numbers increased by about 2 percent per year in the 1980s, but have decreased by about that rate since the early 1990s. This trend stands in sharp contrast to those of most other large whales, including the southern right whale, which have increased steadily at 4 percent or more per year in recent decades.

Deaths due to ship strikes and entanglement in commercial gillnets and lobster pot lines appear to be a major reason for the population's failure to recover. From 1991 through 2001, the cause of death for 14 of 28 right whale carcasses found along the eastern United States and Canada was attributed to these causes (11 ship strikes and 3 entanglements), and other such deaths are likely. For example, a dead right whale seen floating entangled in fishing gear off Rhode Island in 2000 was not considered a fishery-related death because it could not be retrieved for direct examination. Other deaths due to these and other causes undoubtedly go unobserved.

When combined with natural mortality and the species' low rate of reproduction (a single calf every 3 to 6 years per adult female), human-related deaths could make the principal difference between a population that is declining and one that otherwise would be increasing, albeit slowly. A recent modeling study suggested that eliminating the deaths of just two female right whales per year could reverse the decline. Since the early 1980s, when a directed data collection program was first begun, an average of about 12 calves per year has been born. In 2001 a record high number of calves (31) was seen. Although an encouraging turn of events, this record comes on the heels of a series of record low calving years. Between 1998 and 2000 annual calf counts were 6, 4, and 1, respectively. Thus, even with 31 births in 2001, calf production over the past four years is still slightly less than the previous annual average. Recent research suggests that fluctuations in calf numbers may reflect variations in right whale food supplies, which could affect the fitness of mature females.

Under the Endangered Species Act and the Marine Mammal Protection Act, the National Marine Fisheries Service is the lead federal agency responsible for the

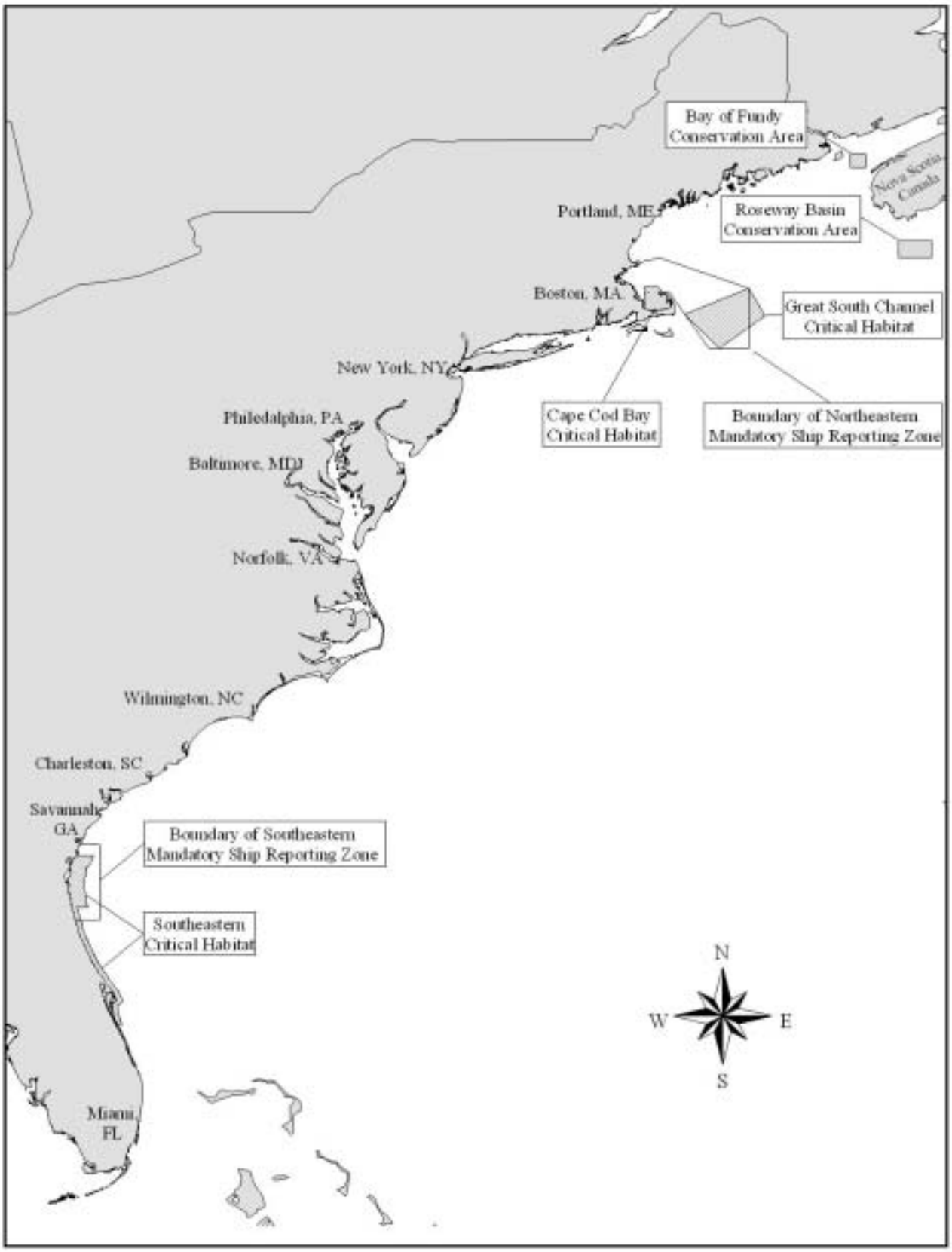
Bay of Fundy
Conservation Area
Nova Scotia
Canada
Portland, ME
Roseway Basin
Conservation Area
Boston, MA
Great South Channel
Critical Habitat
New York, NY
Cape Cod Bay
Critical Habitat
Boundary of Northeastern
Mandatory Ship Reporting Zone
Philedalphia, PA
Baltimore, MD
Norfolk, VA
Wilmington, NC
Charleston, SC
Savannah,
GA
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Figure 1. (Opposite page) Designated critical habitats and mandatory ship reporting zones for North Atlantic right whales (figure courtesy of Leslie Ward and Alex Smith, Florida Marine Research Institute).

recovery of North Atlantic right whales. Many other agencies and groups also perform vital research and management tasks. In addition to the Marine Mammal Commission, cooperating federal and state agencies include the Army Corps of Engineers, the Coast Guard, the Environmental Protection Agency, the Navy, the Florida Fish and Wildlife Conservation Commission, the Georgia Department of Natural Resources, the Maine Department of Natural Resources, the Massachusetts Division of Fisheries, and the Rhode Island Division of Fish and Wildlife. Key non-governmental partners include the Center for Coastal Studies, the Humane Society of the United States, the International Fund for Animal Welfare, the Massachusetts Environmental Trust, the New England Aquarium, the University of Rhode Island, the University of Georgia, and Woods Hole Oceanographic Institution. Recovery work also is closely coordinated with Canada's Department of Fisheries and Oceans, which leads related activities in Canada.

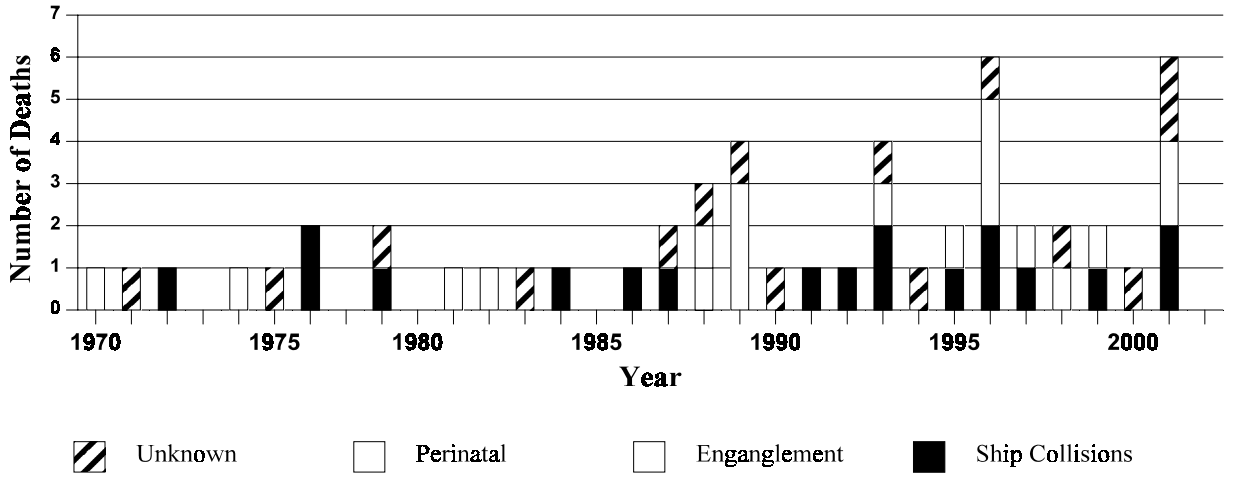
To help organize and coordinate recovery work, the National Marine Fisheries Service prepared a right whale recovery plan in 1991 and subsequently established various advisory teams. Among the latter, two regional implementation teams are charged with the overview of research and management activities. One team focuses on the feeding grounds off New England and the other focuses on the calving grounds off Florida and Georgia. Pursuant to Marine Mammal Protection Act requirements concerning the incidental take of marine mammals in commercial fisheries, the Service also established the Atlantic Large Whale Take Reduction Team to recommend steps to prevent the entanglement of right whales and other large whales in fishing gear. A representative of the Marine Mammal Commission has participated in meetings of all three teams.

As discussed in previous annual reports, the Commission helped initiate right whale research off the U.S. East Coast in the late 1970s, and it made the initial recommendations for preparing a right whale recovery plan in the 1980s. In recent years (1996, 1998, and 2000) the Commission has conducted a series of right whale program reviews of recovery work by key program participants to identify research and management priorities. Results of those efforts are described in past annual reports. The following section describes developments and activities by the Commission and others in 2001.

Recent Right Whale Mortalities and Injuries

From 1970 through 2001, 52 dead right whales have been reported along the eastern United States and Canada (see Fig. 2). Perhaps two or three times that

Figure 2. Known Mortality of North Atlantic Right Whales: 1970-2001



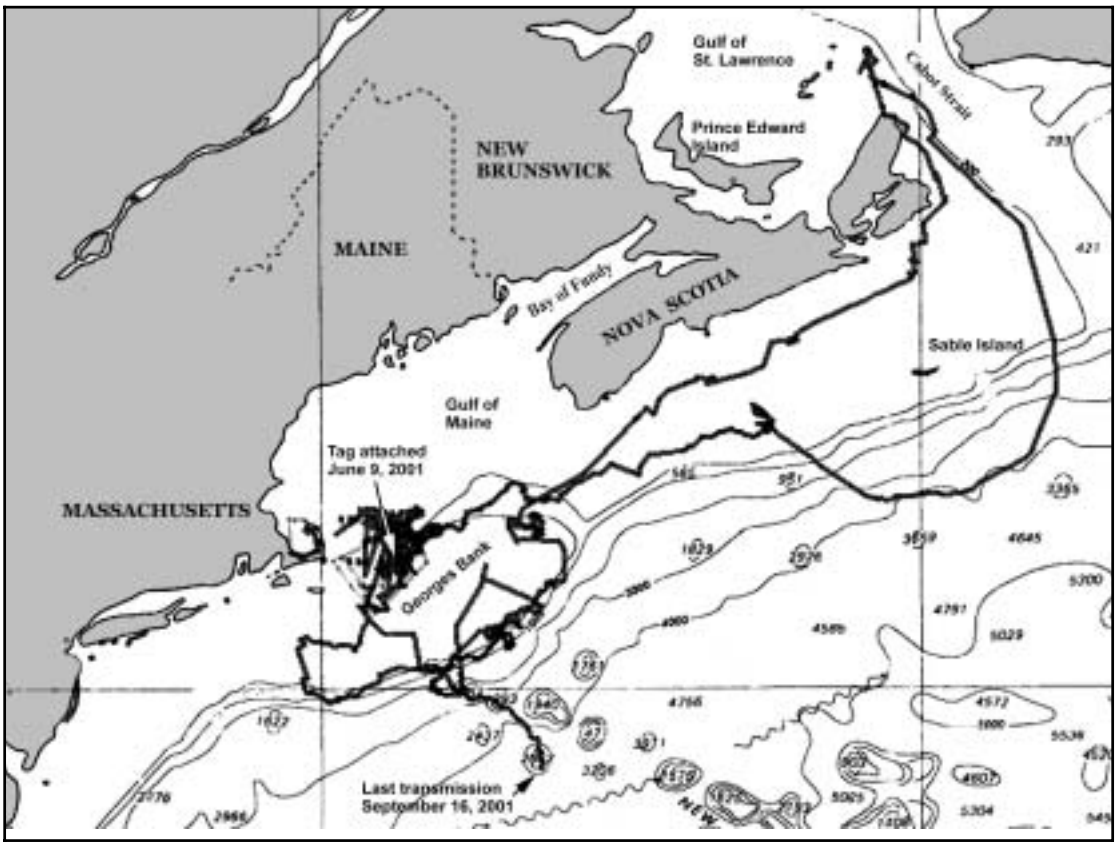


Figure 3. Track of Churchill, an entangled North Atlantic right whale, between 9 June and 16 September 2001 (figure courtesy of the Center for Coastal Studies).

number go unrecorded because carcasses sink, are consumed by scavengers, or otherwise disappear. As a result, documented carcasses, including those attributed to ship strikes and entanglements, undoubtedly represent only a portion of the total number of actual deaths. In 2001, six dead right whales were found — four calves, an adult male, and a whale of unknown age and sex. Three died of unknown causes, two were struck by ships, and one likely died due to entanglement in fishing gear. In addition, a seventh whale, last seen badly entangled in gear, almost certainly died.

The first carcass was found floating 6.5 km (3.5 nmi) off Flagler Beach, Florida, on 27 January. Photographed by a right whale aerial survey team responding to a public sighting report of a dead whale, the carcass was found late in the day. Efforts to relocate the carcass the next day for retrieval were unsuccessful. However, on 13 February, the flippers and skin of a right whale calf thought to be remains of the same calf washed ashore a few miles south of Flagler Beach. Neither the photographs of the floating carcass nor the remains found in February were sufficient to determine cause of death.

The second carcass was found on a beach near Chincoteague, Virginia, on 17 March. Five large propeller slashes on the dorsal tail stock indicated that the whale was killed by a ship. The same day, a passenger on a charter fishing boat off Murrell's Inlet, South Carolina, photographed another dead right whale calf. Unaware of the significance of the observation until seeing a media report on right whales several weeks later, the photographer did not report the carcass until mid-April. Although the photograph confirmed that the animal was a right whale calf, it was not possible to determine a cause of death. The fourth carcass was found floating about 3.5 km (2 nmi) off Fire Island, New York, on 18 June. The Coast Guard immediately responded and towed the carcass ashore. Twelve large propeller slashes on the head and back indicated that it had been killed by a ship.

The fifth carcass found in 2001 was an adult male with an 18-year sighting history (whale #1238). It was seen floating in the central Gulf of St. Lawrence on 25 October and washed ashore three days later on the Magdelene Islands, Quebec, Canada. About 200 m (656 ft) of rope was wrapped around its peduncle and

flippers, suggesting that it died as a result of entanglement in fishing gear that was later identified as part of a "Danish seine." The last confirmed sighting of the whale alive was on 25 June 2001 when it was seen with no attached gear in the Great South Channel.

The sixth carcass was photographed from a Canadian Coast Guard plane on 3 December about 30 nmi (55.5 km) off the Atlantic coast of Nova Scotia north of Halifax, Canada. Although photographs confirmed that it was the carcass of a right whale, the carcass was not recovered and it was not possible to determine its cause of death. Photographs of the carcass showed no signs of entanglement or ship collision injuries.

Several other entanglements and non-lethal injuries varying in severity also have been documented. At the end of 2000 three whales had been last seen entangled in fishing gear (whales #1130, #1720, and #2223). The entanglement of whale #1130, found in Cape Cod Bay in early March 2000, was classified as a potentially life-threatening entanglement. It was trailing line with a yellow buoy and a weight attached. After an unsuccessful rescue attempt, the whale disappeared for the remainder of 2000 and was not resighted in 2001. Whale #1720, first seen entangled 148 km (80 nmi) east of Cape Cod in late May 2000, and again in late June, was trailing about 12 m (40 ft) of line. Although the entanglement was not thought to be life-threatening (that is, it was thought the line would come free without human intervention), the whale was not resighted either later in 2000 or in 2001.

Whale #2223 was first seen entangled in the Bay of Fundy in mid-August 2000 trailing about 60 m (200 ft) of line. It was not seen again until early spring 2001 in Cape Cod Bay. At that time, a disentanglement team from the Center for Coastal Studies removed 30 m (100 ft) of line and attached a satellite tag to the remaining line in hopes of relocating the whale to continue disentanglement work. However, the whale moved out of the Bay and, over the next month, traveled between southern Maine and the edge of the continental shelf about 240 km (130 nmi) southeast of Cape Cod. In early May, the tag fell off and was later recovered with about 30 m (100 ft) of line attached. Drag from the satellite tag apparently helped pull the line free, and on 8 June 2001 the whale was resighted by an aerial survey team in the Great South Channel with no gear attached.

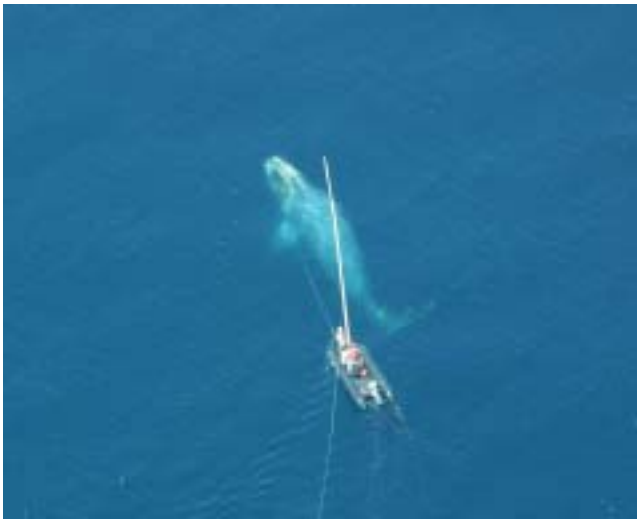


Figure 4. Pole system used to inject tranquilizing drugs into Churchill (photo courtesy of the Center for Coastal Studies).

In 2001 four new entanglements were observed, two of which were considered potentially life-threatening. The first of the severe entanglements (whale #1102, named Churchill) received intense national media attention. The whale was an adult male first reported by an aerial survey team as entangled on 8 June, 139 km (75 nmi) east of Cape Cod in the Great South Channel. It was trailing about 30 m (100 ft) of line and had line wrapped tightly around its upper jaw, which was cutting into the skin. The entanglement was considered potentially lethal and on 9 June a disentanglement team attached a satellite tag to the trailing line. The National Marine Fisheries Service organized an extensive rescue effort, and during the following weeks, there were several rescue attempts. Some of these involved the first efforts ever made to immobilize a large whale with drugs in the open ocean (see Fig. 3) so that workers could remove the embedded line. Although the drugs were successfully injected, they had little or no apparent effect on the animal.

Between June and mid-September, the whale traveled more than 10,000 km (5,500 nmi), spending most of its time out of rescue range (Fig. 4). At its last sighting on 23 August, the whale's condition had declined markedly, with evidence of significant weight loss and widespread infection. On 16 September tag transmissions stopped about 850 km (460 nmi) east of Cape May, New Jersey, where the animal presumably died and sank.

The second serious entanglement (whale #2427) involved a seven-year-old male found by a whale-watching boat 56 km (30 nmi) east of Portsmouth, New Hampshire, on 20 July. The whale was immobile with its head out of the water, and had a line trailing from both sides of its mouth. A partially deflated buoy was attached. A line was wrapped tightly around its rostrum and baleen was hanging out of its mouth. A disentanglement team from the Center for Coastal Studies in Cape Cod successfully removed all but a short length of line caught in the baleen. The whale sustained what may have been a serious injury and was later seen with its head still out of the water and baleen still extending from its mouth.

In addition to the two serious entanglements, two other unidentified whales were also seen entangled. The first was seen on 2 February off the tip of Cape Cod, Massachusetts. It had line across the back behind the blow hole but did not appear to be in need of assistance. The second was a juvenile whale with a minor entanglement seen on 13 September 2001 in the Bay of Fundy shipping channel by right whale researchers. About 7.5 m (25 feet) of red line trailed from its mouth or left flipper. Disentanglement efforts were not considered necessary. Neither animal was resighted in 2001 to determine if the entangling gear had been shed.

Thus, at the end of 2001 five whales had been last seen entangled: two with serious entanglements (#1130 first seen in 2000 and whale #1102, which probably died), and three with what appeared to be minor entanglements (#1720 and two unidentified whales). In addition, the fate of the disentangled whale last seen with baleen extending from its mouth (#2427) was uncertain.

In addition to these entanglements, an adult female (#1160) accompanied by a newborn calf was photographed off southern Georgia on 29 January 2001 with propeller wounds from a recent vessel strike. The wounds, which were faint and unnoticed at the time, included two parallel lines of propeller slashes 3–4 km (10–12 ft) long. Based on appearance, the wounds were caused by a vessel, perhaps a few tens of meters long with twin propellers. On 26 February the whale was resighted off Hilton Head, South Carolina, still accompanied by her calf. By then, the propeller slashes were clearly visible. Several subsequent resightings suggest that, although the injury was serious, it was not life-threatening and the wounds have begun to heal.

North Atlantic Right Whale Recovery Plan

Following a series of recommendations by the Marine Mammal Commission, the National Marine Fisheries Service developed and in 1991 adopted a recovery plan for northern right whales pursuant to provisions in the Endangered Species Act. The plan focused mainly on recovery needs for right whales in the North Atlantic and, to a lesser extent, on right whales in the North Pacific. To incorporate new information and reassess priority needs, the Service subsequently began preparation of a new recovery plan devoted exclusively to North Atlantic right whales. A draft plan was completed and circulated for public review and comment in July 2001.

Among other things, the draft plan concluded that existing regulatory measures to prevent ship collisions appear to be adequate, but that steps to assess and implement voluntary or mandatory speed and routing measures would be considered if ship strikes continue at unacceptable levels. To reduce mortality caused by commercial fisheries, the draft plan identified steps to (1) design and incorporate gear modifications to make fishing gear less likely to entangle whales, (2) consider strengthening time-area fishing closures in areas where right whales occur, and (3) continue and expand whale disentanglement efforts.

In response to the request for comments, the Commission wrote to the Service on 6 September 2001. The Commission noted that the draft revision was a substantial improvement over the 1991 plan. However, it strongly disagreed with the Service's conclusion that existing measures to prevent ship strikes are adequate. The Commission also noted that information from a study organized by the Commission to assess factors affecting the likelihood of ships hitting whales (see Laist et al. 2001 in Appendix C and Chapter VIII) was not considered in the draft plan. The Commission therefore recommended that the draft be modified to (1) note that existing regulatory mechanisms are not adequate to mitigate collisions between ships and right whales and (2) incorporate information from the study on collisions between ships and whales.

The Commission also recommended that the draft plan be expanded to (1) provide an assessment of possible impacts on right whales from anthropogenic sources of sound in the marine environment, (2) review information on whale vocalization patterns, and (3) describe in greater detail the tasks needed to develop

geographic information system databases, assess compliance with adopted regulatory measures, and coordinate related enforcement efforts by the Coast Guard and state agencies.

At the end of 2001 the Service was reviewing comments by the Commission and others and revising the document.

Congressional Appropriations for Right Whale Recovery

Concerned about the status of North Atlantic right whales, Congress has significantly increased funding for right whale recovery work in recent years. For fiscal year 2001, it appropriated $5 million, including $2.9 million to be distributed as grants by the Northeast Consortium (a group of New England universities) and $2.1 million to meet the responsibilities of the National Marine Fisheries Service. With its funds, the Northeast Consortium requested proposals and awarded grants to 16 new and ongoing projects. Most of the funds were used to support studies to monitor right whales in the Bay of Fundy and Cape Cod Bay, assess methods of detecting right whales with passive acoustic technology, improve and test satellite tags for tracking right whales, assess right whale hearing capabilities, analyze vessel management options, investigate right whale feeding and prey availability, study right whale reproduction, help the state of Maine develop a program to reduce entanglement risks in fishing gear, and assess factors contributing to the risk of collisions between right whales and ships.

With regard to funding provided to the Service, a spending plan was to have been developed by 30 January 2001. Completion of the plan was delayed by several months and, although the Commission was not provided a copy for review, it is the Commission's understanding that the funds were used in part to support aerial surveys for right whales in the calving grounds and in feeding areas off New England, to operate mandatory ship reporting systems in both the calving grounds and feeding grounds off Massachusetts, to develop and test fishing gear modifications less likely to entangle whales, and to convene implementation team meetings and meetings of the take reduction team to help identify and coordinate necessary research and management actions.

For fiscal year 2002, Congress again increased funding for right whale recovery work. It appropriated $6.85 million, of which $1.5 million is for supporting cooperative state programs, $1 million is to complete projects initiated by the Northeast Consortium's 2001 right whale grant-making program, and $4.35 million is for work by the National Marine Fisheries Service.

As a related matter, the Commission wrote to the National Oceanic and Atmospheric Administration on 19 June 2001 on the need to request funds for the development and support of state conservation programs on right whales, as well as Hawaiian monk seals and other endangered marine mammals. The Commission noted that state agencies offer knowledge, personnel, expertise, resources, and legal authority to help carry out urgent research and management tasks concerning endangered marine mammals. To help develop state programs, section 6 of the Endangered Species Act authorizes the Secretaries of the Interior and Commerce to enter into cooperative agreements with state agencies on work to conserve endangered species. It also authorizes the Secretaries to request appropriations for federal matching funds to help develop and implement those agreements.

Although the Fish and Wildlife Service has routinely requested and received funding under section 6, the Commission noted that the National Marine Fisheries Service had never made such requests for state programs addressing endangered marine mammals under its jurisdiction. Therefore, the Commission recommended that the National Oceanic and Atmospheric Administration (1) examine the existing and potential role of state agencies in carrying out recovery program tasks for right whales and other endangered species under its jurisdiction, (2) where appropriate, develop cooperative agreements with states under section 6 to establish and clarify state agency involvement in those recovery programs, (3) annually determine funding levels appropriate for federal support of those programs, and (4) exercise the authority to request such funding for state activities that contribute to the recovery of right whales and other endangered marine mammals under its jurisdiction.

On 16 July 2001 the National Oceanic and Atmospheric Administration responded to the Commission's letter noting that it had several cooperative agreements with state agencies under section 6 and was pursuing agreements with several other states. It also noted that, although it had not received base funding for those agreements, it had issued grants to help support state

work on certain species. The agency also agreed that everything possible should be done to work with states and advised the Commission that it intended to request funding for section 6 agreements in its fiscal year 2003 budget.

Entanglement of Right Whales in Fishing Gear

Commercial fishing gear poses a significant entanglement risk for North Atlantic right whales. Although only 3 of 52 confirmed deaths since 1970 have been attributed to entanglement, it is likely that the number of such deaths is significantly greater. Some confirmed deaths due to unknown causes are likely by entanglement, and nearly two-thirds of all North Atlantic right whales bear scars from past entanglement. In addition, a recent analysis found that 28 animals had sustained serious entanglement injuries between 1970 and 1999. Although 20 of those injuries proved to be non-fatal, based on resightings, in 8 cases whales disappeared after being last seen either severely entangled or with what were considered possibly fatal entanglement injuries. Most of the latter whales have not been resighted for six or more years and are presumed to have died.

Development of a Take Reduction Plan – To reduce entanglement risks, the National Marine Fisheries Service formed the Atlantic Large Whale Take Reduction Team in 1996. The team is composed of representatives from relevant fisheries, federal and state agencies (including the Marine Mammal Commission), environmental organizations, and the research community. Its charge includes developing agreed measures for reducing the incidental take of right whales in Atlantic coast gillnet and lobster trap fisheries to a level less than the species' calculated potential biological removal (PBR) level. The PBR is calculated using a formula designed to estimate the number of animals that could be removed from a population (other than by natural causes) while maintaining a high degree of assurance that it would increase toward its optimum sustainable population level. Because of its critical status, the PBR level for North Atlantic right whales has been determined to be zero.

After several meetings, the team recommended measures that the Service considered in developing an Atlantic Large Whale Take Reduction Plan. The Service then adopted interim final rules on 22 July 1997 to implement the final plan's regulatory measures. With minor changes, those rules were adopted as final rules on 16 February 1999. Serious entanglements continued to occur, however, and the Service therefore reconvened the team in February 2000 and adopted additional regulatory changes on 21 December 2000. The plan's major regulatory mechanisms have included seasonal fishing closures in designated right whale critical habitats and requirements for using fishing gear design features thought to reduce whale entanglement risks. Major non-regulatory measures include efforts to disentangle whales and to develop and test new fishing gear designs less likely to entangle large whales.

As discussed in previous annual reports, the Commission has written to the Service on numerous occasions expressing its belief that the plan's regulatory measures are too weak to offer much protection against entanglement risks, and that too much faith for resolving the problem has been placed on disentangling whales and requiring gear specifications of questionable effectiveness. Before 2001 gear requirements for most areas included use of a gear feature selected from a list of options, such as the use of buoy lines no thicker than 7/16 inch (1.11 cm), that either were already standard practice or offered questionable benefit for reducing entanglement risks. The Commission also noted that seasonal fishing closures for critical habitats allowed almost all gillnet or lobster fishing in those areas before the closures went into effect to continue and expand. As a result, in most cases the regulations required little or no change in either the design of gear or where it could be set. Believing that the surest way to reduce entanglement risks was to remove hazardous gear from areas where right whales are most abundant, the Commission therefore recommended that the Service strengthen the seasonal fishing closures in designated critical habitats to prohibit gillnets and lobster traps during times of peak right whale abundance. These recommendations, however, have not been adopted.

Evaluation of Additional Protection Needs – As noted above, serious entanglements of right whales continued to occur in 2001. To reduce those risks, the Service began to issue alerts to advise fishermen when and where groups of right whales had been seen feeding. To guide this process of issuing alerts, Service scientists developed criteria to identify when they should be issued and the areas to be covered. By

examining past whale sighting data, they determined that an initial sighting of three or more whales with a sighting density of at least four whales per 100 nmi^2 was a useful indicator of a feeding group that could remain in an area for a week or more. They also determined that a 15 nmi (27 km) buffer around an initial sighting area usually would encompass the whales' movements during the course of a feeding event.

Following these criteria, in March 2001 the Service began issuing alerts whenever groups of right whales were detected. More than a dozen alerts were announced in 2001, requesting that fishermen voluntarily avoid setting gear in sighting areas and that they reduce the number of buoy lines on gear already set. Each alert was for a 15-day period unless the Service confirmed that whales had left the area. In one case, to protect a group of 13 feeding right whales, the Service also published a rule requiring that all gillnets be removed from the area within 48 hours and that at least 50 percent of the vertical lines on all lobster pots be removed.

The Service also reinitiated formal consultations under section 7 of the Endangered Species Act for each of four fishery management plans governing Atlantic coast gillnet (the multispecies groundfish, spiny dogfish, and monkfish fisheries) and lobster trap fisheries. These consultations ended on 14 June 2001 with a set of biological opinions that concluded that all of the respective fisheries were jeopardizing the continued existence of the North Atlantic right whale. Each opinion therefore identified a set of reasonable and prudent alternatives that included (1) additional gear research and modification requirements, (2) the development of a dynamic area management process to temporarily close or manage fishing in areas where right whale feeding aggregations are observed, and (3) the development of seasonal management areas in right whale feeding grounds outside critical habitats where either (a) fishing would be prohibited in seasons whales are likely to be present or (b) fishermen would be required to use fishing gear that "has been proven to prevent serious injury or mortality to right whales."

On 27–28 June 2001 the Service reconvened the Atlantic Large Whale Take Reduction Team in Portland, Maine, to obtain advice on implementing the reasonable and prudent alternatives. In part, the team considered whether and what "whale safe" gear (gear with no risk of entangling whales) or "low risk" gear (gear that was highly unlikely to kill or seriously injure whales) might be acceptable for use in seasonal management areas. In this regard, it identified, but did not reach consensus on, possible gear design requirements and fishing practices that might allow gillnets and lobster gear to be used in seasonal management areas.

Proposed Regulatory Changes to the Take Reduction Plan – Based in part on the team's advice, the Service published three *Federal Register* notices in October 2001 on proposed rules to strengthen the Atlantic Large Whale Take Reduction Plan. The first, published on 1 October, proposed new requirements for lobster gear and gillnet designs to make them less likely to entangle whales. For most gear, the existing rules required the use of one gear design feature from a list of several options specific for each gear type. Those options included features, such as weak links or line no thicker than 7/16th inch, which the Service believed whales could break and thereby free themselves. The notice proposed changes to those options for different gear types in different areas.

For northern inshore lobster traps, the Service determined that one of the options on its gear technology list — use of buoy line no thicker than 7/16 in (1.11 cm) — was not an appropriate entanglement risk reduction tool because line thickness was not necessarily proportionate to line strength. It therefore proposed replacing this option in January 2003 with an option for using sinking line or neutrally buoyant line between traps. Because many traps are linked with floating line that can rise in loops up through the water column and entangle swimming whales, use of sinking or neutrally buoyant line that lies on the bottom was believed to be a useful way of reducing entanglement risks. The Service advised that it was deferring this action until 2003 because a fisherman reported excessive wear with weak links on buoys. The Service apparently was concerned that northern inshore lobster fishermen would be left with too few options from which to select if the 7/16th-in line was dropped.

Other proposed changes included the following: (1) for southern nearshore lobster traps, replacing the gear option list with a requirement for using on buoys 600-lb (272-kg) weak links that would separate without leaving a knot on the end of lines so that lines might slip more easily through whale baleen, (2) for offshore lobster traps, requiring that weak links on surface buoys

and high flyers (flags used to mark gear locations) be reduced from 3,780 lbs (1,714.6 kg) to 2,000 lbs (907.2 kg), while retaining a 3,780-lb weak link between the buoy line and the surface buoy system, and (3) for mid-Atlantic anchored gillnet gear, replacing the gear option list with requirements for using 1,100-lb (499-kg) knotless weak links on the buoys and on the float line at the center of each gillnet panel.

On 2 October the Service published a proposed rule to formalize a dynamic area management process similar to the whale alert effort it began earlier in 2001 to provide protection for feeding aggregations of whales found at unpredictable locations. The rules proposed the possible imposition of fishing restrictions for periods of up to 15 days within 15 nmi (27 km) of the locations where three or more whales were observed or thought to be feeding, such that their density is equal to or greater than 0.04 whales per nmi^2. The restrictions, which would take effect two days after being published in the *Federal Register*, could require either that owners of gillnets and lobster traps remove their gear from the area or that fishing be limited to gear with certain modifications set forth by the Service. In deciding whether to impose restrictions and what restrictions might be required, the Service noted that it would consider several factors, such as recent whale entanglements, how much fishing gear was in the area, weather conditions that might prevent fishermen from safely removing gear, and whether the area was near other fishery closure areas.

On 3 October the Service published an advanced notice of proposed rulemaking requesting comments on a possible action to establish a new seasonal area management process at an unspecified future date. Similar to dynamic area management zones, the seasonal zones could involve requirements to reduce, eliminate, or modify fishing gear within designated areas. However, under the seasonal process, the restrictions would apply seasonally in areas other than critical habitats where past sighting data indicated that right whales predictably form seasonal feeding aggregations.

On 31 October 2001 the Commission commented to the Service on all three notices. It reiterated its concern that the Service was placing too much reliance on gear design requirements with questionable and possibly limited value for reducing entanglement risks. Given the urgency for reducing right whale entanglements, the Commission noted that strong reliance on gear design requirements as a risk reduction tool was warranted only when there is a solid reason to believe that they would reduce entanglement risks. For example, replacing floating line between lobster traps with neutrally buoyant or sinking line would eliminate line from the water column and clearly reduce entanglement risks. Likewise, prohibiting the use of hazardous gear in times and areas where whales are most abundant could reasonably be assumed to reduce risk. Conversely, although weak links may eventually prove helpful for reducing entanglements, their effectiveness has not been demonstrated and may prove to be minimal. Accordingly, although such devices should be encouraged, they should not be relied upon to resolve entanglement problems in the short term when other, more certain means of risk reduction exist.

In this regard, the Commission expressed concern about the Service's proposal to defer the removal of the gear requirement option for using 7/16th-inch (1.11-cm) buoy lines for inshore lobster waters (which the Service had determined to be inappropriate as a risk-reduction measure), while also deferring the addition of an option for using neutrally buoyant line between lobster traps (an option that has a clear benefit for reducing entanglement risks). The Commission also expressed concern that the Service was not proceeding immediately to develop rules for seasonal area management zones, and that the proposals left it unclear precisely when and what restrictions would be imposed under the dynamic and seasonal area management processes.

Among other things, the Commission therefore recommended that the Service:

- modify the lobster take reduction technology list by deleting 7/16-in (1.11-cm) line and adding neutrally buoyant line for ground lines and buoy lines immediately, rather than deferring the changes until January 2003;
- assess the effectiveness of weak links and knotless lines by examining lines removed from whales, as well as photographs of entangled whales, to evaluate the extent to which knots tied by fishermen may have contributed to entanglements;
- describe how it intends to apply certain factors identified for the purpose of determining whether to impose restrictions under the dynamic management process; and

- by spring 2002, implement final rules to establish a seasonal area management zone for an area north of Georges Bank between Cape Cod and the Hague Line, thereby prohibiting gillnet and lobster fishing in spring and early summer in that area until such time as fishing gear unlikely to injure or kill right whales has been developed and proven effective.

With regard to the latter recommendation, the Service on 28 November 2001 published a proposed rule to implement a seasonal area management zone north of Georges Bank. The proposal called for seasonal gear requirements within the western third of the zone during March and April and in the eastern two-thirds of the zone during May, June, and July. During these periods, lobster gear would be required to have sinking or neutrally buoyant line between traps, a single buoy on each string of traps, and a 1,500-lb (680-kg) weak link at the surface buoy and high flyer. Gillnets would be required to use five 1,100-lb (499-kg) weak links on each net panel and to have a 22-lb (9.98-kg) Danforth-style anchor at each end of the gillnet.

The Commission provided comments on the proposal to the Service on 13 December 2001, expressing its appreciation to the Service for moving quickly to the proposed rulemaking stage and its support for establishing the proposed zone. It also noted that the requirement for the use of sinking line or neutrally buoyant line on offshore lobster traps should reduce potential entanglement risks. However, the Commission also noted that reliance on weak links to prevent entanglement risks from buoy lines on lobster traps and gillnets appeared inconsistent with the recommended reasonable and prudent alternative in the biological opinion for restricting gear to that which "has been proven to prevent serious injury or mortality to right whales." In this regard, it noted that information accompanying the proposed rule referred to a case in which required weak links had not been successful in preventing the entanglement of the right whale disentangled in July 2001.

To be consistent with the standard set forth in the biological opinion, the Commission therefore recommended that restrictions within the proposed seasonal management area zone prohibit all gillnet and lobster fishing. The proposed rules noted that this option had been considered but rejected because of concern that displaced fishermen would create a zone of hazardous fishing gear around the established zone. With regard to this point, the Commission noted that information presented with the Service's proposed rule suggested that relatively few people actually fished in the zone during that season. It also noted that past experience with management zones requiring gear modifications (e.g., areas in which acoustic deterrents are required to reduce harbor porpoise bycatch) indicate that fishermen often choose to fish outside such zones to avoid having to modify their gear. The Commission therefore questioned whether a seasonal closure would create either a significant barrier to whales or a major hardship for fishermen.

Finally, the Commission noted that the report of the June 2001 meeting of the Atlantic Large Whale Take Reduction Team suggested that gear design require-ments for special management areas eventually should be applied to all fishing areas. Noting that time would be needed for manufacturers to produce supplies of new gear and for fishermen to replace existing gear, the Commission therefore recommended that the Service immediately modify the Atlantic Large Whale Take Reduction Plan to set forth a proposed schedule for phasing in requirements for promising risk-reduction measures, such as the use of sinking or neutrally buoyant lines between lobster traps and using a single buoy to mark strings of lobster traps and gillnets.

As of the end of 2001 the Service expected to take final action on the various proposed rules early in 2002.

Other Actions to Reduce Entanglements – Several other notable contributions also were made to reduce entanglement risks to right whales. Following the lead of the Massachusetts Division of Marine Fisheries, the Maine Department of Natural Resources and the Rhode Island Division of Fish and Wildlife took steps to develop right whale conservation programs. During 2001 both states received grants from the National Marine Fisheries Service to work with the fishing industry to heighten awareness of interactions between right whales and fishing gear and to assist in the implementation of research and management actions to reduce right whale entanglement risks.

As a related matter, several New England states joined the National Marine Fisheries Service in organizing a workshop to be held in spring 2002 to examine

ways to reduce entanglements. The workshop will involve fishermen, gear manufacturers and distributers, gear technicians, material specialists, and whale biologists. Its goal will be to identify options for developing new fishing gear and fishing techniques that will minimize or eliminate the risk of serious whale entanglements.

Also during 2001 the Right Whale Research Consortium, an organization of non-governmental research groups including the New England Aquarium, the Center for Coastal Studies, the University of Rhode Island, Woods Hole Oceanographic Institution, and others cooperating on studies of North Atlantic right whales, sponsored a $10,000 award competition for developing equipment or ideas to prevent or mitigate entanglement risks for right whales. From 20 entrants, five finalists were selected to receive cash awards or prizes for their work on (1) a new design for a break-away link on gillnet head ropes, (2) equipment to keep trap and net buoys on the seafloor while gear is actively fishing, (3) a gun to attach a tail harness for helping to disentangle whales, (4) a device to cut ropes from entangled whales, and (5) a chemical process to speed the degradation of lost and discarded ropes and nets.

Also in 2001 the Massachusetts Division of Marine Fisheries began funding a project initiated in 1999 by local lobster fishermen to remove lost and illegal lobster traps from Cape Cod Bay. Initially funded as a pilot project by the International Fund for Animal Welfare in 2000 with assistance from the Massachusetts Division of Environmental Law Enforcement, the project involves the removal of any lobster traps that are not legally set between 1 January and 15 May when the number of right whales in the bay peaks. During this period, lobster traps must meet certain gear specifications (e.g., have at least four traps per buoy, use sinking line between traps, and have a weak link between the buoy and buoy line) and be properly marked. Any gear not properly marked or otherwise found to be noncompliant is pulled from the water to reduce entanglement threats to whales.

Collisions between Ships and Right Whales

The major known cause of human-related right whale deaths and the cause of nearly half of all confirmed right whale deaths since the early 1990s is collisions with ships. At least two of five dead right whales found in 2001 were killed by ships. Based on the large size of propeller slashes and the presence of massive bones broken or crushed in examined struck whales, it appears that the vast majority of such deaths are caused by large ships, although calves, in particular, may be killed by smaller vessels. An analysis of collisions between ships and all species of large whales recently organized by the Commission (see Chapter VIII) found that the majority of serious or lethal injuries was due to ships 80 m (262 ft) or longer.

To reduce ship collision risks to right whales, the National Marine Fisheries Service has relied on the willingness and ability of vessel operators to voluntarily take actions to avoid hitting whales. To promote this strategy, the Service and cooperating agencies and groups began an intensive aerial survey program in key right whale habitats to find whales and alert vessel operators of whale locations. They also developed videos, placards, brochures, amendments to maritime guides and publications, and other materials describing the plight of right whales and the need for precautionary measures by vessel operators (e.g., being alert for whales, posting extra watches in right whale habitats, steering clear of sighted whales, and slowing down when right whales are sighted or when in areas where they might be encountered). Mandatory ship reporting systems also were established in key right whale habitats to ensure that vessel operators are aware of the need to avoid collisions with right whales.

A voluntary approach, however, does not appear to be adequate. Vessel-related deaths have continued unabated. In addition, the above-noted review of data regarding whales struck by ships suggests that most whales are not seen before collisions or are seen only at the last moment when it is too late to avoid them. For large vessels more than 100 m (304 ft) long, a ship traveling at normal operating speed can move a kilometer or more in the time it takes to decide whether to turn and to actually begin turning. As a result, reliance on voluntary actions by vessel operators to detect and avoid whales may not be sufficient. Therefore, to examine other measures, a two-year study, funded principally by the International Fund for Animal Welfare and the National Marine Fisheries Service, was initiated in 1999 to identify new measures to reduce ship collision risks.

Recent developments regarding these efforts are discussed below.

Figure 5. Adult female right whale #1160, accompanied by her calf, is shown in the upper photograph, taken off Georgia on 29 January 2001, shortly after being struck by a ship. Resulting propeller slashes are barely visible (photograph by Alicia Windham-Reid). Wounds are clearly visible in the lower photograph, taken off South Carolina on 26 February 2001 (photograph courtesy of William McClellan).

Early Warning Systems – Two aerial survey programs have been established to alert vessel operators to right whale sighting locations. One, started in the winter of 1993–1994, covers the calving grounds off Florida and Georgia, and the other, begun in 1996, covers feeding grounds off New England. Whale sightings, along with advice to use caution when transiting near sighting locations, are relayed to vessels within minutes to hours of the time sightings are made. This information is disseminated via the Coast Guard's broadcast notice to mariners, voice radio, NAVTEX (a telex communication system aboard most large vessels), messages sent to ships through two mandatory ship reporting systems (see below), pager links with port pilots, and other means. Photographs and observations of whales from these surveys also provide one of the most important means of detecting entangled whales and monitoring the status of the population.

In the southeastern United States, surveys are flown only during the December-to-March calving season. Weather permitting, planes fly daily over the center of the calving grounds near the Florida-Georgia border, and less frequently in peripheral areas. The flights are funded mainly by the Army Corps of Engineers, the Coast Guard, the Navy, the National Marine Fisheries Service, the Florida Fish and Wildlife Conservation Commission, and the Georgia Department of Natural Resources. The survey and sighting relay network requires extensive coordination and involves staff from the New England Aquarium, the Georgia Department of Natural Resources, the Florida Marine Research Institute, the Navy's Fleet Area Control and Surveillance Facility, and the Coast Guard.

During 2001 combined survey and sighting efforts documented 30 calves, the highest number on record, and more than 500 sightings of one or more animals, also a record high. On five occasions, aerial observers saw ships heading directly toward whales and radioed the ship. In one case a fast-moving container ship bearing down on a mother/calf pair began to turn away when contacted, but then turned back directly toward the animals. When within about one ship's length of the pair, both dived and were next seen a few moments later astern of the ship just outside the ship's wake. Both were just below the surface and swimming at a rapid pace away from the ship. Neither appeared injured. In another case, the ship slowed to 10 knots and came within about 200 m (604 ft) of a whale when it dived, altered its course, and resurfaced behind the vessel. In the other cases, the ships turned or slowed to avoid the whales and came no closer than a half mile (0.8 km) of the whales, and the whales showed no apparent response to the ships. As noted above, survey teams also photographed an adult female right whale (accompanied by a calf) that sustained a serious but non-lethal propeller wound in the calving area in late January (Fig. 5).

The northeastern program covers a much larger geographic area that extends farther offshore. Survey flights occur daily between March and June (weather permitting) and periodically at other times of the year. The greatest effort is concentrated in Cape Cod Bay in late winter and spring and in the Great South Channel in spring. The surveys are funded mainly by the National Marine Fisheries Service and the Coast Guard although the Massachusetts Environmental Trust and

the State of Massachusetts have also contributed significantly in some years. The survey work is carried out by the Service, the Center for Coastal Studies, and the Massachusetts Division of Fisheries.

In 2001 more than 500 right whale sightings were recorded in the northeast. In addition to providing sighting locations for mariners, survey teams detected entangled whales, provided sightings that triggered several whale alerts to fishermen about the location of right whale feeding aggregations, detected an additional calf not recorded by surveys in the calving grounds, and resighted two whales that had not been seen for over six years and were thought to have died.

Mandatory Ship Reporting Systems – In July 1999 the Coast Guard and the National Marine Fisheries Service jointly implemented two mandatory ship reporting systems approved by the International Maritime Organization at the request of the United States to help protect right whales. One is in the core of the southeastern U.S. calving grounds and the other covers major feeding grounds off Massachusetts (see Fig. 1). Within these areas, motorized vessels 300 gross tons or greater must contact a shore station upon entering the area to obtain information on right whales. Messages are automatically sent by a satellite communication system to reporting ships to advise them of the most recent right whale sighting locations, the need for caution to avoid whales, and the availability of related information. Reporting vessels also must provide information on their destination, route, and speed to help monitor vessel traffic and collision risks in the reporting areas. Interim rules for the two reporting systems, published by the Coast Guard in 1999, were adopted as final on 20 November 2001 with minor changes concerning information vessels must report.

Although compliance with the reporting requirements has been disappointing, there were some signs of improvement late in 2001. Compared to monthly ship arrivals in area ports, overall compliance for the two areas combined from July 1999 through December 2001 was 49 percent. In the southeastern calving grounds, where reporting is required only from mid-November through mid-April, the compliance rate was 44 percent for the winter of 1999–2000 and 37 percent for the winter of 2000–2001. Compliance during the first two months of the 2001–2002 season (November and December 2001) was 45 percent. For the northern area, which is in effect year-round, the compliance rate was 58 percent in 1999, 62 percent in 2000, and 51 percent in 2001. In part, low compliance may have been due to incorrect reporting instructions in some mariner publications, which were corrected in October 2001. Perhaps related to this change, reporting rates in the northern area increased from 46 percent in September 2001 to 67 and 73 percent in November and December, respectively.

To improve compliance, the National Marine Fisheries Service has been sending letters describing ship reporting requirements to owners, agents, and captains of vessels that failed to comply. When compliance failed to improve, the southeastern right whale implementation team wrote to the Coast Guard on 31 January 2001 expressing concern and requesting increased enforcement effort. In response, the Coast Guard agreed to begin issuing warnings to owners of noncompliant vessels and eventually to impose civil penalties if noncompliance continues.

To evaluate risks of collisions between vessels and whales the National Marine Fisheries Service contracted with the Florida Marine Research Institute to create a geographic information system for archiving reports by ships and to prepare a summary report analyzing that data. A final report by staff of the Service, the Institute, and the Coast Guard analyzing data available through July 2000 is expected to be completed early in 2002. The report will include charts depicting reported vessel traffic routes in both areas, data on vessel speeds at the time of entry into the areas, and other information. Preliminary results suggest that reported ship speeds in the two areas ranged from 5 to 25 knots and that more than half of the vessels were traveling at 14 knots or less. About three-fourths of the vessels entering the southeastern area used speeds of 18 knots or less and about three-fourths of those entering the northeastern area were traveling at 16 knots or less.

Report on Recommended Measures to Reduce Ship Strikes – In 1999 a study was initiated to evaluate potential measures to reduce collisions between ships and right whales. The study, funded mainly by the International Fund for Animal Welfare and the National Marine Fisheries Service with additional funding from the Marine Mammal Commission and the Georgia Department of Natural Resources, resulted from recommendations by the Marine Mammal Commission to the Service for a project to evaluate voluntary measures that shipping companies might take to avoid hitting

right whales. The study was conducted under the aegis of the two regional implementation teams and in consultation with representatives of major shipping companies and port authorities along the U.S. East Coast.

During the course of the study, more than 28 workshops and meetings were held with shipping industry representatives and government officials to consider information on vessel-related right whale deaths and possible mitigation measures. Included in these meetings was a workshop held on 10 April 2001 at the Coast Guard Academy in New London, Connecticut, that brought together more than 100 officials from shipping organizations, government agencies, and environmental groups. Discussion of mitigation measures quickly focused on two fundamental variables: vessel routes and vessel speeds. It also was apparent that application of those measures would have to differ in different areas because of variations in geography, vessel traffic, and right whale occurrence. For example, in some areas routing measures might include ad hoc measures to avoid temporary, unpredictable whale feeding aggregations discovered by aerial survey teams, whereas in other areas, it may be more appropriate to establish seasonal or permanent routes to minimize travel distances through right whale critical habitats, depending on local bathymetry and right whale use patterns. During the discussion, it was pointed out that any such measures must not compromise navigation safety or general protection of the marine environment.

To assist in the study, a representative of the Marine Mammal Commission presented findings of the above-mentioned review of collisions between ships and whales at several meetings held during the course of the study. Among other things, that review suggested that the risk of serious and lethal injuries to whales declined sharply at speeds below 14 knots and may approach negligible levels at speeds of 10 knots or less. Accordingly, it concluded that reducing speeds to between 10 and 13 knots could be an appropriate mitigation measure in situations where risks of collisions with whales are an important concern.

In August 2001 a study report (see Russell et al. 2001, Appendix C) was submitted to the National Marine Fisheries Service. In part, the report recommended various routing and speed measures for vessels 65 ft (19.8 m) or longer. Because migrating whales are believed to travel close to shore, it recommended seasonal 10-knot speed limits within 20 nmi (37 km) of major port entrances between southern New England and northern Georgia during migratory periods. For the calving grounds, it recommended a seasonal 10-knot speed limit within about 25 nmi (46.2 km) of the northeastern Florida and southern Georgia coasts, and that a study be done to determine if new mandatory traffic lanes for three area ports could help reduce travel through areas where whales are seen most often. For feeding grounds off Massachusetts, it recommended a combination of measures: requiring vessel traffic to follow existing recommended travel lanes through the Great South Channel; a seasonal 10-knot speed limit for a segment of those lanes; and a dynamic management system for imposing short-term 10-knot speed limits in other segments of those lanes when groups of whales are observed feeding.

In the fall of 2001 the study also was presented to the two regional implementation teams. The southeastern team considered the report's recommendations for the calving area at its meeting on 24–25 September 2001 in Fernandina Beach, Florida. The team then wrote to the Service on 18 October 2001 to convey its views. It noted that the authors had done a commendable job of soliciting views from constituent groups, consolidating information on the various issues, and formulating recommendations for potential management options. It also recommended unanimously that the actions identified in the report be further considered after certain additional studies are undertaken. The additional studies include economic analyses of route and speed measures, an assessment of the likelihood that ships would call at ports outside the calving area due to new restrictions, a risk assessment to determine which recommended measures would offer the greatest protection to whales, and a port access study, which is a prerequisite for any action to establish new vessel traffic requirements.

With regard to economic impacts, a preliminary analysis of report recommendations was presented to the team during its meeting that suggested that overall economic impacts of the measures would be minor but would have the greatest effect on cruise ships and container ships. Several team members, however, felt that the further analyses mentioned above were needed to adequately assess potential costs.

The northeastern implementation team considered the report at its meeting on 24 October 2001, but as of

the end of 2001 it had not yet conveyed its views to the Service. As of the end of 2001 the Service had not yet announced what action it would take with regard to the report and its recommendations.

National Whale Conservation Fund

As described in the previous annual report, the National Fish and Wildlife Foundation recently established the National Whale Conservation Fund to help obtain public and private contributions for conserving whale populations in U.S. waters. Created in response to a 1999 directive by Congress, which later appropriated $250,000 in seed money, the Fund is to be administered in consultation with both the Marine Mammal Commission and the National Marine Fisheries Service. Its purpose is to support of research, management, conservation, and education/outreach activities related to the conservation and recovery of whales, particularly those that are most endangered.

During 2001 substantial progress was made to develop the Fund. Among other things, a manager was hired by the Foundation, a council was appointed to oversee Fund development, and an initial grant was made to the Center for Coastal Studies to supplement support for work to disentangle right whales and other large whales found entangled along the U.S. East Coast during 2001. During 2001 Center staff responded to five entanglement reports, including three humpback whales and two right whales. Two humpback whales and one right whale were successfully disentangled, efforts to remove gear from one right whale were unsuccessful and the whale is thought to have died, and efforts to remove gear from one humpback whale were also unsuccessful but the whale subsequently shed the gear by itself. Although fundraising efforts were set back substantially by economic repercussions from the terrorist attacks of 11 September, at the end of 2001 a request for proposals was issued for the Fund's second grantmaking cycle.

Right Whale Litigation

Litigation continued to play a role during 2001 in directing state and federal actions designed to avoid the taking of right whales. Two lawsuits filed in 2000 by environmental groups against the Secretary of Commerce and other officials (*Humane Society of the United States* v. *Evans* and *Conservation Law Foundation* v. *Evans*) prompted the National Marine Fisheries Service to take certain steps to address fishery interactions. As discussed above, these included the preparation of four new biological opinions on fisheries that may affect rights whales and the adoption of rules for seasonal and dynamic management measures in areas used by right whales.

The plaintiffs in these cases, which were subsequently consolidated into a single case, sought to compel the Service to strengthen its fishery-related regulations to reduce the taking of right whales incidental to commercial fishing operations. They alleged that the Service had violated the Endangered Species Act and the Marine Mammal Protection Act by failing to implement fishery management plans that were not likely to jeopardize the continued existence of right whales and by not implementing effective take reduction plans to eliminate taking incidental to commercial fishing operations. Among other things, the plaintiffs asked the court to compel the Service to issue emergency regulations mandating modifications in lobster and other fishing gear and to restrict or completely close fisheries in areas where right whales are known to aggregate. They also asked the court to require the Service to convene a ship-strike take reduction team to develop an effective take reduction plan that would meet statutory requirements.

On 4 May 2000, before the suits were filed, the Service determined that new biological opinions and a reassessment of its previous no jeopardy determination were needed for right whales. Accordingly, the Service developed and, on 14 June 2001, issued a new biological opinion. Upon issuing the opinion, the federal defendants filed a motion to have the case dismissed on grounds that it was moot. The plaintiffs, however, did not believe that the new opinion adequately addressed the issues before the court and opposed the motion. In response, the court stayed its consideration of the matter until the regulations called for in the opinion had been developed.

As noted above, in early October 2001 the Service published proposed rules addressing two of the areas of concern identified in the biological opinion and an advance notice of proposed rulemaking for a third area. These notices covered issues relating to seasonal area management, dynamic area management, and gear modifications. Final rules were transmitted by the Service on 31 December 2001 for publication in the *Federal Register.* The Commission understands that,

based upon the issuance of these rules, the defendants intend to seek dismissal of the case early in 2002.

As described in the Commission's previous annual reports, a separate lawsuit was filed against the Massachusetts Executive Office of Environmental Affairs by Richard "Max" Strahan in April 1995 alleging four separate violations of the Endangered Species and Marine Mammal Protection Acts concerning right whales by Massachusetts officials (*Strahan* v. *Durand)*. In 1996 the court ruled that the plaintiff had demonstrated a sufficient likelihood that endangered whales are periodically taken by entanglement in 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 therefore ordered the defendants to apply to the National Marine Fisheries Service to obtain an incidental take authorization for right whales under the Marine Mammal Protection Act. The court also ordered the state to develop and submit a proposal to restrict, modify, or eliminate the use of fixed fishing gear in coastal waters of Massachusetts listed as right whale critical habitat.

In 1997 the U.S. Court of Appeals upheld the lower court's decision, with one exception. The appellate court ruled that Massachusetts was not required to apply for an incidental take authorization under the Marine Mammal Protection Act. Although Massachusetts sought review of this decision by the U.S. Supreme Court, the Court chose not to hear the case.

Settlement of the case was reached on 26 April 2001 under an agreement signed by Massachusetts state officials, the Conservation Law Foundation, which had intervened in the case as a plaintiff, and the Massachusetts Lobstermen's Association, which had intervened as a defendant. Under the terms of the settlement, the parties agreed that, subject to certain exceptions, dynamic gillnet regulations would be implemented, temporarily prohibiting gillnet gear from being used when an aggregation of right whales is present in Cape Cod Bay during the period between 15 May and 31 December of each year. This prohibition will become effective within 72 hours of the first verified sighting of a whale aggregation consisting of three or more whales and is to remain in effect until all right whales have left the bay. The settlement also sets out gear requirements for lobster fishing and prohibits the use of floating groundlines. Under the agreement, the state may continue to issue experimental fishery permits to encourage the development and use of alternative lobster fishing gear that may be more effective in preventing the taking of right whales.

North Pacific Right Whale (*Eubalaena japonica*)

The North Pacific right whale is one of three right whale species that were severely depleted by commercial whaling. A recent analysis of historical whaling records suggests that between 26,500 and 37,000 North Pacific right whales were killed between 1839 and 1909, and that between 21,000 and 30,000 were killed during the 1840s alone. The total number of North Pacific right whales still surviving is probably in the low hundreds.

When compared with the North Atlantic right whale, which survives as a single population numbering about 300 whales, it is uncertain which of these two right whale species is the more endangered. However, there is no doubt that they are the two most endangered large whale species in the world. Although both are considered "endangered" under the Endangered Species Act, following an earlier taxonomic scheme that classified all Northern Hemisphere right whales as members of a single species (see discussion earlier in this chapter under North Atlantic right whales), North Atlantic and North Pacific right whales are presently lumped together as "northern right whales" on the Act's list of endangered and threatened species.

North Pacific right whales are thought to be divided into two populations — one in the western North Pacific and the other in the eastern North Pacific. In summer, the western stock feeds in the Okhotsk Sea and along the Kuril Islands off eastern Russia. Although its winter distribution is unknown, the population's winter calving grounds are believed to occur somewhere off Southeast Asia or perhaps in deep water in the western North Pacific. A reliable abundance estimate for the western stock is not currently available. A recent analysis of data from a Japanese whale survey off eastern Russia between 1989 and 1992 produced a preliminary regional abundance estimate of 922 whales (95 percent confidence interval, 404–2,108), but that estimate was based on sightings of only about 30 right whales, some of which may have

been resightings of the same individuals. Based on sighting records for the past 30 years, a population size in the low hundreds, at most, seems likely. Whatever the current number, it would have been substantially larger had it not been for an episode of illegal whaling between 1967 and 1970. During those years Soviet whalers killed about 135 right whales on the population's summer feeding grounds.

The eastern North Pacific population is far more severely depleted than the western population. It may number only a few tens of whales, making it the most endangered marine mammal population in U.S. waters. Early in the 1960s the population apparently numbered in the low hundreds and was recovering slowly from heavy whaling in the mid- to late 1800s. Between 1963 and 1967, however, Soviet whalers illegally took more than 350 right whales in the southeastern Bering Sea and the Gulf of Alaska. Since then, sightings in the eastern North Pacific have been very rare and there have been no confirmed reports of calves.

Each summer since 1996 a few right whales have been seen in the southeastern Bering Sea about 200 miles north of Unimak Pass. The sightings include three or four whales in 1996, four or five in 1997, five or six in 1998, six or seven in 1999, and 13 in 2000. In 2001 groups of two and three whales were seen in the same area. These sightings apparently reflect the discovery of a preferred feeding grounds for remnants of the eastern North Pacific population.

The National Marine Fisheries Service is responsible for right whale research and management activities and, since 1996, most sightings have been made during aerial and shipboard surveys organized by the Service to study right whales using the southeastern Bering Sea in summer. The surveys have sought to photo-identify and collect biopsy samples from as many individual right whales as possible. Photographs collected through 2001 reveal that at least 14 individuals have been in the groups sighted. Biopsy samples have been collected from six whales and genetic studies revealed that all were males. Although none of the sightings off Alaska has included calves, reports of courtship behavior suggest that a potential for reproduction still exists.

Critical Habitat Petition

The reported right whale sightings in the southeastern Bering Sea between 1997 and 1999 prompted the Center for Biological Diversity to petition the National Marine Fisheries Service in October 2000 to designate a large portion of the southeastern Bering Sea as a right whale critical habitat. The petition sought to designate waters between 45 and 100 m deep along the outer edge of the continental shelf, extending as a band about 800 km (432 nmi) northwest from the eastern Aleutian Islands.

The Endangered Species Act provides for such designations when it is determined that a specific geographic area includes physical or biological features that are essential for the conservation of a listed species and when special management needs may exist. Critical habitat designation does not necessarily trigger new regulatory measures, but it does clarify and highlight the obligations of federal agencies to consult with the Service on any actions they may take or authorize that could modify the area or adversely affect the listed species. To help evaluate the merits of the proposed action, the Service published a *Federal Register* notice on 1 July 2001 requesting comments on the petition.

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, responded to the Service on 11 July 2001. It noted that although recent right whale sightings in the area are sparse, the repeated summer sightings since 1996, along with historical whaling records showing that right whales were once abundant in the area, provide a reasonable basis for concluding that the petitioned area contains features essential to the population's survival. Based on experience with North Atlantic right whales, the Commission also noted that collisions with ships and entanglement in commercial fishing gear could represent significant conservation issues for North Pacific right whales. It therefore recommended that the Service proceed with designating the area as critical habitat with a view toward modifying its boundaries at a future date if warranted by better data on the distribution and habitat-use patterns of the whales.

To improve information in this regard, the Commission recommended that surveys to photograph and biopsy right whales in the southeastern Bering Sea be continued. If steps were not already planned to do so, the Commission also recommended that studies be initiated to (1) use satellite tags to track right whale movements and habitat-use patterns in the southeastern Bering Sea, (2) analyze available biopsy samples from

the southeastern Bering Sea and the western North Pacific to assess genetically whether whales from the two areas comprise separate stocks, and (3) examine recent photographs of North Pacific right whales to look for scars that might indicate interactions with fishing gear or ships. The Commission also recommended that the Service evaluate the extent to which potentially hazardous gillnet or trap fishing gear is present in the petitioned area during seasons when right whales are present.

The Service replied to the Commission by letter of 18 September 2001 noting that it was in the process of reviewing comments and other information bearing on the petition. With respect to the research activities recommended by the Commission, the Service noted that right whale surveys in the southeastern Bering Sea would be continued and expanded as funding permits, although no surveys were planned in the western North Pacific. It also advised that it planned to use satellite tags to track right whales, but not until it reviewed concerns raised by the Scientific Committee of the International Whaling Commission on the effects of tags implanted in the past on North Atlantic right whales. Regarding genetic analyses, the Service noted that, although genetic data strongly support the conclusion that North Atlantic and North Pacific right whales are separate species, the number of North Pacific right whales sampled is likely too small to distinguish between eastern and western stocks, and such studies therefore are not currently planned. Finally, the Service noted that photographs of the North Pacific right whales show no evidence of scars from either ships or fishing gear.

As of the end of 2001 the Service had not yet announced a decision on whether to proceed with the petition to designate critical habitat for North Pacific right whales.

Marine Mammal Commission Review

During the annual meeting of the Marine Mammal Commission and its Committee of Scientific Advisors, held in Anchorage, Alaska, on 14–16 November 2001, representatives of the Service reviewed information on its North Pacific right whale research and management plans for 2002. In addition to actions noted above, the Service advised that a draft recovery plan for North Pacific right whales was being prepared and would be available for review in 2002. It also noted that it was planning to expand right whale survey efforts in the southeastern Bering Sea. Planned work includes surveying an expanded area using hydrophones to locate and photograph right whales, sampling oceanographic conditions to assess ecological factors related to right whale distribution, and possibly using satellite tags to track right whale movements.

Based on this information, the Commission, in consultation with its Committee of Scientific Advisors, wrote to the Service on 27 December 2001 providing further comments and recommendations. The Commission noted that it was pleased to learn that a recovery plan for North Pacific right whales was being prepared and it recommended that the Service complete both the recovery plan and the evaluation of the critical habitat petition as soon as possible. The Commission also noted that all of the identified research efforts seemed essential and recommended that funding to accomplish them be provided in 2002.

Noting the possible deferral of work using satellite tags pending a review of International Whaling Commission concerns about the effects of such tags on whales, the Commission stated that it did not believe available information on tag effects warranted a deferral of this work. It noted that it was aware of no mortalities resulting from the tagging of large whales and that, in its view, the risk of being unable to protect right whales and their habitats because it is not known what areas they use is far greater than the risk of serious tagging effects. In addition, it noted that recent advancements, such as the use of antibiotics on tags, have reduced tagging risks to animals.

Finally, the Commission recommended that, if it was not already being done, the Service update the listing of "northern right whales" on the List of Endangered and Threatened Species of Wildlife under the Endangered Species Act. It noted that the list should reflect the current understanding that North Pacific and North Atlantic right whales constitute separate species, that both stocks are endangered, and that the North Pacific right whale is believed to be divided into separate eastern and western stocks.

Humpback Whales in Alaska *(Megaptera novaeangliae)*

Humpback whales occur in all the worlds's oceans. Although they usually inhabit coastal waters and feed mainly on krill and small schooling fish (e.g., capelin, anchovy, herring, walleye pollock, mackerel, and sand lance), humpback whales also occur in the open ocean — especially when migrating between summer feeding grounds and winter calving grounds. Like some other large whale species, humpback whales appear to fast during the calving season (and perhaps also during their migration), living off fat reserves that accumulate in their blubber during the feeding season. Because their feeding grounds occur in temperate and polar latitudes and their calving grounds are almost always in the Tropics, the distance traveled by migrating humpback whales can be among the longest of any mammal on earth. In this regard, a recent study documented an individual humpback whale feeding off Antarctica that was subsequently resighted on its calving grounds at least 8,400 km (5,220 mi) away along the west coast of Central America.

Because of the reversal of seasons in the Northern and Southern Hemispheres, the timing of migrations by humpback whale populations in the two hemispheres is always six months out of phase with one another. As a result, although it has been generally believed that members of northern and southern populations rarely, if ever, interact with each other, recent findings reveal that their tropical calving habitats do, in some cases, overlap geographically. Thus, opportunities for interbreeding may be somewhat greater than previously thought. Some 13 stocks of humpback whales are currently recognized worldwide, all of which were severely depleted by commercial whaling. Although many, if not most, populations are showing encouraging signs of recovery, the species is still listed as endangered throughout its range under the Endangered Species Act.

Three stocks of humpback whales occur in the North Pacific Ocean, one of which — the central North Pacific stock — migrates annually between winter calving grounds in Hawaii and summer feeding grounds located principally along the Gulf of Alaska. The central stock appears to be increasing in size. Its most recent abundance estimate (based on data from the early 1990s) is about 4,000 whales.

Preferred feeding grounds for the central North Pacific stock include the Alexander Archipelago in southeastern Alaska and British Columbia, Prince William Sound, the Kodiak Island area, and the eastern Aleutian Islands. With further research, it seems likely that other important feeding areas, possibly including pelagic waters in the Gulf of Alaska and the Bering Sea, could be identified. Although a few whales move among different feeding areas within and between years, the vast majority return to the same feeding grounds year after year. For example, a recent study of humpback whale photographs taken between 1990 and 1993 identified 287 individuals using the southeastern Alaska feeding area. A review of more than 300 photographs taken during that period at other feeding areas revealed that only four of those whales also were seen elsewhere in Alaska and British Columbia. Preliminary results of ongoing research by scientists with the National Marine Fisheries Service using a large data set of photo-identified whales appear consistent with these findings.

This strong site fidelity to feeding grounds is thought to be due to ingrained migratory patterns imparted to calves by their mothers during the first year of life, when mother/calf pairs remain together constantly. Between 1985 and 1992, 648 individual humpback whales were identified from photographs taken in southeastern Alaska. Although such data can provide a good basis for estimating the number of whales using specific feeding grounds, data to develop reliable abundance estimates for all feeding grounds in Alaska currently are not available.`

With commercial hunting of humpback whales banned, the species' greatest sources of human-related injury and death are now entanglement in commercial fishing gear and collisions with ships. However, more subtle effects on behavior and habitat-use patterns also are possible as a result of disturbance by vessel traffic, anthropogenic sources of noise, and effects of pollution from agricultural runoff. Humpback whales are a major focus for commercial whale-watching operations in both Alaska and Hawaii and also may be affected if there is a proliferation of high-speed ferries, as is being considered for coastal waters of both states.

Alaska Whale-Watching Regulations

The National Marine Fisheries Service has lead responsibility for the recovery of humpback whales

under both the Marine Mammal Protection Act and the Endangered Species Act. On 26 June 2000, the Service published a *Federal Register* notice proposing rules for vessels approaching humpback whales in Alaska. The proposal, developed mainly to protect humpback whales from harassment and collisions by whale-watching vessels, called for prohibiting vessel approaches closer than 200 yd (182.9 m) to humpback whales in all waters off Alaska. At the time of the proposal, whale-watching in Alaska was unregulated except in Glacier Bay National Park, where the National Park Service prohibits approaches closer than 1/4 mi (440 yd [402.3 m]). Although the National Marine Fisheries Service adopted rules in the 1980s prohibiting vessel approaches closer than 100 yd (91.4 m) to humpback whales in Hawaii, the Service noted that a 200-yd limit in Alaska seemed warranted because of the high degree of site fidelity among feeding humpback whales and because whales could be hemmed in by whale-watching vessels in the confined bays, coves, and inlets that often characterize their habitat in Alaska.

The Commission commented to the Service in support of the proposed rule on 26 October 2000. In its letter, however, the Commission also recommended that the rule include a vessel speed limit of between 10 and 13 knots within fixed distances around whales to minimize collision risks. In support of its recommendation, the Commission provided preliminary results of a review on collisions between ships and whales (see Chapter VIII and Laist et al. 2001 in Appendix C). Based on that review, it noted that such collisions occurred more often than previously thought and that whale-watching boats had been involved in numerous reported collisions. It also noted that speed was an apparent factor in collisions causing serious or fatal injuries and that whale-watching guidelines recently adopted for New England waters recommend decreasing speed limits within concentric circles of decreasing diameter around whales.

After considering comments on its proposal, the Service published a final rule in the *Federal Register* on 31 May 2001 establishing a 100-yd approach limit. The preamble explained that a 100-yd, rather than a 200-yd, approach limit had been adopted to be consistent with the rules already in effect for Hawaii. In response to comments urging the use of vessel speed limits near whales, the Service added a measure requiring that vessels operate "at slow, safe speed when near a whale." No explanation was given as to what constituted either "slow, safe speed" or being "near a whale."

Regarding the Commission's recommendation for speed limits of between 10 and 13 knots, the Service stated that specific speed limits were not adopted because it believed that they were neither enforceable nor practical. Although the rationale for those conclusions was not provided, the preamble stated that some vessels had "clutch-in speeds" greater than 10 knots, implying that they could not operate safely at speeds between 10 and 14 knots. Clutch-in speed is the slowest speed a vessel can travel without having to glide with the engine disengaged

After reviewing the final rule, the Commission was concerned that the Service's rationale for rejecting specific speed limits was not well founded and that the adopted rule would be less effective and less enforceable than the Commission's recommended approach. In addition, as noted in the North Atlantic right whale section earlier in this chapter, specific speed limits of 10 to 13 knots are under consideration to protect right whales along the U.S. East Coast, and the Commission was concerned that the precedent set by the rule would seriously constrain options to protect that species. The Commission therefore wrote to the Service on 18 June 2001 recommending that the rule be revised to set forth specific speed limits within explicit distances around whales.

With regard to Service concerns about the practicality of specific speed limits, the Commission questioned whether any whale-watching vessels had clutch-in speeds greater than 10 to 13 knots. It also noted its understanding that very few vessels had such high clutch-in speeds and those that did routinely operated at slower speeds by engaging and disengaging their engines. The Commission therefore asked the Service for a list of vessel types with clutch-in speeds of between 10 and 13 knots and information as to why they could not operate safely at slower speeds. With regard to enforcement, the Commission noted that a specific speed limit was needed to provide vessel operators with clear guidance as to what constituted a slow safe speed when near whales. It also asked for an explanation as to why the adopted measure's ambiguous speed and distance standards would be easier to enforce than the specific speed and distance limits recommended by the Commission.

The Service responded to the Commission by letter on 16 October 2001. It also provided information on the matter during the Commission's annual meeting on 16–18 November 2001 in Anchorage, Alaska. The Service stated that it did not plan to revise its rule as recommended by the Commission because of continuing concerns about practicality and enforcement. It noted that, although vessels with clutch-in speeds of 10 to 13 knots could operate safely at slower speeds, prolonged travel at those speeds could put undue mechanical stress on the vessel. It also noted that, in areas of rapid current, some vessels traveling with the current may be unable to maintain safe steerage at speeds of 10 to 13 knots over the ground. With regard to enforcement, no explanation was provided as to why the adopted rule would be easier to enforce than one with specific speed and distance provisions; however, the Service stated that most vessel operators in Alaska would likely interpret "slow, safe speed" as 15 knots or less. It also said that, given the limits of speed and range-detecting technology, enforcement officers could not determine precisely how fast a vessel was traveling or when it was within a set distance greater than 350 feet (106.7 m) from a whale.

After considering this information, the Commission remained concerned that the Service's speed provision was too vague to be effective and that the rationale for not using specific speed and distance standards was questionable. On 27 December 2001 the Commission therefore again wrote to the Service on the matter. In the absence of survey data to support the Service's assertion that most vessel operators would consider 15 knots or less to be a slow, safe speed, the Commission observed that such a conclusion seemed speculative. It also noted that speeds of 14 and 15 knots, which apparently meet the Service's standard for "slow, safe speed," did not appear to be slow enough to reduce serious injury or mortality risks to whales based on available data. Moreover, the Commission commented that, as the rule was written, it seemed doubtful that courts could levy fines against a vessel operator who stated that they considered speeds greater than 15 knots to be slow and safe enough for whales.

The Commission also noted that it had not yet received the requested list of vessel types with clutch-in speeds greater than 10 knots that might be affected by a specific speed limit, but that it continued to believe that very few vessels, and no whale-watching vessels, would fit this category. It also noted that, given distances of a few miles or less that vessels might need to travel at reduced speed to comply with these regulations, potential wear on engines would likely be insignificant compared with that which is routinely experienced when ships slow to enter port or avoid other navigation hazards.

With regard to vessel safety problems posed by using slow speeds in areas of high current, the Commission agreed that such situations were a potential concern. To address this point, the Commission noted that specific speed limits could be required subject to an exemption in situations where they could compromise vessel or human safety. This would afford vessel operators the flexibility needed to operate safely in those occasional cases where slow speed could be hazardous. In this regard, the Commission commented that enforcement officers should have no more difficulty judging when vessel safety needs override a specific speed limit than they would judging what constitutes "slow, safe speed" under current regulations.

Finally, the Commission noted that the public did not have a chance to comment on the speed restriction adopted by the Service in its final rules. Therefore, the Commission recommended that the Service develop and seek public comment on a proposed rule to modify the current Alaska humpback whale approach rule. Specifically, it recommended that the requirement for using "slow, safe speed when near a whale" be replaced by one requiring vessels to travel at 12 knots or less, unless inconsistent with vessel or human safety, when within a half mile (0.8 km) of any humpback whale in Alaska. With regard to the applicable distance around a whale, the Commission noted that a mile (1.6 km) or more seemed appropriate for open-water areas, but that a half mile may be more appropriate for inland waters where whales tend to feed in southeastern Alaska.

With regard to enforcement, the Commission noted that compliance by commercial whale-watching vessels likely would increase if vessel operators knew that their passengers were aware of the applicable restrictions and to whom violations should be reported. The Commission therefore recommended that the Service add a provision to require that operators of commercial vessels engaged in whale-watching either provide their customers with flyers or prominently post a placard aboard their vessel identify-ing the approach rules and phone numbers for reporting violations.

Other Alaska Humpback Whales Issues

As noted above, the Commission reviewed research and management issues concerning humpback whales in Alaska during its annual meeting on 16–18 November 2001. During that review, two issues in addition to the status of Alaska whale-watching regulations were examined: the preparation of stock assessment reports for humpback whales in Alaska and the reporting of vessel collisions.

Under section 118 of the Marine Mammal Protection Act the National Marine Fisheries Service is required to prepare stock assessments for each marine mammal stock in U.S. waters. For marine mammals listed as endangered, such as humpback whales, stock assessments must be updated annually. Among other things, each assessment must estimate the abundance of the relevant stock and calculate its potential biological removal level (PBR). The latter, calculated by a set formula, is the number of animals that can be removed from a discrete stock of animals (not including natural mortality) while maintaining a high degree of assurance that the stock will continue to increase toward or remain at its optimum sustainable population level.

To help prepare stock assessments, the Service established four regional scientific review groups. Based on information noted above indicating that whales using different Alaska feeding areas constitute discrete groups, the Alaska Scientific Review Group recommended late in 2000 that the stock assessments for humpback whales in Alaska calculate minimum population estimates and PBRs for each summer feeding area in Alaska. This approach is already followed for humpback whales in the Gulf of Maine and along the West Coast between California and Washington, and the group noted that this would bring the Alaska humpback whale stock assessments in line with those for other areas.

The Commission considered this recommendation and determined that it had merit. It concluded that, when there is substantial information to indicate that the loss of a regional group of animals is unlikely to be replaced within a few generations by members of the same species from surrounding areas, that group of animals should be treated as a separate management unit for purposes of preparing stock assessments. It also believed, however, that subdividing stocks into such groups should be approached cautiously and done only when (1) there is strong information to indicate that members of a group exhibit a high degree of site fidelity and discreteness from other population components, (2) the group represents an ecologically significant part of the regional ecosystem, (3) immigration of conspecifics from other areas is not likely to occur for at least several generations, and (4) their geographic extent comprises a significant part of the population's overall range.

The Commission therefore recommended in its 27 November 2001 letter to the Service that separate abundance estimates and PBRs be developed for well-defined feeding groups of humpback whales in southeastern Alaska, Prince William Sound, and other areas, as information warrants.

During the Commission's annual meeting review, it also was advised of an incident in which a humpback whale was killed by a vessel, possibly a cruise ship, at the mouth of Glacier Bay in July 2001. The whale, a pregnant female, was among the first whales to be individually identified in southeastern Alaska. First identified from photographs taken in Glacier Bay in 1975, the whale was subsequently resighted numerous times in both Alaska and Hawaii, providing some of the first evidence of an annual migration between the two areas. Her death followed a similar event in southeastern Alaska in July 1999 when a humpback whale was killed and caught on the bow of a large cruise ship. It is uncertain how often such incidents occur; however, they have been reported sporadically throughout the United States to the Service, in the press, and in scientific papers. As discussed in Chapter VIII, such reports provide an important basis for assessing the frequency of ship strikes, the types of vessels involved, and other related factors.

During its meeting, the Commission was advised that, although the National Park Service requires the reporting of any collisions with whales in Glacier Bay National Park, the National Marine Fisheries Service has no such reporting requirement for lethal or non-lethal collisions with whales in Glacier Bay or any other area. Noting the importance of such reports to assess their frequency and possible mitigation measures, the Commission therefore recommended in its 27 November 2001 letter that the Service develop a regulation to require that vessel operators report collisions that kill or seriously injure whales to appropriate Service officials.

Gray Whale (*Eschrichtius robustus*)

The gray whale, which is now found only in the North Pacific Ocean, is divided into two discrete stocks — the eastern (or California) stock and the western (or Asian) stock. The eastern stock migrates between wintering areas off Baja California, Mexico, and summer feeding grounds in the Bering and Chukchi Seas between Alaska and Russia. The western stock migrates between winter calving areas along the coast of China and summer feeding grounds in the Okhotsk Sea, mainly off the northeastern coast of Sakhalin Island, Russia.

In the mid-1800s and early 1900s commercial whaling severely depleted both stocks. Because of this overexploitation, gray whales were among the first whale species afforded protection under an international ban on whaling adopted by the League of Nations in the mid-1930s and extended by the 1946 International Convention for the Regulation of Whaling. Gray whales were listed as endangered throughout their range under the U.S. Endangered Species Conservation Act of 1969, the predecessor to the Endangered Species Act of 1973. Although certain threats to the population and its habitat remain, the eastern North Pacific gray whale stock has made a substantial recovery and was removed from the endangered species list in June 1994. Since these international moratoriums entered into force, the western stock, which was reduced to a much lower level, has not recovered and currently may consist of fewer than 100 animals. The National Marine Fisheries Service is the lead federal agency responsible for the conservation of gray whales.

The Eastern North Pacific Stock

The eastern stock of gray whales was thought to have been reduced to a few thousand animals when the ban on commercial whaling of gray whales went into effect. Over the past 35 years, the National Marine Fisheries Service has conducted 22 surveys to monitor the stock's size and trend. Survey results from 1997–1998 indicated a population of about 26,600 whales, a level thought to be within the stock's optimum sustainable population range. The Service is currently analyzing surveys conducted in 2000–2001 and 2001–2002 that may indicate a substantial drop in the population. Since 1994 the Service also has surveyed whales migrating northward to assess calf production. Results through 1998 indicate that calves have accounted for between 2.6 and 6.5 percent of the population. This figure dropped to 1.7 percent in 1999 and 1 percent in 2000 and 2001.

Gray Whale Strandings, 1999–2001 – In 1999 and 2000, respectively, 284 and 377 gray whales stranded or were found floating near shore along the west coast of North America from Mexico to Alaska. Prior to 1999 the annual average was fewer than 40 animals, and the previous record for a single year was 87. In June 1999 the National Marine Fisheries Service consulted with the Working Group on Marine Mammal Unusual Mortality Events, which declared the strandings an unusual mortality event and provided recommendations to the Service to monitor the extent of the event and investigate its nature. In 2001 only 21 animals were observed stranded or floating near shore, and the working group determined the unusual mortality event to be over. Information on the stranding events in 1999 and 2000 and actions taken to investigate the causes are discussed in Chapter VI. The cause or causes of the events are yet to be determined.

Five-Year Status Review – The eastern North Pacific stock of gray whales was removed from the Endangered Species Act list of endangered and threatened wildlife on 16 June 1994. To help ensure that such delisting actions are prudent, the Act requires that the responsible agency monitor a species' status for at least five years after it is removed from the list. As discussed in previous annual reports, on 16–17 March 1999 the Service convened a workshop to review the results of its five-year research program as well as other information bearing on the status of eastern North Pacific gray whales. The results and findings of the workshop were summarized in an August 1999 report prepared by the Service.

Participants in the workshop concluded that the eastern North Pacific stock did not meet established criteria for listing as either threatened or endangered and that it should not be relisted under the Act. The stock continued to increase after delisting from an estimated number of 23,100 whales in 1994 to an estimate of 26,635 (95 percent confidence interval, 21,878–32,427) in 1997–1998 based on winter counts

along the California coast during the stock's southbound migration those years. Modeling analyses indicate that the stock has increased at an average rate of about 2.5 percent per year since the late 1960s.

Workshop participants recommended that monitoring studies be continued for another five-year period (i.e., 1999–2004), in part because the stock offers a unique opportunity to assess how a cetacean population responds to natural and anthropogenic influences as it approaches or reaches environmental carrying capacity. The participants identified and ranked research needs, including, in decreasing order of priority, (1) continued annual surveys of whales migrating southward along the California coast to monitor population size, (2) continued studies of the effects of human activity and development in winter calving and nursing lagoons in Mexico, (3) photogrammetry studies to assess the condition of whales, (4) continued calf counts to assess population productivity, and (5) surveys in the Bering and Chukchi Seas to examine the effects of environ-mental parameters, particularly climate warming, on whale foraging patterns.

On 7 August 2001 the Marine Mammal Commission wrote to the Service to emphasize the working group's advice on research needs and express its concern over the unusual stranding events in 1999 and 2000. The Commission recommended that the Service (1) formally initiate a second five-year period of monitoring for the eastern North Pacific gray whale and prepare a monitoring plan based on the 1999 workshop's recommendations, (2) review all data pertinent to the unusual strandings in 1999 and 2000 and make a formal declaration regarding the status of the event (which had not yet been declared ended) and complete development of a response plan for similar events in the future, (3) analyze the cumulative effects of mortality and decreased reproduction in 1999–2000, aboriginal hunting, ship strikes, and other human-related factors and report the results to the International Whaling Commission, and (4) review current and planned studies of both the eastern and western stocks to ensure that they provide the information necessary to understand the stocks' status and facilitate recovery.

At the Commission's 2001 annual meeting, representatives of the Service reported on studies currently underway at the Southwest Fisheries Science Center to assess the stock's calf production and the physical condition of living gray whales. As noted above, calf production declined significantly in 1999 and appears to have been poor in 2001. Photographic comparisons from 1997 to 2000 indicate that an overall reduction in physical condition may have contributed to the unusual stranding events in 1999 and 2000. Both of these observations are indicative of population stress, perhaps related to the availability of food resources. The Service also reported that seasonal sea ice cover may affect calf production by limiting the whales' access to important feeding grounds.

Potential Threats to Calving and Nursing Lagoons – The eastern North Pacific gray whale population uses a series of coastal bays and lagoons along the western shore of Mexico's Baja California Peninsula for calving and nursing calves. In 1976 three of the coastal lagoons (San Ignacio, Ojo de Liebre, and Guerrero Negro) were designated by Mexico as the Whale Sanctuary of El Vizcaino. In 1988 they also were designated as the Vizcaino Biosphere Reserve, part of a United Nations system of internationally significant natural areas, and in 1993 they received further recognition and protection as a Natural World Heritage Site.

In 1994 the Mitsubishi Corporation and the Mexican government proposed the development of a large saltwater evaporation project that could affect the whales' use of two of the stock's most important calving lagoons. The proposal included construction of a large evaporation facility on the shores of Laguna San Ignacio: 116 square miles (300 sq km) of evaporating ponds, a 1.25-mile-long (2 km) pier, and pumps to siphon 6,000 gallons (22,710 liters) of seawater per second. Concerns were raised that barge traffic and noise from the facility could disturb and displace calving and nursing whales, and spills of fuel, brine, or other chemicals could pose pollution risks.

In 1995 the Mexican environmental secretariat rejected the proposal on grounds that it was incompatible with the objectives of the biological reserve. The developers appealed the finding but then withdrew the proposal and announced that they would develop an environmental assessment, which was completed early in 2000. The assessment concluded that construction and operation of the facility would have no detrimental effects on gray whales. However, on 3 March 2000 the developers jointly announced that they were canceling the project despite the fact

that the environmental assessment concluded that the proposed saltworks would not adversely impact the lagoon, the gray whales, or other plant and animal species. They cited other factors to be considered, including the impact of a project of this magnitude on the integrity of the area as well as public opposition to the project.

At the Commission's 2001 annual meeting, representatives of the National Marine Fisheries Service reported that Sempra Energy and CMS Energy Corporation plan to build a liquid gas terminal in Baja California about 60 mi (96 km) south of the U.S.–Mexican border and 12 mi (19.3 km) north of Ensenada. The project includes a pier of 1,000 ft (305 m) or longer extending out from the coast and directly in the migratory path of the eastern gray whale. The project is to be completed by 2005. The Commission intends to monitor the situation as it develops.

Subsistence Take of Gray Whales – Native residents in Russia and the United States take gray whales under a subsistence whaling quota from the International Whaling Commission (IWC). Annual takes between 1994 and 1998 ranged from 42 to 122 whales. During that period, only two gray whales were taken by Alaska Natives in 1995 and the remainder were taken by Russian hunters.

In May 1995 the Makah Tribal Council of Washington State requested permission from the Departments of Commerce and State to take up to five gray whales annually for ceremonial purposes. Whaling had been a traditional part of the tribe's way of life for more than 1,000 years until it ceased in the 1920s. In 1999 the United States and the tribal council (citing its whaling rights under the 1855 Treaty of Neah Bay) requested and the IWC approved the current quota for gray whales. The quota was established as a five-year block of 620 whales, with no more than 140 whales to be landed in any one year. Under a subsequent agreement between Russia and the United States, Russia agreed to limit its take to 135 whales and the United States agreed to limit its take to 5 whales.

On 17 October 1997 Rep. Jack Metcalf of Washington and several environmental groups sued the Department of Commerce, challenging the department's actions to promote and authorize whaling by the Makah. The court found in favor of the defendants (the Department of Commerce), but the plaintiffs appealed the decision to the Ninth Circuit Court of Appeals.

In the spring of 1999 Makah whalers put to sea to renew the tribe's whaling tradition. Since their initial announcement of intent to resume a gray whale hunt, the Makah's whaling plans have been the focus of sharp criticism and intense protest by people opposed to the killing of whales. Antiwhaling activists attempted to prevent the hunt in 1999 by running boats between the tribe's whaling canoe and targeted whales. Several activists were arrested by the Coast Guard. After one whale was struck a glancing blow by a harpoon but escaped alive, Makah whalers succeeded in killing and landing a gray whale on 17 May 1999. No more whales were landed by the Makah during 1999.

On 9 June 2000 the Ninth Circuit Court of Appeals overturned one aspect of the previous court ruling, finding that the 1997 environmental assessment on whaling by the Makah Tribe should have been completed before the National Marine Fisheries Service (Department of Commerce) and the Makah tribe entered into a 1996 cooperative agreement on whaling. The court reasoned that, because the assessment was completed after the 1996 agreement, it may have predisposed the preparers to find that the proposal would not significantly affect the environment. On 11 August 2000 the Service rescinded its cooperative agreement with the Makah Tribe and subsequently set the 2000 gray whale quota to zero while it developed a new environmental assessment.

On 17 January 2001 the Service published notice in the *Federal Register* of the availability of a new draft environmental assessment examining the consequences of issuing a quota for gray whales to the Makah for 2001 and 2002. The draft considered four alternatives: (1) the Service would grant the Makah a quota of five whales per year, targeting only migrating whales, (2) the quota of five whales would allow targeting migrating whales and a limited hunt outside the migrating period, (3) the quota of five whales would be without restrictions, and (4) no quota would be issued. Public hearings on the draft were held 1 February 2001 in Seattle, Washington. Alternative 1 was similar to the regime in place in 1999.

The Marine Mammal Commission wrote to the Service on 16 February 2001 to request, as it had in a

9 October 1997 letter, that the issue of precedence between the 1855 Treaty of Neah Bay and the 1946 International Convention on the Regulation of Whaling be clarified. The Commission believes that the relationship between the two treaties provides an important context for analyzing the various alternatives, and that the Service's position on this issue needs to be clear and consistent. With regard to the first alternative, the Commission asked for clarification of how the Service determined the number of allowable strikes and how the Service defined the term "strike." The Commission disputed the Service's reasoning behind its claim that the granting of this alternative will not set a precedent for other Native groups that may wish to engage in whaling in the future. With regard to alternative 2, the Commission suggested that confusion could result if potential biological removal assessments were defined as a range, as proposed in this alternative, and noted that the conclusion reached by the Service regarding potential biological removal failed to recognize and account for other forms of human-related mortality such as ship strikes or entanglement in fishing gear. The Commission did not agree with the Service that there would be no effects on the gray whale population under alternative 3, nor did it agree that a decision by the United States to prohibit subsistence whaling could be viewed as being contrary to the underlying IWC action, as the Service has indicated in its analysis of alternative 4.

On 19 July 2001 the Service published notice in the *Federal Register* of the availability of the final environmental assessment, in which alternative 1 was chosen as the whaling regime. In a *Federal Register* notice dated 26 November 2001 the Service announced its intent to conduct an environmental assessment on issuing a quota to the Makah Tribe for the years 2003–2007. In a *Federal Register* notice dated 13 December 2001 the Service announced that a quota of five whales had been issued to the Makah Tribe for the 2001–2002 season.

The Western North Pacific Stock

As recently as the 1970s, the western North Pacific gray whale stock was thought to have been extirpated by whaling activity. However, a small remnant population is now known to have survived. Its range extends from the Okhotsk Sea to the South China Sea. Based on findings from an ongoing U.S.–Russia photo-identification project, the total population is thought to number just under 100 individuals. Because of the very small size of the surviving population and the possibility that fewer than 50 reproductive individuals (including fewer than 20 reproductive females) may remain, the World Conservation Union (IUCN) listed the western gray whale as "critically endangered" in 2000.

Current threats to western gray whales include poaching in the northern Sea of Japan and incidental fisheries-related mortality throughout most of their range, particularly in the extensive coastal net fisheries off southern China. Substantial nearshore industrialization and ship traffic throughout the population's migratory corridors increase the likelihood of exposure to chemical pollution and ship strikes.

During its 2001 annual meeting, Service representatives informed the Commission of current and planned offshore oil and gas development in the South China Sea and within 20 km of the population's only known feeding ground off the northeastern coast of Sakhalin Island in the Okhotsk Sea. Anthropogenic activities related to oil and gas exploration, including high-intensity geophysical seismic surveying, drilling operations, increased ship and air traffic, and oil spills, all pose potential threats to this stock of gray whales.

Plans to build piers and barge-docking stations on the gray whale feeding grounds around Sakhalin Island are of particular concern. In addition, proposed pipelines running the length of the island to the production complex on southern Sakhalin Island may cause the whales to be confined and limit their access to the waters off Piltun Lagoon, the major feeding area for the population.

In 1995 Russian and U.S. scientists initiated a cooperative research program off northeastern Sakhalin Island to monitor the population status of western gray whales. Funding for the program has come largely from the oil and gas consortia involved in developing the region. Research findings to date have provided vital new information on the status of the western population and the nature and magnitude of ongoing threats to its survival. This research has provided valuable information on the stock's reproduction rate, status, and physical health.

Mothers with calves and pregnant females have been identified in the study area annually and are among the most frequently sighted individuals. Eighteen calves were observed on the feeding grounds between 1995 and 2000, and six more were observed in 2001. Sixty-seven percent of the 18 calves identified between 1995 and 2000 have not been resighted after the year of their birth. These findings suggest that calf survivorship within the first year is low, possibly as low as 33 percent. Reproductive females, both lactating and pregnant, have especially high energetic demands, making it imperative that they have unimpeded access to their feeding grounds. The pronounced seasonal site fidelity to their feeding grounds off northeastern Sakhalin Island indicates that this area is critical to the survival of the population.

During 1999, 2000, and 2001 significant numbers of unusually thin gray whales were observed on these feeding grounds. The cause or causes of their poor condition are undetermined. In addition, during 1999–2000 the distribution of feeding activity was shifted northward compared with the distribution in 1997 and 1998. Although the factors responsible for the changes in whale distribution and individual physical condition are currently unknown, the influence of offshore oil and gas activities cannot be ruled out, and movements of the whales away from their expected feeding areas coincided with seismic testing near those areas. In 2001 feeding activity was again shifted northward during June and July, but when seismic surveys were being conducted between 1 August and 8 September in the northern portion of the main feeding area, whales shifted to a more southern distribution. Once these seismic operations ceased, whales again reoccupied the more northern reaches of their feeding area.

Finally, the research on this population has included the collection of biopsy samples from 79 individuals. The DNA comparisons indicate that eastern and western gray whales can be genetically differentiated and are considered to be geographically isolated population units. However, because population differentiation is based on statistical differences in haplotypic frequencies and associated haplotypic diversity indices, the origin of single individuals cannot be determined with certainty. Recent molecular analyses of whale meat samples purchased from a Japanese market in August and October 1999 showed that they were from a gray whale. Mitochondrial DNA sequences obtained from those samples were identical (the same haplotype) to those of a gray whale killed off western Hokkaido in May 1996 and were also identical to the most common haplotype found in both western and eastern gray whale populations. Based on the geographic location where the whale was found, the historical occurrence of gray whales in the Sea of Japan, and the freshness of the specimen, it was concluded that this whale likely came from the western population. Without additional analyses, however, it is uncertain if the gray whale market samples are from the Hokkaido whale or another individual.

International Whaling Commission

Concerns about the western gray whale were raised at the 2001 annual meetings of the International Whaling Commission and its Scientific Committee. The Scientific Committee noted many of the issues raised above including, among others, the "skinny" whale phenomenon, the impact of seismic surveying and other oil and gas exploration in the Sakhalin Island area, the continued low reproductive success, and the small number of reproductive females remaining in the stock. The Committee strongly recommended that current international research and monitoring be expanded, more effective monitoring and protection measures be established, and cooperation among scientists, industry, and government officials be increased. More specifically, they recommended that no seismic work be permitted near the feeding grounds of the Sakhalin area while western gray whales are present.

At its 2001 annual meeting, the International Whaling Commission passed a resolution noting its many concerns and asking the involved states and others to pursue all practicable actions to eliminate anthropogenic mortality and to minimize anthropogenic disturbances of the stock. In addition, it urged that expanded research, monitoring, and management activities be strongly supported.

Killer Whales in the Eastern North Pacific (*Orcinus orca*)

Killer whales occur in all oceans of the world but are more abundant in temperate and colder waters within 800 km (500 mi) of coasts. In the eastern North Pacific Ocean they are most common from Puget Sound, Washington, north to the Bering and Chukchi Seas. Killer whales are large, robust animals with adult females reaching about 7 m (23 ft) in length and males reach more than 8 m (26 ft) in length. They have a polygamous breeding system, and the reproductive cycle or season varies geographically. Females reach sexual maturity at about 4.6 to 5.4 m (15 to 17.5 m) in length, and males at about 5.2 to 6.2 m (17 to 20 m). Mature females give birth every three to eight years; lactation lasts about one year, but offspring may remain dependent for a second year. Killer whales may live for 25 to 60 years. They have distinctive pigmentation patterns and dorsal fins, making identification of individual animals relatively easy.

Killer whales, or killer whale pods, in the North Pacific are divided into three non-associating forms or ecotypes referred to as "resident," "transient," and "offshore." Resident and transient forms show distinctive differences in genetic composition, morphology, diet, ecology, distribution, movement patterns, pod size, and social integrity of pods. The offshore form is less well described, but appears to be more closely related to the resident form than to the transient form. One of the more notable differences among these forms is their diet. All killer whales are considered top-level predators, but the diet of resident killer whales appears to be composed of fish, whereas the transient form appears to prey primarily, if not completely, on marine mammals. The diet of the offshore form has not been characterized but is assumed to be fish.

Killer whales are highly social animals that generally occur in pods of fewer than 10 or 20 animals, although larger pods or aggregations have been observed, particularly for the offshore ecotype. In the North Pacific, the composition of pods appears to remain relatively consistent over time with about 20 percent adult males, 40 to 55 percent adult females, and the remainder immature animals of both sexes. Interactions among individuals reflect a social hierarchy, and much of their behavior (e.g., hunting, caregiving) appears to be cooperative. They produce a number of different sounds for such purposes as communication, orientation, and foraging.

Historically, killer whales were hunted commercially, but not in large numbers. Since the early 1960s they have been captured for public display in marine aquariums and zoos. From 1962 until 1976 killer whales were taken for this purpose from the waters off the Pacific coast of North America, including Puget Sound. Since 1976 most animals taken for public display have been from waters off the coasts of Japan and Iceland.

Stock Structure, Status, and Trends

The National Marine Fisheries Service currently recognizes five stocks of killer whales along the western coast of North America: (1) the eastern North Pacific northern resident stock (British Columbia through Alaska), (2) the eastern North Pacific southern resident stock (inland waters of Washington State and southern British Columbia), (3) the eastern North Pacific transient stock (Alaska to Cape Flattery, Washington), (4) the California/Oregon/Washington Pacific Coast stock (Cape Flattery, Washington, through California), and (5) the eastern North Pacific offshore stock (southeastern Alaska through California). The Service's minimum population estimate for the northern resident stock is 723 animals, which is considered conservative, and the trend in abundance cannot be described for this stock based on the available data. The minimum estimate of abundance for the southern resident stock is 82 animals, which is a decrease of 15 animals since 1995. Their minimum abundance estimate for the transient stock is 346 whales, which is considered conservative, and trends cannot be described for this stock based on the available data. Abundance and trends have not been described for the California/Oregon/Washington coastal stock. Finally, the Service's estimate of minimum abundance for the offshore stock is 211, but this estimate is tentative, and trends for this stock cannot be determined based on the available data.

None of these stocks is listed as threatened or endangered under the Endangered Species Act or depleted under the Marine Mammal Protection Act. However, in early May 2001 the Center for Biological Diversity petitioned the Service to list the

southern resident stock as endangered. The petition and response are described below in the section on the southern resident stock. The status of killer whale stocks in the eastern North Pacific has become an issue of considerable concern in the past few years due to their potential role as predators in Alaskan ecosystems and their interactions with, and vulnerability to, human activities.

Killer Whale Predation

The effects of killer whale predation on two other marine mammal species in Alaska, the Steller sea lion and northern sea otter, have become a matter of considerable concern in recent years. Killer whale predation is the leading hypothesis for the decline of the northern sea otter in the southwestern part of its range (the Alaska Peninsula west through the Aleutian Islands and including the Kodiak Archipelago, the Pribilof Islands, and the Bristol Bay area). The hypothesis is that killer whales have increased their predation of sea otters to compensate for declining availability of other, more common, prey, including Steller sea lions. Killer whale predation is also considered a possible contributing factor in the decline of Steller sea lions, at least in recent years. The supporting evidence for these hypotheses is stronger with respect to the sea otter; both hypotheses are plausible but additional research is necessary to verify or refute them. Unfortunately, the information needed to evaluate these hypotheses is not available in sufficient detail. Data are needed on the rate of killer whale predation on sea lions and sea otters, either from direct observations or inferred from better information on killer whale numbers, trends, and diet. Research programs to address these questions are being initiated by the National Marine Fisheries Service (with respect to Steller sea lions) and the Fish and Wildlife Service (with respect to northern sea otters).

Interaction with Fisheries

In the southeastern Bering Sea and Prince William Sound, killer whales interact with longline fisheries for Pacific halibut, sablefish, and Greenland turbot. The whales sometimes damage or remove fish and damage gear. Studies of such depredation in the 1980s indicated that the killer whales tended to target the larger fish caught, that depredation occurred on at least 20 percent of bottom longline sets in the southeastern Bering Sea, and that an estimated 25 percent of the total catch was lost in Prince William Sound. A review of killer whale/longline interactions in the 1980s suggested that this phenomenon was spreading to the Aleutian Islands. Longline fisheries exist throughout the Aleutian Islands and along the continental shelf break (200-m isobath) in the Bering Sea. Such interactions may spread as killer whales learn to take advantage of the foraging opportunities presented by longlines with hooked fish.

In turn, the whales may be injured by ingestion of hooked fish, entangled in the longline gear, or shot by fishermen. The Service estimates that for the period from 1995 to 1999 the average number of killer whale mortalities resulting annually from such interactions in the Bering Sea/Aleutian Islands region was about 0.8 whales. Estimated killer whale mortality due to groundfish fisheries during the same period was similar, suggesting an average total mortality rate of about 1.4 whales per year in the Bering Sea and Aleutian Island region. However, surveys conducted in 1992 by the Service also indicated that 8 of 182 killer whales observed in the Bering Sea and Gulf of Alaska exhibited evidence of gunshot wounds. The mortality rate from such wounds is unknown. In Prince William Sound 22 of 37 whales in the pod responsible for most fishery interactions were lost between 1986 and 1991. The cause is unknown, but gunshot wounds is one of the leading hypotheses, along with possible effects of the Exxon Valdez oil spill.

A variety of techniques has been tried to reduce or eliminate such interactions, including acoustic deterrents (e.g., "bang pipes" and seal bombs) and modified fishing procedures, such as operating vessels in teams that alternately retrieve lines so that one crew can keep animals away while the other retrieves hooked fish. To date, none of these techniques has proven to be particularly successful.

Effects of the *Exxon Valdez* Oil Spill

The 24 March 1989 grounding of the tanker *Exxon Valdez* on Bligh Reef in Alaska's Prince William Sound caused the largest oil spill in U.S. history. Although long-term effects of the spill on marine mammal populations are still being assessed, one resident killer whale pod known to inhabit Prince William Sound and one transient pod have suffered

substantially higher than normal levels of mortality and reduced reproduction since that time. In the 15 months following the spill the resident pod, which numbered 36 whales before the spill, lost 13 individuals and failed to produce any new calves. The pod consisted of 22 individuals in 1999, a decade after the spill, and 25 individuals in 2001. The transient pod declined from 22 individuals in 1989 to 9 individuals in 2001.

The causes of the declines are not clear. The resident pod was seen in and near areas where oil was present immediately after the spill. The pod then left the sound shortly after the spill, possibly to avoid noise and other disturbances associated with clean-up activities. The timing of the spill and related activities, and the observed declines of these pods, suggest that the spill is at least one of the leading hypotheses to explain the declines. An alternative or perhaps complementary hypothesis, at least for the transient pod, is that the decline was related, at least in part, to a decline in the abundance of one of their main prey, harbor seals. From 1984 to 1997 harbor seal abundance in Prince William Sound declined by 63 percent.

Southern Resident Whales

Killer whales in the eastern North Pacific include a so-called southern resident stock that comprises three separate pods and ranges from waters off the northern end of Vancouver Island to Monterey Bay, California. The pods are most commonly found, however, in the inland waters of Puget Sound, and Juan de Fuca and Georgia Straits.

In the late 1960s and early 1970s, an estimated 47 killer whales were taken from this stock for display in aquariums and for research. Most of these animals were immature, and their removal reduced the stock to an estimated 70 animals in 1976. Over the next two decades the population appeared to recover, at least partially, from the loss of these animals, and by 1999 abundance of the stock was estimated to be 99 animals. Since 1995, the stock has declined again to the current abundance of 82 animals. The decline observed over the past six years appears to have resulted from both a decrease in fecundity and an increase in mortality. The increased mortality is particularly worrisome because it has involved not only immature animals, but also mature females. Mature females usually have a high probability of survival and are critical to the stock's ability to recover.

Three potential causes have been identified as possible contributing factors in the decline: high contaminant loads, disturbance by whale-watching ventures and other vessel activity, and declines in available prey, particularly salmon, in the central part of the stock's range. The inland waters of Puget Sound have become highly polluted with organochlorines, including polychlorinated biphenyls or PCBs, that are bioaccumulated in the food chain. Killer whales are top-level predators in the food chain, and those found in this region are considered among the most contaminated marine mammals in the world. Their contaminant levels are similar to or greater than those observed in marine mammals in other highly polluted waters, including the Gulf of St. Lawrence and the Mediterranean Sea. High PCB levels may compromise immune system function, and the levels observed in killer whales in this region exceed thresholds thought to cause immune system dysfunction in seals. High contaminant loads also may compromise reproduction. Although direct causal relations between contaminants and changes in immune and reproductive system function are difficult to prove in wild animals, existing evidence suggests the possibility of such links in Atlantic and Mediterranean cetaceans that have experienced viral epidemics.

The killer whales in the southern resident stock also may be significantly affected by whale-watching and other human activities that adversely modify the essential features of killer whale habitat or directly disturb the animals and disrupt their behavior. Excessive contact with whale-watchers, for example, may disrupt foraging, resting, or other behaviors and cause killer whales to abandon primary habitat or shift their habitat-use patterns. Noise associated with whale-watching or other vessels may not only disturb the animals, but also may increase ambient noise levels to the extent that it interferes with or masks killer whale sounds used for foraging, communication, or other purposes.

Finally, decline in the southern resident stock of killer whales may be due, at least in part, to a decline in the availability of their prey. These whales depend heavily on salmon, and the abundance of salmon has declined in the Puget Sound region since the mid- to late 1980s. Various alternatives have been suggested

to explain the decline in salmon, including regime shifts in the North Pacific, but it also is clear that large amounts of salmon habitat have been destroyed or adversely modified by humans.

In response to this decline, the Center for Biological Diversity (CBD) petitioned the National Marine Fisheries Service on 1 May 2001 to list the southern resident stock as endangered under the Endangered Species Act. The Service determined that the petition had merit, published in the *Federal Register* a notice of a status review and a request for information from the public, and convened a biological review team.

One of the key issues that the team will address is whether the southern resident stock constitutes a distinct population segment. A "distinct population segment" has been defined by the Service on the basis of three elements: "(1) discreteness of the population segment in relation to the remainder of the species to which it belongs, (2) the significance of the population segment to the species to which it belongs, and (3) the population segment's conservation status in relation to the [Endangered Species] Act's standards for listing." The Alaska Regional Scientific Review Group wrote to the Service (15 December 2001) urging the Service to use molecular genetics data collected by the Service's own researchers to redefine stocks of killer whales in the eastern North Pacific. The review group stated that it believes these stocks to be unequivocally reproductively isolated. In an earlier letter of 13 December 2000 the review group had recommended that killer whale stocks be divided into eight new stock categories and that stock assessment reports be prepared for each of them. The Biological Review Team is expected to release a draft status review in March 2002. The question of whether the southern resident population constitutes a distinct population segment is expected to be addressed in the review.

Current and Future Research

The role of killer whales in the declines of northern sea otters and Steller sea lions and the vulnerability of killer whales to human activities are largely unresolved at this point due, in part, to the lack of support for research on killer whales. In spite of their charisma and their ecological importance as top-level predators, elatively little research has been done on North Pacific killer whales, as is evidenced by the lack of information on stock abundances and trends. Nonetheless, important research has been conducted on the species in spite of the small amount of support that has been available, and the resources directed to future research are expected to increase largely due to interest in the potential role of killer whales in the Steller sea lion decline. Research efforts were increased in 2001 and increased funding is expected to be available at least through 2004. The research is expected to focus on abundance estimation, distribution, and predation by stock and ecotype. In view of the potential role of killer whale predation on sea lions and sea otters, the majority of this research will occur in Alaska. Research also will be conducted on population assessments for killer whales in Prince William Sound.

Preliminary research results to date suggest that transients make up a larger portion of the total population in southeastern Alaska than in Prince William Sound or in the central Aleutian Islands region; harbor seals and porpoises are the primary prey of transient killer whales in southeastern Alaska, although Steller sea lions are also taken; the majority of the killer whales in the Aleutian Islands near Unalaska are residents (fish-eaters) rather than transients (mammal-eaters); and prey in the Unalaska region include fur seals and harbor seals (transients) and halibut (residents).

A long-term commitment to such research will be required to provide the information necessary to understand the role of killer whales in these ecosystems, their population status and trends, and their vulnerability to human activities. Presentations by Service representatives at the Marine Mammal Commission's 2001 annual meeting described the research currently under way and anticipated for the near future. Based on those presentations, it appears that the Service has initiated a multifaceted, multiagency research effort to address important management issues related to killer whales. In a 31 December 2001 letter the Commission recommended that the Service pursue such research partnerships and expand its research program on killer whales to provide the necessary information that will become available only with appropriate long-term planning, funding, and coordination of effort among and within agencies.

Gulf of Maine Harbor Porpoise (*Phocoena phocoena*)

Harbor porpoises, among the smallest of all cetaceans, occur in relatively discrete regional populations throughout the temperate coastal waters of the Northern Hemisphere. They feed on small schooling fish, such as herring and hake. In some areas, large numbers of harbor porpoises are caught incidentally in commercial gillnet fisheries. In the 1980s high levels of porpoise bycatch in the Bay of Fundy, Canada, and waters off New England raised grave concern over the possible effect on the Gulf of Maine/Bay of Fundy harbor porpoise population. This population (hereafter called the Gulf of Maine population or stock) is confined to the southern Bay of Fundy and northern Gulf of Maine during summer, but occurs from Maine to New Jersey in spring and fall months and reaches as far south as North Carolina in winter. In the late 1980s abundance estimates for this population were not available, but information suggested that several thousand porpoises were being killed annually in U.S. and Canadian gillnet fisheries and that this level of take was not sustainable.

Since that time, the National Marine Fisheries Service has conducted harbor porpoise population surveys in 1991, 1992, 1995, and 1999. Although the first survey yielded a population estimate of 37,500 porpoises (95% confidence interval, 26,700 –86,400), the most recent survey resulted in an estimate of 89,700 porpoises (95% confidence inter-val, 53,400–150,900). Most of the difference between the first and the most recent estimates is likely due to improved spatial coverage; however, an actual increase in abundance by some uncertain amount also seems possible, if not likely, given information on declining bycatch levels over the past decade.

From the 1960s, when regional gillnet fishing began, to the mid-1980s, almost all of the region's porpoise bycatch was in U.S. and Canadian gillnet fisheries for groundfish (cod, haddock, and flounder). As gillnetters began targeting dogfish, monkfish, and other species, however, harbor porpoises were caught in those fisheries as well. To estimate bycatch levels, the National Marine Fisheries Service began placing observers aboard a sample of U.S. gillnet vessels fishing for groundfish off New England in the late 1980s. By comparing the number of porpoises and the amount of fish caught on observed trips to total landings for the fishery, bycatch estimates were generated for the entire New England groundfish fishery. In 1993, the Canada Department of Fisheries and Oceans began a similar program for gillnet fishing in the Bay of Fundy. In the early 1990s the U.S. observer program was expanded to cover the dogfish and monkfish fisheries off New England, and in the mid-1990s it began monitoring gillnet fisheries for dogfish, monkfish, and coastal finfish (e.g., shad, weakfish, bluefish, and rockfish) south of New England.

Bycatch estimates from these observer programs through 2000 (the latest year for which complete data are available) are shown in Table 2. To various degrees, these estimates are incomplete because not all fisheries that catch harbor porpoises in a given year have been monitored. For example, in the early 1990s no estimates were available for fisheries in Canada where harbor porpoises are known to have been taken. Even in recent years, some coastal gillnet fisheries apparently catching harbor porpoises in the mid-Atlantic (based on stranded animals with net marks in unsampled areas) have not been observed. However, the estimates are believed to reflect a large majority of the bycatch, particularly in recent years, and they show a substantial decline in bycatch levels over the past decade. Although bycatch estimates for 2001 were not complete as of the end of the year, preliminary estimates through the summer suggest that estimates for 2001 will be the lowest to date.

The reasons for the decrease in bycatch appear to be twofold. First, the National Marine Fisheries Service adopted time-area fishing restrictions for the explicit purpose of reducing harbor porpoise bycatch. These restrictions, which were incorporated into a harbor porpoise take reduction plan, include seasonal fishing closures, areas in which gillnets must meet certain specifications (e.g., twine diameter and net lengths) that have relatively low bycatch risk, and geographic areas in which gillnets must be equipped with acoustic deterrents called "pingers" (i.e., devices affixed to nets that emit periodic sound pulses at specified frequencies to try to keep porpoises away from nets). Second, bycatch levels have been reduced because of increasingly stringent fishery management measures, such as time-area fishing closures, adopted by the Service to rebuild overfished

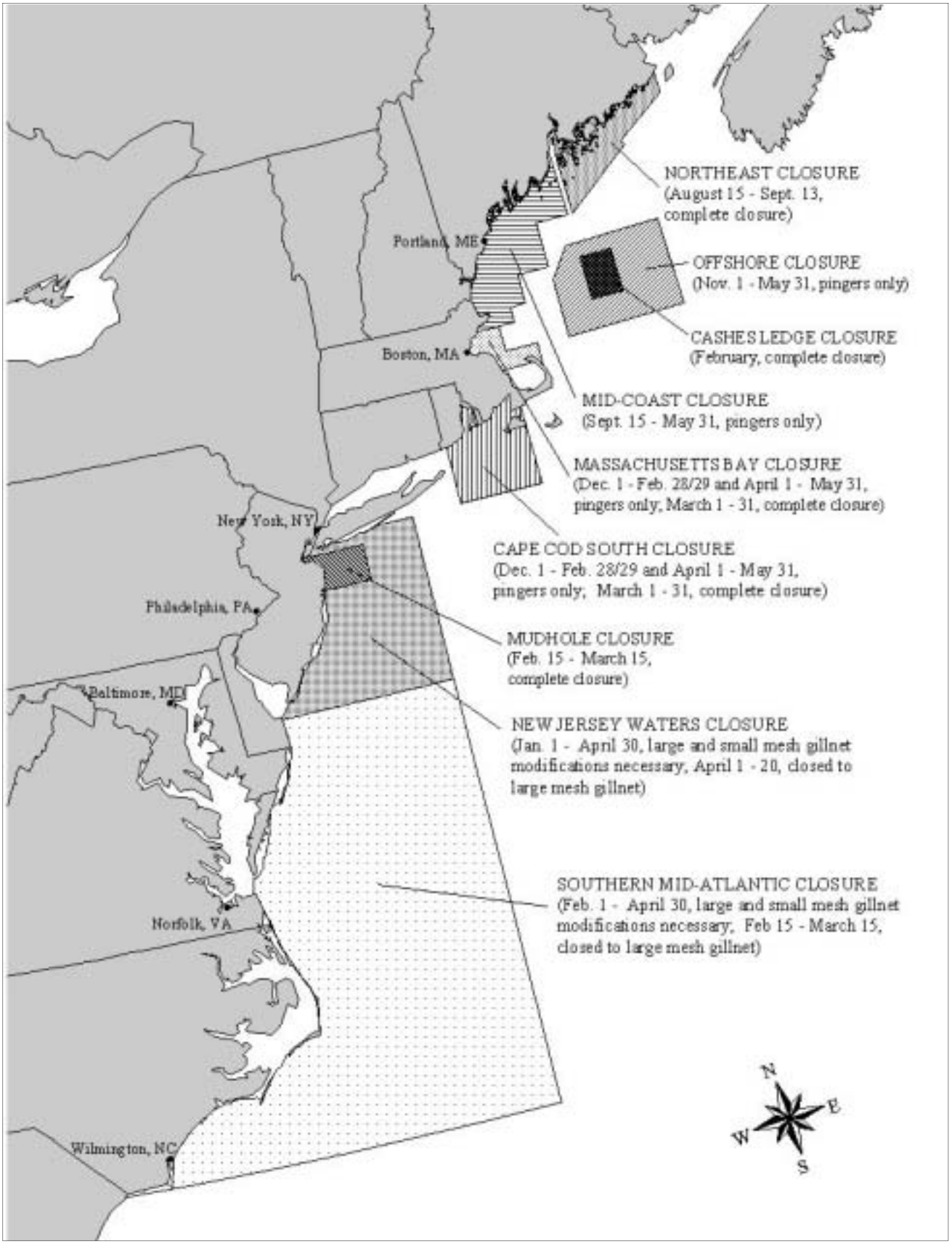

NORTHEAST CLOSURE
(August 15 - Sept. 13, complete closure)
Portland, ME
OFFSHORE CLOSURE
(Nov. 1 - May 31, pingers only)
CASHES LEDGE CLOSURE
(February, complete closure)
Boston, MA
MID-COAST CLOSURE
(Sept. 15 - May 31, pingers only)
MASSACHUSETTS BAY CLOSURE
(Dec. 1 - Feb. 28/29 and April 1 - May 31, pingers only; March 1 - 31, complete closure)
New York, NY
CAPE COD SOUTH CLOSURE
(Dec. 1 - Feb. 28/29 and April 1 - May 31, pingers only; March 1 - 31, complete closure)
Philadelphia, PA
MUDHOLE CLOSURE
(Feb. 15 - March 15, complete closure)
Baltimore, MD
NEW JERSEY WATERS CLOSURE
(Jan. 1 - April 30, large and small mesh gillnet modifications necessary, April 1 - 20, closed to large mesh gillnet)
SOUTHERN MID-ATLANTIC CLOSURE
(Feb. 1 - April 30, large and small mesh gillnet modifications necessary; Feb 15 - March 15, closed to large mesh gillnet)
Norfolk, VA
Wilmington, NC
N
E
W
S

Table 2. Estimates of harbor porpoise bycatch in sink gillnet fisheries in the Bay of Fundy (Canada), New England (United States), and off the U.S. mid-Atlantic states, 1990–2000[1]

Year	New England[2]		Bay of Fundy[3]	U.S. Mid-Atlantic[4]		Other[5]	Total
1990	2,900	(1,500–5,000)	–		–	–	–
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	103	(11–254)	–	1,590
1996	1,200	(800–1,800)	20	311	(162–567)	–	1,530
1997	782	(501–1,208)	43	572	(296–1,071)	–	1,397
1998	332	(170–728)	10	446	(294–894)	–	788
1999	270	(78–64)	<20	53	(3–98)	19	362
2000	570	(169–924)	<20	21	(1–53)	2	612

[1] Numbers in parentheses are ranges of the 95 percent confidence interval where available.

[2] Palka, D. 1997. Gulf of Maine Harbor Porpoise By-catch. Prepared for the Gulf of Maine Harbor Porpoise Take Reduction Team Meeting, December 16–17, 1997. National Marine Fisheries Service, Woods Hole, Massachusetts. Estimates for 1997, 1998, and 1999 are from unpublished National Marine Fisheries Service data.

[3] Trippel, E. A. 1998. Harbour Porpoise By-Catch in the Lower Bay of Fundy Gillnet Fishery. DFO Maritime Regional Fisheries Status Report 98/7E. Canadian Department of Fisheries and Oceans, Dartmouth, Nova Scotia. Estimate for 1999 is from unpublished data provided by E. A. Trippel.

[4] Palka, D. 1997. Mid-Atlantic Harbor Porpoise By-catch and Gear Characteristics. Prepared for the Gulf of Maine Harbor Porpoise Take Reduction Team Meeting, 16–17 December 1997. National Marine Fisheries Service, Woods Hole, Massachusetts. Estimates for 1997 to 2000 are from unpublished National Marine Fisheries Service data.

[5] Harbor porpoise strandings with signs of gillnet fishery–related interactions in areas of the U.S. mid-Atlantic region not monitored by fishery observers.

stocks of groundfish and monkfish. Some of these closures also include areas of historically high porpoise bycatch. In addition, because fishery management measures reduced landing quotas and placed limits on the number of days gillnetters were allowed to fish, many participants in these fisheries have dropped out, thereby reducing the number of deployed gillnets. Although it is unclear precisely how much bycatch has been reduced by either one of these two sets of measures, it now seems likely that harbor porpoise bycatch has been reduced to a sustainable level that could allow the population to increase or remain stable.

Figure 6. (Opposite page) Time-area management zones under the Gulf of Maine Harbor Porpoise Take Reduction Plan (figure courtesy of Caroline Good, National Marine Fisheries Service).

To provide a basis for managing the incidental take of marine mammals in commercial fisheries in U.S. waters, the Marine Mammal Protection Act was amended in 1994 to require that the National Marine Fisheries Service prepare stock assessment reports for each marine mammal stock under its jurisdiction in U.S. waters. In part, each assessment is to calculate a potential biological removal (PBR) level. If incidental taking exceeds that level, the Service is to convene a take reduction team to develop a plan that will reduce the bycatch to below the PBR level within six months. PBR is calculated using a formula designed to estimate the number of animals that can be removed from a stock annually (not including natural mortality) while maintaining a high degree of assurance that it will continue to increase toward or remain at its optimum sustainable population level. The formula relies, in part, on the

lower limit of a population's estimated range of abundance (i.e., minimum population size) and its estimated maximum productivity rate.

Based on data available when the first harbor porpoise stock assessment was completed in 1995, bycatch levels were estimated to be several times higher than the stock's calculated PBR level of 403 porpoises per year. Based on the 1999 population survey, however, PBR is now calculated to be 747 porpoises per year. Bycatch estimates were below this level for both 1999 and 2000.

Harbor Porpoise Take Reduction Plan

As noted above, the Marine Mammal Protection Act requires the National Marine Fisheries Service to convene a Harbor Porpoise Take Reduction Team and to prepare a take reduction plan whenever the incidental taking of marine mammals by commercial fisheries exceeds a marine mammal stock's calculated PBR level. Such plans are to include regulatory and nonregulatory measures to meet the Act's goals of reducing incidental marine mammal takes to below the PBR level within six months of implementation, and subsequently for reducing takes to levels approaching zero by April 2001.

In response to this requirement and high levels of porpoise bycatch, the Service established two harbor porpoise take reduction teams. In February 1996 it established a Gulf of Maine team to recommend measures for gillnet fisheries off New England, and in February 1997 it established a team to address incidental taking by gillnet fisheries between New York and North Carolina. Two teams, rather than one, were established because of differences in the fisheries in the two regions. The teams include representatives of regional fisheries, environmental groups, the scientific community, and involved federal and state agencies. A representative of the Commission has participated on both teams.

Each team developed a different regulatory approach to reduce porpoise bycatch. The Gulf of Maine team recommended seasonal fishing closures in high bycatch areas and management zones in which gillnets were required to be equipped with pingers at either end of each individual net panel making up a gillnet string. Scientific experiments indicate that pingers are capable of reducing bycatch by as much as 90 percent when properly maintained and deployed. The mid-Atlantic team also recommended seasonal fishing closures but chose not to rely on pingers. Instead it recommended requirements based on data that suggested that harbor porpoise bycatch rates would be low if certain fishing practices (e.g., soak times — that is the length of time a net is allowed to remain in the water after being set) and gear characteristics (e.g., twine diameter for mesh, mesh size, tie-downs to limit the vertical height of nets, and the number and length of nets) were used.

As discussed in previous annual reports, the teams met numerous times and submitted their respective recommended plans to the Service. The Service was slow to respond to recommendations and failed to meet certain statutory deadlines, which prompted the lawsuit to compel action on some measures. However, in December 1998 the Service adopted a Gulf of Maine Harbor Porpoise Take Reduction Plan that combined recommended elements from both teams. The plan was implemented under provisions of the Marine Mammal Protection Act. The regulatory measures for New England included six seasonal management zones in which fishing was either prohibited entirely or permitted only if gillnets were equipped with pingers (see Fig. 6). The measures for mid-Atlantic gillnet fisheries included seasonal fishery closures and seasonal restrictions on the fishing practices and gear characteristics mentioned above. Nonregulatory measures addressed various research, enforcement, bycatch monitoring, and education issues.

To review progress toward reducing bycatch and to develop further recommendations for meeting established goals, the Service reconvened the two take reduction teams late in 2000. The mid-Atlantic team met on 28–30 November 2000 and the Gulf of Maine team met on 12–13 December 2000. At both meetings, Service representatives reminded the teams that the Marine Mammal Protection Act required that incidental take levels be reduced to "insignificant levels approaching a zero mortality and serious injury rate." Although the Service has not yet defined this standard, for planning purposes the team was advised that the Service was considering a reduction in bycatch to no more than 10 percent of PBR (i.e., 76 porpoises per year) to satisfy this goal. Recognizing that such a reduction could not be met by the statutory deadline of April 2001, the Service

proposed a new date of 2 December 2003 as the target for reaching the zero mortality rate goal.

At its meeting, the Gulf of Maine team was particularly disturbed by evidence from the observer program of noncompliance with established regulations (e.g., fishing without pingers in zones requiring such devices) and the lack of at-sea enforcement effort. They expressed a strong view that efforts to implement seasonal enforcement must take precedence over other recommended measures and that enforcement should include the boarding of boats at sea to inspect for compliance. The Gulf of Maine team also recommended measures to assess whether noncompliance with pinger requirements or improperly maintained pingers were significant factors causing bycatch. It recommended that the Service establish an annual certification program for any one wishing to fish in an area restricted to pingers. To be certified, gillnetters would need to participate in a training session on the use of pingers and current restrictions, present their pingers for testing, and agree to have their certificate on board when fishing in an area where pingers are required. In addition, the team recommended that fishery observers be equipped with devices to test pingers on either side of a net panel in which an incidentally caught harbor porpoise is found to determine if the pingers were working properly at the time a porpoise was caught.

For waters south of New England, the mid-Atlantic team recommended that waters inside Delaware Bay be excluded from gear restrictions. A similar exclusion exists for waters in Chesapeake Bay, and the team concluded that bycatch data from Delaware Bay did not justify inclusion of the area in the plan. The team also expressed concern about the adequacy of the observer coverage, which had declined from 5 to 2 percent and was not covering many segments of the gillnet fleet at levels sufficient to develop useful bycatch estimates. In addition, it was noted that recent levels of observer coverage were not adequate to determine when the zero mortality rate goal was achieved. That is, as fewer harbor porpoises are taken, observer coverage must be increased in order to estimate low bycatch levels with any useful statistical confidence. The team therefore recommended that the Service increase observer sampling to at least 6 percent of the overall mid-Atlantic gillnet fishing fleet.

Both teams also strongly recommended that the Service conduct a scientific experiment to assess the effectiveness of new acoustically reflective gillnets in reducing harbor porpoise bycatch. The new nets are made of hollow-core strands filled with a material that reflects sound so that echolocating porpoises might detect nets more easily. Preliminary tests of the new nets in Canada appear promising; however, those tests have not been extensive and they have not followed a rigorous scientific protocol. The teams therefore recommended conducting an experiment to compare bycatch rates in the new nets with those in nets equipped with pingers.

Finally, both teams expressed concern about relying on take reduction measures outside of the harbor porpoise take reduction plan (i.e., closures under fishery management plans) to reduce harbor porpoise bycatch. The Gulf of Maine team recommended that the Service prepare a proposal for integrating key fishery management plan closures for groundfish into the harbor porpoise take reduction plan. In this way, changes to those measures warranted by fishery management data would not incidentally increase porpoise bycatch. The mid-Atlantic team also felt that better coordination between the planning process for take reduction plans and fishery management plans was essential, but concluded that it was premature to recommend an integrated course of action. Instead, it recommended that the Service develop a process for calculating the effects of changes to fishery management plans on harbor porpoise bycatch and consult with the fishery management councils and harbor porpoise take reduction teams to identify proposed changes to the harbor porpoise plan that may be needed.

With regard to the latter issue, the Marine Mammal Commission wrote to the Service on 17 November 2000 following a review of the status of harbor porpoise conservation measures at its 10–12 October 2000 annual meeting. During that meeting the Commission learned that the New England Fishery Management Council was considering actions to reconfigure fishery closures under the groundfish fishery management plan that could have an effect on harbor porpoise bycatch. In its letter, the Commission recommended that the Service estimate possible increases in harbor porpoise bycatch that might result from the proposed changes to the groundfish plan and that, concurrent with any action

to implement them, the Service adopt compensatory bycatch reduction measures under the harbor porpoise take reduction plan.

On 2 February 2001 the Service responded to the Commission's 17 November letter noting that it would consider effects of proposed changes to fishery management plans on harbor porpoises during the process of reviewing required environmental assessments or environmental impact statements. Where proposed changes would increase harbor porpoise bycatch, it noted that it would discuss those changes with the Council and ask the harbor porpoise take reduction teams to recommend changes to the harbor porpoise take reduction plan. It also noted that it would consider the Gulf of Maine team's recommendation on integrating all measures necessary to protect harbor porpoises under the plan. The New England Fishery Management Council subsequently decided against altering the fishery closures most beneficial to harbor porpoises.

During 2001 there were few new developments in the harbor porpoise conservation program. Apparently due to limited staff and funding and higher priority needs for other species, there was limited progress on implementing recommendations of the two take reduction teams. Neither team met in 2001. However, as recommended by the mid-Atlantic team at its meeting in November 2000, the Service adopted rules on 11 January 2001 exempting Delaware Bay from the gear restrictions in the harbor porpoise take reduction plan. To determine if deployed pingers are working properly, the Service also completed development of a device to check whether pingers properly emit sound. Although further development work will be needed to design devices that can test for a wider range of frequencies, an initial order for 10 devices capable of checking for frequencies on most pingers now in use was received late in 2001. As of the end of 2001 the Service had not yet decided whether these devices should be provided to enforcement officers to randomly check deployed gillnets or to fishery observers to test pingers in nets that catch porpoises.

Support was not provided in 2001 for the scientific study recommended by both take reduction teams to field-test new acoustically reflective gillnets, and as of the end of the year it was not clear whether or what steps might be taken to conduct such a study. As a related matter, however, the Service provided funding for a study to determine if captive bottlenose dolphins can detect reflective netting more easily than traditional netting. This study was undertaken as part of efforts to develop a bottlenose dolphin take reduction plan (see also the following section of this chapter). At the end of 2001 the Service also had not yet developed a mandatory annual certification program for using pingers in New England waters. As noted above, however, preliminary information on bycatch estimates through the summer of 2001 indicated that bycatch levels for 2001 would be even lower than the 1999 and 2000 estimates.

Endangered Species Status Review for Gulf of Maine Harbor Porpoises

In September 1991 the Sierra Club Legal Defense Fund (now known as Earthjustice) petitioned the National Marine Fisheries Service to list the Gulf of Maine harbor porpoise population as threatened under the Endangered Species Act. The petition was prompted by the large harbor porpoise bycatch at that time and the lack of any management actions to reduce that take. As discussed in previous annual reports, the Service published a proposed rule on 7 January 1993 to list the population as threatened. Public comments on the action were requested several times over the next five years, but each time, the Service deferred a decision because it believed that measures it was taking to reduce bycatch levels would eliminate the need to list the population or, in one case, because a moratorium had been imposed on listing actions.

Delays in acting on the petition and the failure to meet other statutory deadlines required for harbor porpoise conservation led to a lawsuit filed in 1998 against the Secretary of Commerce by the Center for Marine Conservation, the Humane Society of the United States, and the International Wildlife Coalition. As part of an agreement to settle the suit, the Service committed to making a final decision on the listing action in early January 1999. If the Service chose not to list the population, it also agreed to review the population's status by 31 March 2001 to determine if its decision was still warranted. On 5 January 1999 the Service withdrew its listing proposal, but retained the harbor porpoise population on the Endangered Species Act list of candidate species for further review.

On 2 August 2001 the National Marine Fisheries Service published a proposed rule and accompanying analysis in the *Federal Register* to remove the Gulf of Maine harbor porpoise population from the Endangered Species Act list of candidate species. Among other things, the Service's analysis noted that estimated bycatch levels had declined substantially to below the population's calculated PBR level in 1999 and 2000. It assumed that this reduction was due to a combination of actions taken under the harbor porpoise take reduction plan and those taken under fishery management plans to reduce gillnet fishing.

With regard to the latter point, the Service noted that if the goals of fishery management plans are met and fish stocks increase, closures incidentally protecting harbor porpoises could be lifted outside of the harbor porpoise take reduction plan process. To address this possibility, the Service said it would monitor actions taken under relevant fishery management plans to ensure that any changes that may result in unanticipated increases in harbor porpoise bycatch are mitigated through available regulatory mechanisms. It also noted that it may revise the harbor porpoise take reduction plan to include all measures necessary to ensure reduced harbor porpoise bycatch instead of relying on fishery management plan time-area closures.

On 19 October 2001 the Service published a final rule deleting the Gulf of Maine harbor porpoise from the list of candidate species. It noted that since withdrawing its proposal to list the population as threatened in 1999, there was no new information to suggest that the incidental take by commercial fishing could cause the stock to be in danger of extinction or likely to become so in the foreseeable future. It therefore concluded that listing as either endangered or threatened was not warranted at this time.

In response to concerns about the lack of plans to prevent the lifting of fishery management plan closures that help protect harbor porpoises, the Service stated that relying on an adaptive strategy to protect harbor porpoises under both the harbor porpoise take reduction plan and fishery management plans had reduced bycatch to below its PBR level and it considered this to be the best strategy for preventing potential increases in harbor porpoise bycatch. It also stated that it would be aware of any changes that the New England or Mid-Atlantic Fishery Management Councils might propose to fishery management measures that might affect harbor porpoises directly or indirectly, and that it would work with the councils and the two harbor porpoise take reduction teams to determine whether any changes to fishery management plans would precipitate the need for changes to the harbor porpoise take reduction plan.

Bottlenose Dolphins along the Atlantic and Gulf of Mexico Coasts (*Tursiops truncatus*)

Bottlenose dolphins are distributed throughout the world's temperate and tropical regions, and are the most common marine mammal along the U.S. southeastern and Gulf of Mexico coasts. Bottlenose dolphins are long-lived; males and females may exceed 40 and 50 years of age, respectively, although the majority of animals do not live to these ages. Females reach sexual maturity at about five to ten years of age and males at about eight to twelve years of age. Mature adults measure about 2.5 m (8.2 ft) in length, although males tend to be slightly larger. They have a promiscuous breeding system in which males and females may have multiple mating partners. Females generally give birth to single offspring every three to six years and provide relatively long parental care (on the order of 18–20 months or more). Bottlenose dolphins may occur as solitary individuals or in groups ranging from two to hundreds of animals. They form strong social bonds and their social interactions are complex and dynamic, varying in apparent purpose (e.g., traveling, foraging, care of offspring), composition (e.g., different sex and age classes), and longevity. Bottlenose dolphins eat a variety of prey, including benthic (associated with the bottom), pelagic (in the water column), and surface-dwelling fish and invertebrates. Common prey includes weakfish, Atlantic croaker, spot, silver perch, sand seatrout, mullet, and squid. Their primary predators are large sharks.

Stock Structure, Status, and Trends

Bottlenose dolphin stock structure is relatively complex and poorly understood. In the western North Atlantic, bottlenose dolphins can be distinguished as belonging to either of two different ecotypes — coastal or offshore. These ecotypes are distinguished not only on the basis of their

distribution, but also their genetic composition, morphology, parasites, and prey. In addition, in coastal areas some dolphins occur primarily along the outer coastline; others inhabit bays, sounds, inlets, estuaries, and other more inland waters. The above general description of bottlenose dolphins is based primarily on the coastal ecotype because relatively little is known about the offshore ecotype.

Stock structure is further complicated because dolphins within these ecotypes compose different reproductive stocks; that is, groups of animals that are more or less reproductively isolated from other groups within the same ecotype. The degree of reproductive isolation is important not only because it serves as a basis for genetic and evolutionary separation of stocks, but also because it is an important determinant of each stock's vulnerability to, and ability to recover from, adverse influences, both natural and human-related. Efforts to distinguish reproductive stocks are complicated by the difficulty of studying these animals in their natural environment, by the fact that animals from different stocks cannot be separated on the basis of appearance, and by the fact that different stocks have geographic ranges that overlap temporally and spatially.

In 1987 and 1988 a large number of bottlenose dolphins stranded along the eastern coast of the United States (described below), and the geographical pattern of the die-off was taken as evidence of a single coastal migratory stock. In 1993 the Service designated that stock as depleted under the Marine Mammal Protection Act, but the Service's stock assessment reports from 1995 to 2000 describe only a general western North Atlantic coastal stock. In 1997, ten years after the die-off of the purported coastal migratory stock, the National Marine Fisheries Service established a research program to investigate stock structure primarily using genetics, but also using photo-identification, telemetry, stable isotope ratios, and information from strandings. Initial efforts have focused along the Atlantic coast because this region includes the so-called coastal migratory stock and because of documented high levels of incidental take in gillnet fisheries in the areas occupied by this purported stock. Preliminary results have provided additional insights into possible stock structure along the Atlantic coast and suggest the possibility of at least seven stocks in this region, consisting of migratory animals as well as year-round and seasonal residents in the ocean and in bays, sounds, and estuaries of the mid-Atlantic and southeastern Atlantic Ocean off the East Coast of the United States. Additional research on this matter is still needed. The take reduction team convened by the Service in 2001 is operating under the assumption that seven coastal bottlenose dolphin stocks exist in the western North Atlantic.

Similar research is needed in the Gulf of Mexico, where stock structure is even less clear. In March 2000 the Service hosted a meeting in Sarasota, Florida, to discuss the most efficient ways to resolve questions about the species' stock structure in the gulf. A brief report of that meeting was provided to the Commission at its 2000 annual meeting. Service personnel indicated that funds would be sought to begin a comprehensive research program similar to that now under way along the Atlantic coast. In a 12 December 2000 letter to the National Marine Fisheries Service, the Commission agreed that comprehensive studies along the Atlantic coast provided a good framework for future dolphin research in the Gulf of Mexico. The Commission commended the Service for its efforts in this regard and urged it to expedite funding for such research.

Lacking better information, the National Marine Fisheries Service currently recognizes 38 stocks in the Gulf of Mexico region (outer continental shelf, continental shelf edge and continental slope, western coastal, northern coastal, and eastern coastal, and 33 resident stocks in contiguous, enclosed, or semi-enclosed bodies of water adjacent to the Gulf of Mexico). The most recent abundance estimates for these purported stocks are provided in Table 3. The available information is insufficient for trend analysis for all currently recognized stocks of bottlenose dolphins in the Gulf of Mexico and along the southeastern North Atlantic coast.

Determination of the status of and risks to dolphin stocks will be difficult even after stocks have been identified. Nevertheless, the lack of information on bottlenose dolphin stock structure in these regions is a major impediment to assessment of their status and trends because status and trends are most meaningfully described on the basis of reproductively discrete stocks. Similarly, the lack of information on stock structure impedes the analysis of effects from die-offs, fisheries interactions, coastal

Table 3. Estimates of abundance for bottlenose dolphin stocks in the western North Atlantic (WNA) and Gulf of Mexico (GOM) as reported in stock assessment reports prepared by the National Marine Fisheries Service. Most counts from aerial or shipboard line transects.

Stock	Survey Year	Estimate	Note
WNA Offshore	1998	30,633	The Service declined to use this estimate due to the overlap of coastal and offshore dolphins in the region counted.
WNA Coastal	1994–1995	2,482	The estimate does not include dolphins in "inshore" waters (bays, sounds, inlets, etc.)
GOM Outer Continental Shelf	1992-1994	50,247	Estimates were based on aerial line-transect surveys that overlapped the range of the continental shelf edge and slope stock and may therefore include a positive (unquantified) bias.
GOM Continental Shelf Edge and Slope	1992–1994	5,618	
GOM Western Coastal	1992	3,499	Trend analysis was not conducted but 1983 estimate of abundance was 4,718.
GOM Northern Coastal	1993	4,191	Trend analysis was not conducted but 1983–1985 estimate of abundance was 1,319.
GOM Eastern Coastal	1994	9,912	Trend analysis was not conducted but 1985 estimate of abundance was 4,711.
GOM Bay, Sound and Estuarine Stocks	1992–1994	Ranged from 0 to 1,401	Counts of zero were reported for eight areas where previous counts indicated at least seasonal presence of dolphins; data are insufficient to determine trends.

development, oil and gas operations, and other factors or events that pose potential threats to bottlenose dolphins.

Threats to Bottlenose Dolphin Stocks

Bottlenose dolphins are exposed to a variety of natural and human-related factors that may threaten the well-being of individual dolphins or the status of dolphin stocks. Natural factors include predation by large sharks, disease (e.g., morbillivirus) and parasites, exposure due to naturally occurring biotoxins, and changes in prey availability or loss of habitat due to natural environmental variation. Human-related factors include loss of habitat due to coastal development, direct exposure to toxins from human-generated pollution (e.g., agricultural runoff), disturbance, vessel strikes, entanglement in human debris, noise and pollution related to oil and gas development, direct and indirect interactions with recreational and commercial fisheries (e.g., incidental mortality in nets and loss of prey from fisheries competing for the same prey), and injury or mortality that may result from direct human interactions such as the feeding of wild dolphins. These factors may act independently or synergistically. For example, exposure to pollutants may reduce immune system

function thereby lowering resistance to disease; human-related contamination of coastal waters may increase the likelihood of phytoplankton blooms that result in increased concentrations of biotoxins; or direct interactions such as the feeding of dolphins may increase the likelihood of dolphin injury or mortality due to vessel strikes. Compared with offshore bottlenose dolphins, coastal dolphins may be at greater risk to human-related threats due to their greater proximity to human activities.

Die-Offs – The effects of various threats to bottlenose dolphins in the southeastern United States have manifested themselves most obviously in a series of at least six die-offs observed over the past 15 years. Animals stranded on beaches provide the most obvious evidence of a die-off, but it is not clear that those animals provide a complete and reliable basis for characterizing each die-off (e.g., some dead stranded animals may not be found and some dead animals may not strand or wash ashore). Furthermore, the effect of a die-off on a particular stock of dolphins can only be determined if that stock has been identified and sufficient information exists to put the die-off in perspective. Such information includes stock abundance, status and trends, and composition. Because the stock structure of bottlenose dolphins along the southeastern coast and in the Gulf of Mexico is poorly understood, as is the abundance, status, and trends of each stock, it is difficult to determine the significance of the observed die-offs.

In 1987 and 1988 the annual number of stranded dolphins on the East Coast increased tenfold relative to previously observed stranding levels. The available evidence suggested morbillivirus or biotoxicants as possible causes, and both may have contributed, either independently or synergistically. The die-off started in the mid-Atlantic region, moved northward and then southward to encompass essentially the entire coastline from New Jersey to central Florida. The pattern of stranded animals was considered evidence for a single coastal migratory stock along the eastern coast, and an analysis of the event suggested that more than half of this coastal stock may have died. On that basis, the purported coastal migratory stock was designated as depleted in 1993.

The most recent die-off of bottlenose dolphins in the southeastern United States occurred from May to August 2001 in the vicinity of the Indian River Lagoon along the eastern coast of Florida. At least 35 animals are known to have died; the cause of their deaths are under investigation (see Chapter VI on marine mammal unusual mortality events).

Contaminants – Bottlenose dolphins, particularly those occurring in coastal or inland waters, are exposed to contaminants from a variety of sources including agricultural runoff, vessel pollution, pollution from oil and gas exploration and drilling, and sewage and other waste from coastal developments. Although a considerable number of studies have been conducted illustrating the presence and increasing concentration of contaminants in marine mammal tissues (including those of bottlenose dolphins), the effects of those contaminants on the health of both individuals and marine mammal populations has been difficult to assess. Potential effects of contaminants are thought to include direct health risks to individual animals (e.g., impairment of immune function) as well as impairment of their ability to reproduce. Contaminant loads for some chemicals may increase over time due to bio-accumulation, and some contaminants also may be passed directly from mother to fetus.

In a letter of 18 December 1998 to the Service, the Commission recommended that the Service consult with the Environmental Protection Agency, the Minerals Management Service, and relevant coastal state agencies to determine whether everything necessary was being done to assess the sources, levels, and effects of anthropogenic contaminants present in bottlenose dolphins in waters off the U.S. Atlantic and Gulf states. In a 12 December 2000 letter to the Service, the Commission recommended that the Service initiate carefully controlled experiments and testing to clarify the effects of anthropogenic toxins on individual dolphins and on dolphin populations. The Commission noted that both the report of the Commission's October 1998 workshop on marine mammals and persistent ocean cotaminants and a 1998 report from the International Whaling Commission's Scientific Committee have recommended a multifaceted research approach (combining behavioral observations, life history research, ecological assessment, health monitoring, and toxicology) using index populations of marine mammals, including bottlenose dolphins. At the end of 2000 the Service had indicated that funding would be made available in 2001 for studies of the effects of toxins

on the Sarasota Bay dolphin population, and in 2001 a total of $25,000 was dedicated to those studies.

Tourism and direct human interactions – In recent years, commercial ventures that encourage close and sometimes illegal interactions between humans and dolphins have proliferated in the southeastern United States (also discussed in Chapter IX). These ventures offer members of the public a variety of experiences from watching to swimming with wild dolphins. In some cases, such activities have been interpreted to constitute harassment, whereas in others the legal status is less clear. The feeding of free-ranging dolphins, an activity explicitly prohibited under established regulations, also has persisted in various locations.

To document the extent, nature, and effects of such activities, the Commission contracted for a study to (1) review the literature on the topic of human-dolphin interactions, and (2) quantify and describe the development of swim-with-the-dolphin programs in the Florida panhandle. The study was completed in April 2000 and is available from the Commission (see Appendix B). The study divided free-ranging dolphins into four behavioral types: (1) solitary but sociable with humans, (2) food-provisioned, (3) habituated to humans, and (4) not habituated to humans. Although the report acknowledged a lack of information about the effects of human-dolphin interactions, it concluded that (1) dolphins are vulnerable to injury and death as a result of human contact; (2) animals appearing tolerant of or even seeking such contact have already been placed at risk by extensive habituation achieved through considerable human effort; (3) such contact can disrupt important natural behaviors of wild dolphins; and (4) a precautionary approach is necessary to ensure the protection of wild dolphins from the adverse effects of human-dolphin interactions.

At the Commission's 2000 annual meeting, representatives of the Service reviewed the status of such activities in the southeastern United States and expressed grave concern about the individual and cumulative effects of close interactions between humans and dolphins. They advised the Commission that new draft regulations to address these interactions would soon be circulated to the Commission and other agencies for comment. In its 12 December 2000 letter to the Service, the Commission commended such efforts and urged haste in adopting clear, rational regulations and guidelines. The Commission also urged the Service to consult with other involved agencies (e.g., the Fish and Wildlife Service and the public display industry) to assure that a consistent message reach the public. The Commission noted that patrons of public display facilities offering swim-with-the-dolphin or dolphin-feeding exhibits may be confused about what constitutes appropriate behavior with marine mammals in the wild, and that regulations developed by the Service should be consistent with those issued by the Fish and Wildlife Service for species under its charge.

In July 2001 the National Marine Fisheries Service consulted with the Commission regarding a draft policy developed to address the issue of interactions between the public and marine mammals in the wild. The policy was intended to clarify those interactions constituting harassment. In a 16 July 2001 letter responding to the Service, the Commission expressed its understanding that the Service still intends to promulgate regulations clarifying those interactions between the public and wild marine mammals that constitute harassment. The Commission agreed that, before implementation of such regulations, the policy would help provide the public needed guidance regarding such activities.

Enforcement is an important element of management efforts to avoid harassment of bottlenose dolphins (and other marine mammals) by direct human interaction. At the Commission's 2000 annual meeting, representatives of the Service discussed problems relating to inadequate and ineffective enforcement of regulations intended to protect bottlenose dolphins and other marine life. They noted that enforcement has been compromised by an inadequate number of enforcement officers, the extensive coastline to be covered, and the large number of competing, high-priority demands requiring attention (e.g., investigation of interactions between shrimp fisheries and turtles). In its 12 December 2000 letter to the Service, the Commission strongly recommended that enforcement staffing and efforts be increased significantly, not only for bottlenose dolphins, but also for other species for which the Service is responsible. The letter noted that the Commission also had urged the Fish and Wildlife Service and the Florida Division of Law Enforcement to increase their enforcement capabilities. Finally, the letter recommended that the Service should seek

to develop a coordinated enforcement strategy involving all three agencies in Florida.

Fisheries Interactions and Take Reduction Efforts

Bottlenose dolphins interact with recreational and commercial fisheries throughout their range along the southeastern North Atlantic and Gulf of Mexico coasts. They may be killed or seriously injured incidental to a variety of fishing operations and gear types including gillnets, crab pots, haul/beach seines, long-haul seines, pound nets, and stop nets. They also may be injured or killed by consuming fish caught by hook-and-line fisheries or killed in fishery-generated debris such as lost netting and lines.

Evidence and estimates of fishery interactions suggest that fishery-related mortality may be impeding the recovery of the putative coastal migratory stock of dolphins that was designated as depleted following the 1987–1988 die-off. Based on that concern, the National Marine Fisheries Service convened a take reduction team on 6–8 November 2001 to begin the process of developing a plan for reducing the number of fishery-related takes of bottlenose dolphins along the eastern North Atlantic coast from New Jersey southward. The team consists of representatives of the different fisheries involved, the Atlantic States Marine Fisheries Commission, the Mid-Atlantic Fishery Management Council, the South Atlantic Fishery Management Council, the National Marine Fisheries Service, fishery management agencies of the affected states, universities in the regions affected, conservation organizations, animal welfare organizations, and the Marine Mammal Commission.

Although the official take reduction team met on only one occasion in 2001, the Service hosted two workshops (15–16 May and 11–12 July 2001) prior to the initial team meeting to review and discuss basic information necessary to describe the problem to be addressed by the team. The primary focus of those workshops and the initial team meeting was on stock structure of bottlenose dolphins in coastal waters from New Jersey to Florida, abundance estimates of purported stocks, estimates of the potential biological removal level of each stock, the fisheries that occur within the range of the stocks under consideration, estimates of the number of dolphins killed by fisheries and other sources of human-related mortality, potential measures to reduce fishing-related mortality, and research needed to facilitate the take reduction process. The team's task will be confounded by the considerable uncertainty regarding stock structure, abundance estimates for each stock, annual fisheries-related mortality, and methods for assessing such mortality. The take reduction team is expected to continue its deliberations until rulemaking can be initiated, which is anticipated for mid-2002.

Conservation Plan

As described in previous annual reports, the Commission has repeatedly recommended that the National Marine Fisheries Service develop and implement a bottlenose dolphin conservation plan for the putative western North Atlantic coastal migratory stock. As noted above, this stock was declared depleted in 1993, based on estimates that it may have declined by over 50 percent as a result of the 1987–1988 die-off. On 25 May 2001, almost 15 years after the die-off and 8 years after the depleted designation, a draft plan was forwarded to the Commission for review and comment. The plan provides an overview of the species' history, a review of its natural history characteristics, a summary of known and possible human-related and natural factors that may threaten the population or impede its recovery, an outline of needed and prioritized research and conservation actions, a schedule for implementing those actions, and their projected costs. Necessary actions included (1) identification of stock structure of coastal bottlenose dolphins, (2) estimation of abundance for each stock, (3) assessment of human-related sources of mortality for each stock, (4) assessment of the overall status of each stock, (5) retrospective analysis of the 1987–1988 die-off, (6) establishment of a biomonitoring program to assess the incidence of disease, (7) examination and characterization of factors that could change carrying capacity for bottlenose dolphin stocks, and (8) establishment of a coordinator position to ensure implementation of the plan.

The draft plan also suggested that, in the absence of information to determine the stock's optimum sustainable population level (i.e., that level above which the population would no longer be considered depleted), the time to recovery could be estimated using model simulations if human-related

mortality of dolphins remains under the potential biological removal level as described in the Marine Mammal Protection Act.

In a letter of 15 June 2001 the Marine Mammal Commission commended the Service and its contractors on the overall quality of the conservation plan and provided comments. The Commission's two main questions were whether the Service has adequate funding to implement the plan, and whether the Service would be preparing a similar plan for bottlenose dolphins in the Gulf of Mexico, where dolphin populations are threatened by many of the same problems observed along the southeastern North Atlantic coast. The Commission also encouraged the Service to release the plan to the public for further comment. As of 31 December 2001 the Service was updating the plan with the new information on bottlenose dolphin stock structure and abundance and take reduction efforts. It anticipated release of the plan in draft form for public comment in 2002.

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Cook Inlet Beluga Whale (*Delphinapterus leucas)*

Beluga whales are found in seasonally ice-covered waters throughout arctic and subarctic regions. With the exception of those in the northern Gulf of Alaska, most beluga whales in U.S. waters are thought to winter in the Bering Sea in open leads and polynyas in the pack ice. In spring and summer, they are found in coastal areas or the offshore pack ice. For management purposes, five stocks are recognized in U.S. waters. The distinction is based on the stocks' discontinuous summer distribution and on mitochondrial DNA analyses that indicate clear genetic differences among animals using different summering areas. The five stocks are named after their primary summering areas, which are located in Cook Inlet, Bristol Bay, the eastern Bering Sea, the eastern Chukchi Sea, and the Beaufort Sea.

The most isolated population of beluga whales in U.S. waters is found in Cook Inlet and is separated from the other four summer populations by the Alaska Peninsula. Because of their proximity to Anchorage, beluga whales in Cook Inlet are exposed to the largest urban coastal area in Alaska. Analyses by the National Marine Fisheries Service of beluga whale sightings in Cook Inlet over the past 30 years indicate that the stock's summer range has contracted substantially in recent years. Compared with sightings in the 1970s and 1980s, animals are rarely seen now in offshore waters or the lower reaches of the inlet. In June, when the National Marine Fisheries Service conducts aerial surveys of the population, beluga whales are concentrated in a few groups in the upper reaches of the inlet around the Susitna River delta, Knik Arm, and Turnagain Arm.

Aerial surveys of beluga whales in Cook Inlet have been conducted by the National Marine Fisheries Service annually in June or July since 1994. Data from those surveys indicate that the Cook Inlet beluga whale population declined from an estimated 653 (CV = 0.43) individuals in 1994 to 347 (CV = 0.29) in 1998. This constitutes about a 47 percent decline in four years. The 1999 surveys yielded an abundance estimate of 367 (CV = 0.14), somewhat higher but not significantly different than the 1998 estimate. The 2000 surveys produced the lowest index count (184 whales) since systematic surveys began. However, when corrected to account for missed whales and missed groups of whales, the 2000 estimate was 435 whales. The coefficient of variation around this estimate (0.23) again was rather large and it is likely that the apparent increase in the abundance estimate for the stock between 1999 and 2000 was the result of interannual variation in the survey results, rather than growth in the population. This is borne out by the results of the 2001 surveys. For 2001, the National Marine Fisheries Service estimates the stock to number 386 whales (CV = 0.087). The range of estimates within the 95 percent confidence interval is 325 to 459 whales.

Stock Assessment

Under the Marine Mammal Protection Act, the National Marine Fisheries Service is required to prepare a stock assessment for each marine mammal stock under its jurisdiction that occurs in U.S. waters. Among other things, each assessment is to include an estimate of the stock's potential biological removal level. This calculation is based on the stock's estimated minimum population size, its maximum net productivity rate, and a recovery factor ranging from 0.1 to 1.0, depending on the status of the stock. The potential biological removal level is the maximum number of animals, not including natural mortalities,

that can be removed from the stock while providing reasonable assurance that it will recover to or remain within its optimum sustainable population level. The potential biological removal level calculated for the Cook Inlet population of beluga whales in the 1998 stock assessment, which used a recovery factor of 1.0, was 14 animals.

As discussed in previous annual reports, the Alaska Regional Scientific Review Group, appointed by the Service to provide advice on the status of Alaska marine mammal stocks, met in late 1998 to evaluate information on the Cook Inlet beluga whale stock. The group recommended that the Service, in calculating the potential biological removal level for this stock, use a recovery factor of 0.5 to reflect its depleted status. The group met again in April 1999 to evaluate information concerning the Cook Inlet beluga whale population and concluded that it should be considered a "high risk" stock because of its low abundance, declining trend, limited range, and susceptibility to catastrophic events. As a result of that review, the Alaska Regional Scientific Review Group recommended that the National Marine Fisheries Service use a recovery factor of 0.1 when calculating the potential biological removal level for this stock. Despite this advice, the 1999 stock assessment report for Cook Inlet beluga whales used a recovery factor of 0.5. This resulted in a revised potential biological removal level of 2.7 whales per year.

The Service, in the 2000 stock assessment report, again did not adopt the 0.1 recovery factor recommended by the Scientific Review Group. Rather, inasmuch as the Service had proposed to designate the Cook Inlet beluga whale population as depleted under the Marine Mammal Protection Act and was considering petitions for listing the stock as endangered under the Endangered Species Act, the Service lowered the recovery factor to 0.3. This value was halfway between the 0.1 recovery factor generally used for endangered species and the factor of 0.5 associated with depleted and threatened stocks. Using this value and the minimum population estimate of 303 for 1999, the Service calculated a potential biological removal level of 1.8 whales for this stock.

In its draft stock assessment for 2001, the Service again used the 0.3 recovery factor. Using the minimum population estimate of 360 derived from the 2000 surveys, the Service proposed a revised potential biological removal level for this stock of 2.2 whales per year. Other changes in the draft 2001 assessment reflected the 2000 survey data, new analyses of the distribution of the stock, updated mortality estimates, a description of the provisions limiting subsistence taking, designation of the stock as depleted, and the Service's finding that listing the stock as endangered was not warranted.

Native Subsistence Harvest

Section 101(b) of the Marine Mammal Protection Act allows Alaska Natives to take marine mammals for subsistence purposes or for making and selling handicrafts provided that the taking is not done in a wasteful manner. Only if a stock has been determined to be depleted or has been listed as endangered or threatened may any other limits be placed on such taking.

The estimated subsistence harvest of Cook Inlet beluga whales averaged about 15 animals per year between 1990 and 1994, according to figures derived from a variety of sources and provided by the Alaska Beluga Whale Committee, a group made up of Alaska Native beluga whale hunters and biologists. It is believed, however, that this figure underestimates the take because it does not take into account all animals that were struck and lost and may not include beluga whales taken from the Cook Inlet stock by Native hunters who reside outside the Cook Inlet region. The Cook Inlet Marine Mammal Council, a Native group formed in 1992, estimated that more than 30 whales were taken annually by subsistence hunters in Cook Inlet from 1990 through 1994.

The most thorough surveys of beluga whale subsistence harvests in Cook Inlet were undertaken in 1995 and 1996 by the Cook Inlet Marine Mammal Council. The Council reported that 72 whales were taken in 1995, including 22 that were struck and lost. The kill in 1996 was estimated to be 98 to 147 whales, including an estimated 49 to 98 whales struck and lost. In 1997, 70 whales were estimated to have been taken, of which an estimated 35 were struck and lost. The National Marine Fisheries Service estimates that 42 whales were taken in 1998 although other information, including an unverified report of 20 whales taken during one weekend in June by hunters from outside the Cook Inlet region, suggests that the actual number may have been much larger. Taking at these

unsustainable levels resulted in about a 50 percent reduction in Cook Inlet beluga whale numbers during the 1990s.

The imprecision of the estimates of subsistence taking during much of the 1990s prompted the Commission and others to recommend that the National Marine Fisheries Service adopt marking and tagging regulations, as provided for by section 109(i) of the Marine Mammal Protection Act. In response, the Service promulgated such regulations in 1999, requiring Alaska Native hunters to report each Cook Inlet beluga whale landed and to present the lower left jawbone of the whale for marking. Since establishment of the reporting and marking requirements, however, there has only been one reported landing of a beluga whale.

Part of the impetus for the increased number of beluga whales being taken was the development of commercial outlets for beluga whale muktuk (a popular Native food composed of the skin and blubber of the whale) in Anchorage. Such sales arguably are allowed under the provision of section 101(b) of the Marine Mammal Protection Act that allows edible portions of marine mammals taken by Alaska Natives for subsistence purposes or for the creation of authentic Native handicrafts to be sold in Native villages and towns. Under the National Marine Fisheries Service's interpretation of the Marine Mammal Protection Act, Anchorage is considered to be a Native village. Because of the demand for muktuk, beluga whales taken near Anchorage had a significant cash value. Before 1999, some hunters reportedly took large numbers of beluga whales for the muktuk, which they sold privately or at Native food stores in Anchorage.

The overharvest and precipitous decline of the Cook Inlet beluga whale has led to a number of actions to prevent further decline and to bring about the eventual recovery of the stock. At first, action was limited to a decision by some hunters to refrain voluntarily from taking whales. Subsequently, a free-standing legislative provision was enacted as part of the 1999 Emergency Supplemental Appropriations Act, Public Law 106-31, that prohibited, until 1 October 2000, the taking of a beluga whale from the Cook Inlet stock unless authorized by a cooperative agreement between the National Marine Fisheries Service and an Alaska Native organization. It was believed that allowing the Service to limit the taking of Cook Inlet beluga whales for a 16-month period would provide sufficient time for the agency either (1) to conclude a comprehensive co-management agreement with Native hunters or (2) to list the stock as endangered or threatened under the Endangered Species Act or as depleted under the Marine Mammal Protection Act and complete a rulemaking to restrict the hunt. When it became apparent that such limitations could not be established quickly enough to provide the needed protection to the stock, Congress passed a revised provision in December 2000. That provision, enacted as section 627 of Public Law 106-522, extended indefinitely the prohibition on hunting Cook Inlet beluga whales unless authorized by the National Marine Fisheries Service through a cooperative agreement. Also, as discussed below, the Service issued a proposed rule in October 2000 to establish regulations under the Marine Mammal Protection Act to limit taking by Alaska Natives. That rulemaking is pending.

As a result of these actions, no beluga whales were reported to have been taken during the 1999 season. Although the Service entered into a cooperative agreement with the Cook Inlet Marine Mammal Council to allocate one strike to the Native Village of Tyonek for 2000, no whale was struck during the year. In June 2001, the Service again entered into a cooperative agreement with the Cook Inlet Marine Mammal Council authorizing one strike to Tyonek. This time the hunt proved successful, with the single strike resulting in the landing of a whale on 21 July 2001. No other taking of a Cook Inlet beluga whale was reported during 2001.

Stock Status

Concern over the small and decreasing number of beluga whales in Cook Inlet and the apparent overharvesting of the stock prompted the Service to publish in the 19 November 1998 *Federal Register* a notice of intent to review the status of Cook Inlet beluga whales. The purpose of the review was to determine whether the Cook Inlet stock warranted designation as depleted under the Marine Mammal Protection Act or listing as endangered or threatened under the Endangered Species Act. The review was also intended to elicit information on the stock's distribution, abundance, population dynamics, food habits, and health, as well as the effects of the Native

subsistence harvest and other anthropogenic impacts on the population.

As discussed in previous annual reports, the Commission provided comments to the Service on 22 January 1999. The Commission noted that the unsustainable harvest by Alaska Natives was a major factor in the decline of the population and further noted that the preferred approach for addressing the overharvest should be a cooperative one in which the Native community and the Service shared responsibility for conserving the Cook Inlet beluga whale population. The Commission recommended that the Service also pursue other alternatives, should it prove impossible to implement an enforceable co-management regime that would effectively limit the number of Cook Inlet beluga whales that could be taken. These included adoption of regulations to restrict the harvest or enactment of legislation to impose such limits. In light of the drastic decline of the population and the continuing threat of overharvest, the Commission believed that the population warranted protection under the Endangered Species Act and recommended that the Service use emergency procedures to list the stock as endangered or threatened. The Commission further recommended that the Service initiate a rulemaking under section 10(e) of the Endangered Species Act and/or section 101(b) of the Marine Mammal Protection Act to limit the allowable Native take from the Cook Inlet beluga whale population.

Depletion under the Marine Mammal Protection Act – As part of its status review of the Cook Inlet beluga whale, the National Marine Fisheries Service held a workshop in March 1999. The review confirmed that Cook Inlet beluga whales are geographically and genetically isolated from other beluga whale stocks; that the stock's abundance had declined by nearly 50 percent between 1994 and 1998; and that the potential biological removal level established for this stock should be no more than three whales. The Service provided a draft report based on results of the scientific review to the Commission in early July 1999, seeking the Commission's concurrence that designation of the stock as depleted under the Marine Mammal Protection Act was warranted. The Commission responded by letter of 23 July 1999, recommending that the Service promptly complete and publish a proposed rule under section 115(a) of the Marine Mammal Protection Act to designate the Cook Inlet beluga whale population as depleted or, alternatively, publish a proposed rule to list the population as threatened or endangered under the Endangered Species Act.

The Service chose the first alternative and, on 19 October 1999, published a proposed rule to designate the Cook Inlet beluga whale stock as depleted. As recommended by the Commission and the vast majority of those that commented on the proposed rule, the National Marine Fisheries Service published a final rule in the *Federal Register* on 31 May 2000 designating the Cook Inlet stock of beluga whales as depleted. A more detailed discussion of the basis for this finding may be found in the Commission's previous annual report.

Action under the Endangered Species Act – As noted above, the Commission, beginning in January 1999, had recommended that the Cook Inlet beluga whale stock be listed as endangered or threatened under the Endangered Species Act. This issue was subsequently raised in two petitions seeking to have the stock listed as endangered that were submitted to the National Marine Fisheries Service in March 1999. On 9 April 1999 the Service published a notice announcing their receipt along with a finding that each of the petitions presented substantial information indicating that listing may be warranted. Under the Endangered Species Act, the Service has 12 months in which to make a finding as to whether listing is warranted or not. When the Service failed to meet that deadline, one of the groups of petitioners filed suit in U.S. district court (*Cook Inlet Beluga Whale et al.* v. *Daley*), seeking to compel issuance of the required finding.

The Service published a notice of determination on 22 June 2000, finding that listing under the Endangered Species Act was not warranted at that time. The Service reviewed possible threats to the population, including fishery interactions, oil spills and contact with other pollutants and contaminants, killer whale predation, disturbance from oil and gas exploration and development, shipping, airport operations, other human activities, and prey depletion, and concluded that, with the exception of taking by subsistence hunters, none of these factors was likely having an adverse impact on the stock. As for subsistence hunting, the Service concluded that the problem was being addressed sufficiently by limitations imposed by Public Law 106-31 and by regulations that the Service planned to propose pursuant to the

depletion designation under the Marine Mammal Protection Act. Thus, it believed that the stock was no longer in danger of extinction or likely to become so in the foreseeable future. As for the possible threat posed by the population having been reduced to a small size, an analysis of large whale population dynamics prepared by Service scientists concluded that a stock with at least 300 individuals and a positive intrinsic growth rate was unlikely to go extinct due to stochastic events.

Dissatisfied with the Service's reasoning, the plaintiffs in the aforementioned lawsuit amended their complaint in September 2000 to challenge the Service's decision not to proceed with a listing proposal. They contended that the Service had acted arbitrarily and capriciously in finding that listing was not warranted and that it had failed to use the best available scientific and commercial data in making its decision, as required under the Endangered Species Act. In response to that challenge, the City of Anchorage, the Kenai Peninsula Borough, the Matanuska-Susitna Borough, the Alaska Oil and Gas Association, and the Resource Development Council for Alaska moved to intervene in the case, claiming that their interests would be adversely affected if the Service's decision not to list the Cook Inlet stock of beluga whales were set aside. Those motions were granted and, on 16 July 2001, the district court heard oral argument in the case.

The court issued its ruling on 20 August 2001, finding that the Service had acted within its discretion in declining to list the Cook Inlet beluga whale under the Endangered Species Act. The court found that, although the Service had used small population size to support other listing decisions, this factor alone did not necessarily warrant a listing. In this regard, the court believed that the plaintiffs had failed to carry their burden of showing that the existing population is not sustainable if the harvest is successfully restricted and had not adequately rebutted the Service's study that examined the effects of stochastic events on small populations of whales and its conclusion that extinction was unlikely. Although the court found the plaintiffs' concern that enforcement might not be effective in controlling illegal takings to be reasonable, it found adequate support in the record for the Service's conclusions that future takings would be minimal and that the current population is sustainable.

The plaintiffs filed a notice of appeal in the case on 18 October 2001. They are seeking review of the district court's decision that listing the Cook Inlet beluga whale under the Endangered Species Act is not warranted and of that court's order to strike extra-record materials that the plaintiffs believe undermined the basis for the Service's determination. As of the end of 2001, a briefing schedule in the case had not been set.

Regulation of Native Harvest

Section 101(b) of the Marine Mammal Protection Act provides authority for the Service to regulate the taking of depleted species of marine mammals by Alaska Natives when necessary for the conservation of the affected species or stock. Such regulations, however, may only be prescribed through formal rulemaking, which affords affected Natives and other interested parties the opportunity for a hearing on the record, through which an administrative law judge develops the record of the proceeding and subsequently provides a recommended decision to the agency. Section 103(d) of the Act sets forth the rulemaking procedures and the information that must be published by the agency prior to, or concurrent with, the publication of a proposed rule. Among other things, the agency is to publish and make available to the public any recommendations provided to the Service by the Marine Mammal Commission that relate to the regulations. The Commission provided such recommendations by letter of 31 July 2000.

In general, the Commission strongly supported the proposal to establish harvest limitations, concluding that such an action was essential to conserve the depleted beluga whale stock. The Commission believed, however, that certain aspects of the draft rule provided by the Service needed to be strengthened or clarified. Among other things, the Commission suggested that the Service specify the particulars of the harvest regime more completely, rather than deferring most elements until the adoption of a cooperative agreement after regulations were in place. The Commission further recommended that the Service consider revising a proposed prohibition on the sale of parts and edible portions from Cook Inlet beluga whales to prohibit other quasi-commercial transactions, such as barter, and address the sale of meat from other beluga whale stocks, which, if not also regulated, could

create enforcement difficulties. The Commission also cautioned that any strike limit established under the regulations could be revised only by formal rulemaking, suggesting that a more flexible approach than that under review by the Service might be preferable.

Proposed Rule – After considering the Commission's comments and advice, the Service published a proposed rule on 4 October 2000. At about the same time, the Service issued a draft environmental impact statement reviewing federal actions associated with the management and recovery of Cook Inlet beluga whales. The preferred alternative identified in the statement was the issuance of regulations to establish an annual strike limit of two beluga whales until the Cook Inlet stock is no longer depleted. This alternative was reflected in the proposed rule. The Service believed that allowing two strikes per year would meet the dual objectives of providing an opportunity for a traditional subsistence harvest while not significantly delaying the recovery of the stock. The Service estimated that a take of two whales per year would enable the stock to recover to the lower bound of its optimum sustainable population range within 25 years, as compared with a recovery time of 22 years under a no-harvest scenario. Despite the advice it had received from the Commission, the proposed rule indicated that the Service believed that the proposed strike limit could be adjusted periodically, if necessary, without undergoing formal rulemaking procedures. As with the earlier draft provided to the Commission for comment, the proposed rule would have deferred several specifics of the harvest to be worked out through co-management agreements between the Service and Native hunters.

Formal Hearing – As discussed in greater detail in the previous annual report, the Commission filed a notice on 1 November indicating its intent to participate as a party in the formal rulemaking hearing. That notice indicated that the Commission would be filing direct testimony concerning issues related to the population model being put forward by the Service, the population dynamics of the Cook Inlet stock of beluga whales, and the proposed harvest limits. The Commission also provided comments on some of the issues it intended to pursue at the hearing, including how the allowable strikes would be allocated to Native hunters, the need for a more flexible harvest regime than that proposed by the Service, whether sales or other transactions involving beluga whale products should be allowed, and steps that could be taken to increase hunting efficiency.

The Commission submitted the testimony of its single witness, an expert in environmental statistics and risk analysis for endangered populations, on 9 November 2000. The testimony identified three primary problems with the harvest quota being proposed by the Service. It noted that (1) there was appreciable uncertainty in the key variables forming the substantive basis of the proposed rule, (2) the analysis of the proposal in the draft environmental impact statement did not take sufficient account of that uncertainty, and (3) the proposed rule was not sufficiently precautionary in light of the uncertainty.

The Commission noted that, although there was a range of plausible values for each of the key variables (current and historic population sizes, harvest-related mortality, the lower bound of the optimum sustainable population range for beluga whales, and the stock's maximum growth rate), the Service had used point estimates in its population modeling. In using fixed values for these uncertain parameters, the Service's calculations of the delay in time-to-recovery under different harvest scenarios could be under- or overestimates. Thus, it was not apparent that the proposed harvest levels would meet the Service's stated goal of not delaying recovery time of the population to the lower bound of the optimum sustainable population range by greater than 10 percent. The Commission believed that it would be preferable to develop allowable harvest limits using statistical methods that took account of such uncertainty. Using such an analysis, decisionmakers could judge the proposed harvest levels relative to the probability of achieving an identified outcome (e.g., no more than a certain percentage delay in recovery time).

The testimony also concluded that, although the proposal to allow no more than two strikes per year was a marked improvement over the unregulated harvest of the recent past, there was an unacceptably high risk that the delay in recovery time for the stock would exceed the level identified by the Service as being acceptable. In light of the very small size of the Cook Inlet beluga whale stock and its steep decline in abundance over the past several years, the testimony reflected the Commission's view that it would be more prudent to adopt a rule that initially would be more protective than

that proposed by the Service, and that allowed harvest limitations to be relaxed only after additional data obtained from continued monitoring of the population demonstrated that the population could withstand such taking.

The formal hearing required by the Marine Mammal Protection Act was held in Anchorage, Alaska, on 5–8 December 2000. In addition to the National Marine Fisheries Service and the Marine Mammal Commission, the Village of Tyonek, the Cook Inlet Treaty Tribes, Trustees for Alaska (representing the Center for Marine Conservation), the Alaska Oil and Gas Association, and Joel and Debra Blatchford (representing their interests as individual subsistence hunters) participated as parties. The Municipality of Anchorage, Kenai Peninsula Borough, and Matanuska-Susitna Borough had initially indicated their intent to participate collectively in the hearing but later withdrew because their primary focus was on issues related to the possible listing of the Cook Inlet beluga whale stock under the Endangered Species Act rather than those related to the regulation of subsistence hunting under the Marine Mammal Protection Act.

At the hearing, presided over by an administrative law judge, parties were provided the opportunity to present supplementary direct testimony, to cross-examine other parties' witnesses, and to offer rebuttal testimony. The Commission's proposal for a harvest regime, driven by a likelihood of meeting specific recovery criteria that could be modified to reflect the observed growth of the population, was generally received favorably by the other parties. The Commission believed that such a regime, although more conservative than the Service's proposal in the early years, might enable strike limits to be increased as the stock recovers.

Rather than relying on an adversarial process whereby post-hearing briefs are submitted by the parties, the judge encouraged the parties to work cooperatively to arrive at compromise solutions. To the extent that acceptable resolution of various issues could be reached, the parties could agree to them through stipulations. Heeding the judge's advice, the parties met at the conclusion of the hearing to consider a more flexible harvest regime along the lines recommended by the Commission. Recognizing that the data necessary to discern current population trends would likely not be available for four to six years, the parties tentatively agreed to an interim quota of six beluga whales over the next four years, with four of the allowable strikes to go to the Native Village of Tyonek. It was also agreed that the Service would convene a meeting of agency and other scientists to design a proposal for a longer-term, flexible management regime to be considered by the parties and to develop criteria for determining when the agreed-to harvest limits should be modified in response to unusual mortalities.

Post-Hearing Activities – As proposed at the hearing, the Service convened a meeting of scientists on 14–15 December 2000 to develop a proposal for the long-term management of the beluga whale harvest. That proposal would have temporarily suspended any taking if the documented mortality reached a level that was likely to prevent recovery of the stock and set taking limits for 2005 and beyond so as to provide a 90 percent confidence level that the delay in recovery time for the stock did not exceed 15 percent. However, some of the parties viewed the proposal as being overly complex and too conservative.

On 29 March, the judge issued a scheduling order calling on the parties to file by 29 May stipulations and/or documents identifying controverted issues of fact in need of resolution. To give the parties additional time to try to resolve the outstanding issues, this deadline was extended until 24 July 2001. At that time, the Commission submitted a draft stipulation document being reviewed by other parties and identified the following six controverted issues still to be resolved: (1) harvest limitations after 2004 and until recovery of the stock, (2) emergency provisions for the cessation of the harvest if unusual mortalities occur, (3) the need for a prohibition on taking maternally dependent calves and adults accompanied by such calves, (4) limitations on transactions involving Cook Inlet beluga whale products and products from other beluga stocks within the range of the Cook Inlet stock, (5) procedures for allocating allowable harvest limits among Native groups, and (6) procedures for concluding co-management agreements with Native groups.

The Commission, along with representatives of the National Marine Fisheries Service and the Native Village of Tyonek, continued to pursue discussions to

resolve these issues. These efforts culminated in the submission on 2 October 2001 of proposed stipulations and a draft final rule by the three parties. Under that proposal, the agreement for six strikes over four years would be formalized and an emergency suspension provision would be added. The parties would request that the judge retain jurisdiction over the issue of strike limits for 2005 and establish a process for developing a long-term, science-based harvest regime that (1) provides reasonable certainty that the population will recover within an acceptable period of time, (2) takes into account the uncertainty with respect to the population dynamics and vital rates of the Cook Inlet beluga whale population, (3) allows for periodic adjustments of allowable strike levels based on the results of abundance surveys and other relevant information, (4) provides assurance that the strike levels will not be reduced below those for 2001–2004 unless substantial information indicates that taking must be reduced to allow recovery of the stock, and (5) can be readily understood by diverse constituencies. Under the proposed stipulations, the National Marine Fisheries Service is to develop a proposed schedule for accomplishing this no later than March 2004. The Service would provide funding to Alaska Native subsistence users necessary to facilitate their meaningful participation in that process. Related provisions would prohibit hunting before 1 July of any year and prohibit the taking of maternally dependent calves and adults accompanied by such calves. Further, the proposed stipulation would recognize the need to develop objective standards for identifying maternally dependent calves to provide sufficient guidance to hunters and enforcement officials.

Under the parties' proposal, the sale or purchase of any part or product of a Cook Inlet beluga whale would be prohibited except for authentic Native articles of handicrafts and clothing made from non-edible by-products of legally taken whales. The proposal would, however, allow customary and traditional barter and sharing practices to continue. The parties also recognized the possible enforcement problems that could develop if parts and products of beluga whales from other populations were to enter into commerce in the Cook Inlet area. In response, the proposed stipulations would require that all cooperative agreements authorizing the take of Cook Inlet beluga whales include a mechanism to identify legally taken beluga whales from that population (e.g., through the collection and archiving of genetic samples). Further, the proposed stipulation would ask the judge to retain jurisdiction over this issue and consider remedial action if it appears that parts and products from other beluga populations are being sold in areas and in ways that undermine enforcement of the restrictions on the taking and sale of Cook Inlet beluga whales.

The three parties also developed the framework for the process and criteria that would be used to allocate strikes among Cook Inlet subsistence hunters. Recognizing that the Natives themselves have the greatest knowledge and understanding of subsistence use patterns and needs, the Service would defer to allocation recommendations that reflect the consensus of the hunting community. When consensus is not reached, priority would be given to Cook Inlet tribes and hunters that demonstrate a long-term pattern of use of and reliance on Cook Inlet beluga whales. Factors that would be considered include the duration, history, dependency, and cultural significance of such hunting and the availability of alternative subsistence resources. The parties also recognized that the Native Village of Tyonek had already established that it has a historical and continuing tradition of reliance on Cook Inlet beluga whales as a mainstay of the tribe's subsistence way of life. They also recognized that other tribes and hunters may be able to establish similar claims. As with other issues not fully resolved, the judge would retain jurisdiction to consider any petitions from the parties challenging the modification of these criteria.

The judge reviewed the proposed stipulations and draft final rule submitted by the Commission and the other two parties and found them to be "fair and reasonable." By order of 5 October 2001 the judge called on the other parties to the rulemaking to comment and raise any concerns they may have regarding the proposals. The only party to file a response was Trustees for Alaska, which raised two concerns. The group noted its understanding that the single whale taken in 2001 had been a lactating female, suggesting that a maternally dependent calf might also have been indirectly taken. Thus, they argued that the taking of an adult whale accompanied by a dependent calf should

count as two strikes. Trustees also believed that there was insufficient justification for moving the starting date of the hunting season to 1 July from the 15 July date originally proposed by the Service.

As of the end of 2001 final resolution of these matters had yet to be reached. Among the issues still being reviewed was how to avoid the taking of female whales. At the end of 2001, the judge was seeking the input of Native hunters as to how this might best be accomplished.

Although the rulemaking has yet to be completed, the taking of Cook Inlet beluga whales remains subject to the limitations established under Public Law 106-553. Nevertheless, it is important that final regulations be issued under the Marine Mammal Protection Act to establish agreed criteria for setting strike limits and for resolving other issues related to harvest management.

Hawaiian Monk Seal (*Monachus schauinslandi*)

The Hawaiian monk seal is the most endangered seal in U.S. waters and one of the most endangered seals in the world. It occurs only in the Hawaiian Archipelago, where it numbers about 1,300 to 1,400 animals. The vast majority of monk seals breed, pup, and live out their lives in the remote Northwestern Hawaiian Islands. This chain of small islands and atolls extends about 2,000 km (1,100 nmi) northwest of the main Hawaiian Islands (Fig. 7) and includes the species' six major breeding sites: French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Reef, the Midway Islands, and Kure Atoll. Almost all Hawaiian monk seal pups are born at these sites. Although it seems likely that the species' range originally included the main Hawaiian Islands, monk seals apparently were extirpated from those islands after the first Polynesians arrived about 2,000 years ago. A small monk seal colony now occurs on Niihau (the westernmost of the main Hawaiian Islands) and, in recent years, a few births have been reported annually at other islands, principally Kauai. This suggests that the species may be in the process of reoccupying the main Hawaiian Islands.

In the 1800s sealers, explorers, shipwrecked sailors, and other visitors to the Northwestern Hawaiian Islands killed monk seals for their skins, oil, and food. Although data on their numbers during that period are not available, this exploitation probably caused a significant decline. There is evidence suggesting that by the 1900s monk seals were extirpated from three of the Northwestern Hawaiian Islands (i.e., Laysan, the Midway Islands, and French Frigate Shoals).

By the mid-1950s when the first beach counts of seals were made, there must have been some degree of recovery because monk seals were found at all of the current breeding sites. By the late 1970s, however, beach counts had declined by nearly half. During that period, sharp declines occurred at all of the colonies in the western end of the chain while a rapid increase occurred at French Frigate Shoals in the eastern half of the chain. By the early 1980s the colony at French Frigate Shoals made up nearly half of the remaining population. Human activity associated with expansion of a naval air station at Midway Atoll and installation of a Loran station on Kure Atoll likely were significant factors causing the declines at the westernmost atolls.

Over the past 15 years there has been a reversal in trends at individual colonies. That is, the western colonies have increased slowly or remained stable while the colony at French Frigate Shoals has experienced a sharp decline (Fig. 8). As a result, the overall population has remained relatively stable since

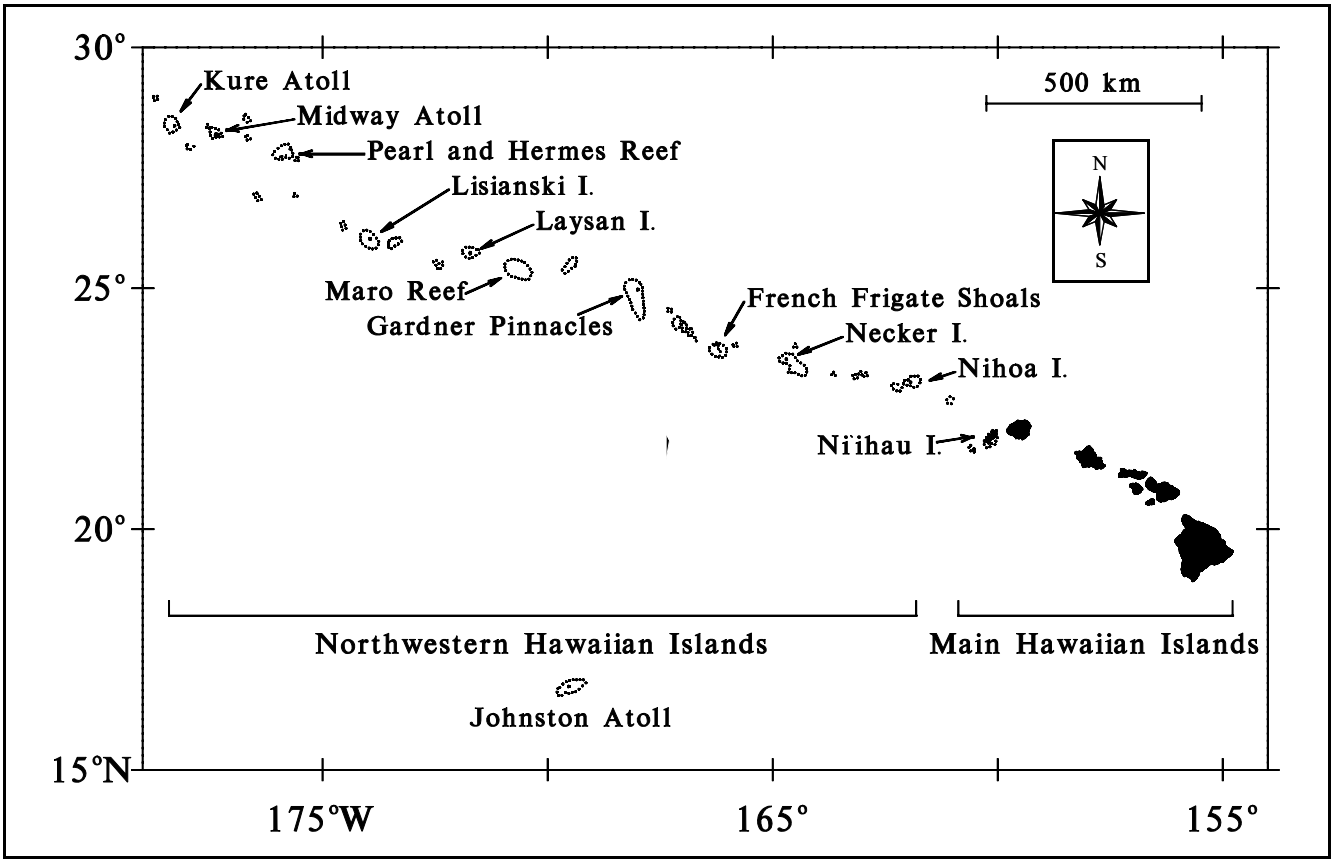

Figure 7. The Hawaiian Archipelago. The Northwestern Hawaiian Islands provide pupping beaches for all major breeding colonies of Hawaiian monk seals.

the mid-1990s. Increases at the westernmost colonies appear to be due in large part to improved efforts to prevent disturbance of seals hauled out on pupping beaches and the translocation of underweight pups that were taken from French Frigate Shoals for rehabilitation and released at Kure Atoll in the 1980s and early 1990s.

The cause of the decline at French Frigate Shoals is uncertain and may include a combination of factors. Since the decline began in the mid- to late 1980s, pups and juveniles at this site typically have been underweight or starving and have experienced very low survival rates. Also, adult females have tended to be smaller than those at other sites, suggesting that the availability of prey has been limited. Possible explanations for the low weight and poor survival rate include overfishing of monk seal prey by the commercial lobster fishery, declines in prey productivity due to regional climate shifts and associated changes in current patterns, prey depletion due to growth of the monk seal colony to a size exceeding its carrying capacity, entanglement of seals in derelict fishing gear, shark predation, and injuries sustained by pups, females, and juveniles from aggressive adult male seals.

The National Marine Fisheries Service has lead responsibility for the recovery of Hawaiian monk seals under the Endangered Species Act and the Marine Mammal Protection Act. However, other agencies also have important responsibilities. Among these are the Fish and Wildlife Service, which manages wildlife habitat and human activities within the lands and waters of the Hawaiian Islands National Wildlife Refuge and the Midway Atoll National Wildlife Refuge; the U.S. Coast Guard, which assists with enforcement and efforts to clean up marine pol-

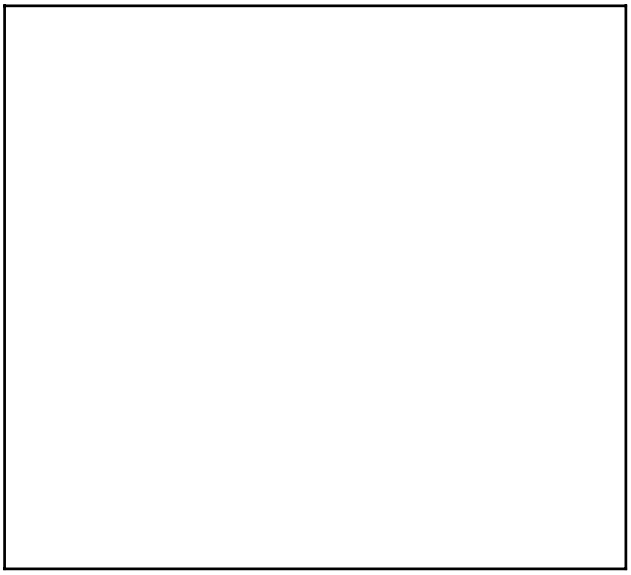

Figure 8. Mean beach counts of Hawaiian monk seals at major breeding colonies; 1983–2001 (source: National Marine Fisheries Service, unpublished data, data for 2001 are preliminary).

lution; the State of Hawaii, which owns Kure Atoll and also has jurisdiction over waters between the refuge boundary and 3 nmi (5.5 km) around all emergent lands in the Northwestern Hawaiian Islands (except Midway); the National Ocean Service, which is charged with conserving natural resources in the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve extending from state waters out to a perimeter about 50 nmi (92.5 km) from the Northwestern Hawaiian Islands; and the Western Pacific Regional Fishery Management Council, which is responsible for developing fishery management plans and proposing regulations to the National Marine Fisheries Service for commercial fisheries around the Northwestern Hawaiian Islands.

In addition, the Service has established a Hawaiian Monk Seal Recovery Team. Composed of scientists and agency resource managers, the team has met annually over the past decade to review program progress and plans and to provide advice on priority research and management needs to the Service. The Marine Mammal Commission has also periodically held reviews of the monk seal recovery program to help provide program guidance.

Developments during 2001 related to the conservation of Hawaiian monk seals are discussed below.

Population Trends at Major Monk Seal Colonies

Major monk seal colonies are visited annually during the summer breeding season by field crews to monitor pup production and to undertake other research and management activities. During these field visits, which now typically last from a week to several months at each site, repeated counts are made of the number of seals hauled out on atoll beaches. Abundance trends at each site are measured by the mean of those counts. As a general rule, beach counts represent about one-third of the total number of seals at a colony, with the other two-thirds at sea when the counts are made. Based on preliminary data through 2001 (see Fig. 8), mean beach counts at French Frigate Shoals have declined by nearly two-thirds since the late 1980s although the rate of decline has slowed since the mid-1990s. In contrast, counts at Pearl and Hermes Reef, Midway Atoll, and Kure Atoll have been increasing slowly but steadily, and counts at Laysan and Lisianski Islands have remained relatively stable.

Preliminary results of beach counts in 2001 suggested a marked decline at all major breeding colonies. Also in 2001, there was a marked decline in observed survival rates of one-year-old seals (i.e., the 2000 cohort) at all atolls except Pearl and Hermes Reef. The reports of the unusually high numbers of juvenile deaths prompted the National Marine Fisheries Service to declare an "unusual marine mammal mortality event" and to undertake an investigation under pro-visions of section 404 of the Marine Mammal Protection Act (see Chapter VI).

The mortality event designation was triggered by the discovery of four dead juvenile monk seals on Laysan Island over a nine-day period in early January 2001. A field team, including a veterinarian, was dispatched to examine dead seals on Laysan Island as well as at other atolls. During this and subsequent population monitoring work, one adult and 12 juvenile monk seal deaths were reported at several breeding colonies between early January and early July. Necropsy results revealed that the animals were emaciated, suggesting that an inability of weaned pups and seals between the ages of one and two to find food

was the most likely explanation for the deaths. As of the end of 2001 analyses of tissue samples had revealed no signs of infectious diseases, natural or anthropogenic toxins, parasitism, or injuries although further testing remained to be done.

Also during 2001 field crews at French Frigate Shoals continued to see evidence of high rates of shark predation on pups. Concern arose in 1999 when evidence suggested that more than 25 percent of the pups born that year at that site were killed by sharks. Because this predation continued to occur in 2000, contingency plans were developed to catch individual sharks found patrolling waters adjacent to pupping beaches and preying on pups. In 2001 eleven pups were believed to have been killed by sharks and six others were injured. A large majority of the shark-related deaths, disappearances, and injuries has occurred at one of the atoll's islands, Trig Island. In response, five sharks exhibiting predatory behavior were culled, and 18 weaned pups were moved from Trig Island and Round Island, where predatory sharks were also seen patrolling the beach, to other islands in the atoll. The 11 pup deaths in 2001 represented about 17 percent of the pups seen during the field season.

Interactions with Commercial Fisheries

Hawaiian monk seals feed on a variety of species, including small reef fishes, octopuses, and lobsters. The sharp decline in monk seal numbers at French Frigate Shoals began in the late 1980s as commercial lobster stocks in the Northwestern Hawaiian Islands declined. The commercial lobster fishery, which focused on banks east and west of French Frigate Shoals (i.e., Maro Reef, Gardner Pinnacles, and around Necker Island), also has a bycatch of octopuses, crabs, and other monk seal prey species. Management of the fishery was based on the assumption that lobster stocks would be sustained as long as the spawning stock biomass of lobsters did not fall below 20 percent of the estimated level that would have occurred in the absence of fishing. Thus, it was assumed that removal of 80 percent of the mature lobsters would have no significant effect on either lobster recruitment or prey availability for monk seals. Under this management system, lobster catch rates declined significantly, and the fishery was closed under an emergency rule in 1991 to prevent overfishing.

In the early 1990s the concurrent declines of lobster stocks and the French Frigate Shoals monk seal colony, the occurrence of lobsters and other species taken by the fishery in monk seal diets, and clear signs of limited prey availability for seals at French Frigate Shoals led the Commission to question the National Marine Fisheries Service's assumption that the lobster fishery was having no significant effect on monk seals. The Service, however, stated that there was no evidence that lobsters were an important part of the monk seal diet and, under management measures developed by the Western Pacific Regional Fishery Management Council, the Service reopened the fishery in 1992 even though there had been little change in lobster abundance. At the recommendation of the Commission, the Service also took steps to determine monk seal foraging patterns using satellite tags on adult male seals at French Frigate Shoals. These studies soon revealed that some monk seals at French Frigate Shoals traveled farther to feed than previously thought, including excursions to the neighboring banks that had been fished intensively for lobster.

Low survival rates of pups and juveniles at French Frigate Shoals continued and, over the past decade, the Commission has repeatedly recommended that the Service adopt a precautionary management approach by closing waters to commercial fishing around French Frigate Shoals until information is adequate to indicate that lobster fishing and its bycatch are not contributing to the sharp decline in monk seals at that site. In 1995 the Commission also recom-mended that the Service use a new research technique to identify monk seal prey preferences — the analysis of fatty acids from prey deposited in seal blubber. Although the Service agreed to pursue this line of research, no action was taken to adopt the Commission's management recommendations. Monk seal numbers at French Frigate Shoals and lobster stocks at banks in the eastern end of the chain continued to decline.

As a result of depletion of lobster stocks at the eastern end of the chain, the Western Pacific Regional Fishery Management Council proposed a new management system, which the Service adopted in 1998. The new system encouraged a shift in fishing effort to banks that had received comparatively little or no commercial lobster fishing effort, including French Frigate Shoals and banks in the western end of the chain supporting major monk seal colonies. The

Commission wrote to the Service and the Council several times in 1998 and 1999 opposing the plan and recommending that all banks supporting major monk seal colonies be closed to lobster fishing until better information was available on its effects on monk seals. However, these recommendations were not adopted. The Commission also wrote to the Hawaii Department of Land and Natural Resources urging that the state close waters within its jurisdiction in the Northwestern Hawaiian Islands to lobster fishing, but no action was taken at that time.

Concerned about the possible effects of the lobster fishery on monk seals, the Hawaiian Monk Seal Recovery Team also wrote to the Service following its 7 December 1999 meeting, recommending that the fishery be closed for at least three years to allow the region's depleted lobster stocks time to recover. Also, on 26 January 2000 several environmental groups represented by Earthjustice, a public interest law firm, sued the Service for failing to properly manage Northwestern Hawaiian Islands lobster and bottomfish fisheries to avoid harming monk seals.

In April 2000 the Service proposed and in June 2000 adopted a rule to close the Northwestern Hawaiian Island lobster fishery for the 2000 fishing season. At that time, the fishery involved about six vessels that each fished for a few weeks in July and August. In closing the fishery for 2000, the Service noted concern about the depleted status of lobster stocks but made no reference to possible effects of the fishery on monk seals. It also announced plans to conduct an experimental lobster fishery in 2000 to assess the status of the lobster stock by sampling previously tagged lobsters at several banks. Catch levels in this program were to be set at a much reduced level from earlier commercial harvests. As noted in its previous annual report, the Commission commented on a research protocol for the experimental fishery. Among other things, it recommended that lobsters caught in this fishery be returned to the reef alive, rather than kept for later sale, to help rebuild the lobster stock and avoid possible effects on monk seal prey availability. Plans for the experimental fishery, however, were subsequently canceled.

On 22 February 2001 the Service announced that the lobster fishery would remain closed for the 2001 fishing season. At the end of 2001 it was the Commission's understanding that the Service planned to assess the status of lobster stocks in the Northwestern Hawaiian Islands in 2002 through a tagging and sampling program in which all caught lobsters would be released alive.

As a related matter, in December 2001 the Hawaii Department of Land and Natural Resources proposed rules to designate a fishery management area in all state waters around the Northwestern Hawaiian Islands and the region's national wildlife refuges. Under the proposal, a state permit would be required to access and remove living resources around the Northwestern Hawaiian Islands to ensure the sustain-able use of area resources for present and future generations. At the end of 2001 the Commission was developing a comment letter expressing support for the state's proposed rule and recommending that manage-ment goals for the area explicitly state an intent to apply a precautionary management approach and to consult with managers of the adjacent national wildlife refuges and the coral reef ecosystem reserve to ensure that decisions affecting the regional eco-system are implemented in a compatible, consistent manner.

Although the Service's plans for commercial lobster fishing in 2002 and beyond were uncertain as of the end of 2001, the future of this and other fisheries in the Northwestern Hawaiian Islands was the subject of actions taken to establish the coral reef ecosystem reserve (see below).

Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve

On 4 December 2000 President Clinton signed into law Executive Order 13178 establishing the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve. Its purpose is to "ensure the comprehensive, strong, and lasting protection of the coral reef ecosystem and related marine resources and species of the Northwestern Hawaiian Islands." The reserve includes all submerged lands and waters around the Northwestern Hawaiian Islands from the seaward limit of state jurisdiction (3 nmi around all emergent lands) out to a distance of about 50 nmi from the center of the chain's islands and banks. At Midway Atoll, where the Midway Atoll National Wildlife Refuge boundary extends to 3 nmi, the reserve boundary is coterminous with the refuge boundary. These boundaries make the reserve the world's second largest marine protected area — second only to Australia's Great Barrier Reef

Marine Park. However, much of the chain's coral reef habitat lies in state waters between the reserve boundary and the boundaries of the Hawaiian Islands National Wildlife Refuge.

The executive order directed the National Ocean Service to manage the reserve and to begin the process of designating it as a national marine sanctuary. The order also directed that a Coral Reef Ecosystem Reserve Advisory Council be established to provide advice on these matters. The council includes experts in certain scientific disciplines and representatives of stakeholder groups as voting members; officials of certain concerned agencies, including the Marine Mammal Commission, serve as nonvoting members.

The executive order also directed that restrictions be imposed on commercial and recreational fishing; exploration and extraction of oil, gas, or other minerals; anchoring on coral; discharging or depositing material; and removing, taking, harvesting, or damaging living or nonliving resources. With regard to fishing, it called for a cap on the number of permits and harvest levels for existing fisheries and a ban on permits for any new types of fishing not authorized by permit in the year before the reserve was established. As a lobster catch limit was in place through December 1999 but not in 2000 when the fishery was closed, it is unclear whether or at what level lobster harvests might resume under terms of the order. The order also called for establishing 15 "reserve preservation areas" within which all fishing (except bottomfish fishing in certain portions of those areas) would be prohibited. The preservation areas were to remain in effect pending an opportunity for public comment and action to make some or all of them permanent. They included waters from the state jurisdictional limit to the 100-fathom isobath around all banks with emergent land (except Midway Atoll) as well as waters within 12 nmi (22.2 km) of certain submerged banks.

A request for comments on the reserve preservation areas was published in the *Federal Register* on 7 December 2000. The Commission responded by letter of 8 January 2001 to the National Oceanic and Atmospheric Administration. In its comments, the Commission expressed support for proposed reserve preservation areas and recommended that they be adopted as permanent. It also suggested some minor changes in the boundaries allowing bottomfish fishing. To the extent that lobster fishing might continue, the Commission noted its concern about its possible effects on Hawaiian monk seals and recommended that the fishery remain closed. It also encouraged close coordination with the State of Hawaii and the Fish and Wildlife Service to develop a consistent, comprehensive management program for the entire Northwestern Hawaiian Islands ecosystem.

After consideration of submitted comments, President Clinton signed Executive Order 13196 on 18 January 2001 making all of the proposed reserve preservation areas permanent. Among other changes, the final provisions increased access to preservation areas for commercial bottomfish fishing and recreational fishing.

Following the inauguration of President Bush and the change of Administration, the Western Pacific Regional Fishery Management Council wrote to the Secretary of Commerce on 22 February 2001 raising concerns about the boundaries of the new reserve and questioning the legality of certain provisions in the executive orders as they related to the management of fisheries. In response, the Secretary initiated a review of the executive orders in March. As of the end of 2001 the review had not yet been completed.

To guide management decisions pending a decision on designating the reserve as a national marine sanctuary, the National Ocean Service drafted a reserve operations plan. At the end of 2001 the draft was undergoing internal review and was expected to be circulated for public review and comment early in 2002. Other initial efforts to administer the new reserve included partial funding to continue work to remove derelict fishing gear and other marine debris from reefs in the Northwestern Hawaiian Islands (see below), construction of a research vessel for use in the reserve, development of a public interpretative display at the reserve's offices at Hilo, and convening four meetings of its advisory council. A representative of the Commission participated in all of those meetings. Among other things, the council provided advice on key management activities, particularly the drafting of the reserve operations plan.

As of the end of 2001 the National Ocean Service planned to begin a scoping process in the spring of 2002 to solicit public comments on designating the reserve as a national marine sanctuary. This is the first step in developing an environmental impact statement on options related to sanctuary designation.

Foraging Ecology Workshop

As noted above, limited prey availability appears to have been a factor in the decline of monk seal abundance at French Frigate Shoals. In recent years, there also have been signs of prey limitations at Laysan Island even though lobster fishing within 20 nmi (37 km) of the island had been prohibited since 1986. Because of these and other concerns, the Service has supported studies to investigate monk seal foraging patterns. Those include the use of satellite tags and depth-of-dive recorders to determine where and at what depths monk seals feed, "crittercams" (a battery-powered video-camera that can be mounted on an animal) to document underwater foraging behavior, scat and spew analyses to identify the types and frequency of prey items consumed, and studies of fatty acids from prey in seal blubber to assess the relative composition of different dietary components. Although all of these studies address important information needs, it has been unclear whether the locations, sample sizes, age and sex composition of animals studied, and other factors have been coordinated in a way that would maximize their collective value.

At the recommendation of the Hawaiian Monk Seal Recovery Team, the Service therefore convened a foraging ecology workshop on 14–15 September 2001 in Honolulu. The purpose of the workshop was to obtain recommendations from an independent panel of experts for use in formulating a comprehensive research plan on monk seal foraging ecology. Specific objectives included evaluating past and ongoing studies, setting priorities for future research needs, and providing a conceptual framework for synthesizing research elements into a multidisciplinary research plan. A member of the Commission's Committee of Scientific Advisors participated on the panel. At the end of 2001 a report of the workshop was being completed and the results were expected to be available early in 2002.

Proposal for a Fishery Support Base at Midway Atoll

Midway Atoll, located near the western end of the Northwestern Hawaiian Islands, includes two of the chain's largest islands: Sand Island (about 445 hectares or 1,100 acres) and Eastern Island (about 135 hectares or 334 acres). The islands have been used since the early 1900s for various purposes, including a trans-pacific cable station, a stop for early transpacific clipper flights, and a Naval air station. The site also was attacked by Japanese planes on 3 June 1942 during the course of the Battle of Midway. As part of its base closing process, the Navy transferred ownership of the atoll to the Fish and Wildlife Service in 1996 for use as the Midway Atoll National Wildlife Refuge.

The airfield, harbor, and other facilities on the island remain strategically important for emergency aircraft landings, medical evacuations of seafarers, a refueling station for Coast Guard enforcement planes, and other purposes. To maintain and operate key components of the islands' infrastructure, including the airfield and harbor, the Service developed a cooperative agreement with a private company to manage the facilities. To generate funding to pay for these expenses, the arrangement includes authority for operating an ecotourism-based public use program that affords paying visitors an opportunity to view the atoll's historic and natural resources in a manner compatible with wildlife protection needs.

On 12 January 2001 the Western Pacific Regional Fishery Management Council forwarded a proposal to the Fish and Wildlife Service requesting permission to use Midway Atoll as a fishery support station. The proposal, developed by the Western Fishboat Owners Association, sought to use the atoll's facilities as a refueling station for bottomfish, lobster, and albacore trolling vessels. It also proposed establishing a catch transshipment station for a 20- to 70-vessel albacore trolling fleet that operates north of Midway Atoll between May and October. Those vessels would transfer their catch to refrigerated carrier vessels up to 250 ft (76.2 m) long for transport to a cannery in Samoa. Other catch might be shipped to the main Hawaiian Islands by planes already servicing Midway. Such a station could cut a few hundred miles of transit distances for fishing vessels that now offload their catch in the Aleutian Islands or the main Hawaiian Islands and provide income to help maintain the islands' facilities.

Statutes for administering national wildlife refuges require that no activities be permitted unless they are compatible with the purposes of the refuge and the mission of the refuge system. Those include maintaining biological diversity; conserving fish and wildlife and their habitats; providing opportunities for research, education and compatible wildlife-dependent

activities; and maintaining the historic significance of the Midway Islands. Consistent with these purposes, vessel access to the atoll has been strictly limited due to the variety of risks vessels may pose, including the transport of alien species to the atoll, fuel spills, introduction of debris, discharges of sewage and bilge water, accidental groundings, and anchor damage to corals. In addition, the condition of the harbor's piers and bulkheads is poor and deteriorating. Accordingly, vessel access has been restricted largely to small recreational boats, supply vessels, and government ships. The fishery management council's proposal would significantly increase the number of vessels using the atoll.

As of the end of 2001 the proposal had been denied at the regional level of the Fish and Wildlife Service, but was being reviewed by the Secretary of the Interior in response to an appeal by the Western Pacific Regional Fishery Management Council.

Figure 9. Tern Island, French Frigate Shoals.

Tern Island Shoreline Protection

Tern Island is one of several small islets at French Frigate Shoals (Fig. 9). It is an important haul-out site for Hawaiian monk seals, as well as a nesting beach for sea turtles and a rookery for many species of seabirds. Tern Island is largely an artificial island built by the Navy during World War II as a landing strip. Originally a shifting sand island about 4.5 hectares (11 acres) in size, it was expanded to about 13.5 hectares (34 acres) to accommodate a landing strip and buildings. This was done by installing a sheetmetal bulkhead around the island and in adjacent shallow waters and backfilling with coral rubble dredged from the surrounding lagoon. In the process of backfilling, various scrap materials as well as fuel storage tanks were buried on the island. Between 1952 and 1979, the Coast Guard took over the island for use as a Loran station.

In 1979 the Fish and Wildlife Service resumed possession of the island and began using its facilities as a permanent field station for the Hawaiian Islands National Wildlife Refuge. (The Service had previously been assigned ownership of the island pur-suant to a 1909 executive order by President Theodore Roosevelt establishing the Hawaiian Islands Reservation.) Since 1979, however, corrosion has caused the seawall to collapse in several areas, forming erosion pockets behind the bulkhead. The eroded areas have created entrapment hazards for seals and turtles and have exposed dump sites containing discarded electrical equipment left during the Coast Guard occupation. Those sites include high concentrations of contaminants, including polychlorinated hydrocarbons (PCBs).

If left to deteriorate further, new openings in the bulkhead will result in loss of the airstrip and possibly the entire island, forcing the Service to abandon the field station. That would eliminate what has become an important terrestrial site for wildlife, leave entrapment hazards for seals and turtles with no on-site rescue personnel, expose unknown types and amounts of hazardous debris buried on the island, and distribute chemical contaminants from untreated dump sites into the surrounding lagoon.

To address this situation, the Service contracted with the U.S. Army Corps of Engineers in 1993 to design a new rock revetment to replace the deteriorating bulkhead. The project was estimated to cost about $11 million. Over the past decade, the Service has sought congressional funding to begin construction. In the interim, the Service, the Coast Guard, and the Corps have been responding to breaches in the seawall with emergency repairs and to discovery of new dump sites with a series of contaminant clean-up efforts. Due to changes in the condition of the seawall and erosion patterns, changing construction costs, and other factors since the initial 1993 design was developed, the planned project is now estimated to cost $16 million. At the end of 2000, $11.9 million had been appropriated for the project.

During 2001 the Service proceeded with steps to initiate the project. In June it circulated a draft environmental assessment for public review and comment. The preferred alternative called for installing 3,854 ft (1,175 m) of rock revetment and 820 ft (259 m) of steel sheet pile bulkhead along one side and both ends of the island. To protect wildlife during construction, the Service identified a number of possible mitigation measures, including phasing construction work to avoid the sensitive seal breeding season, confining construction work to the smallest possible area at any given time, suspending work when seals or turtles approach work sites, closely monitoring potential impacts, and restricting the movement of workers and equipment around the island.

On 23 July 2001 the Commission wrote to the Service commenting on the draft assessment. In the letter, the Commission expressed its belief that replacing the seawall was essential to (1) prevent the spread of hazardous debris and chemicals now buried on the island, (2) prevent the formation of new entrapment hazards, (3) retain important terrestrial wildlife habitat, and (4) maintain logistical support for research and management work at French Frigate Shoals. The Commission therefore concluded that long-term benefits of the project far outweighed potential short-term impacts and recommended that construction proceed at the earliest possible date. It also recommended that the identified mitigation measures be included as part of the proposed project and that the Service consult with the Coast Guard and the Navy to identify contingency measures for cleaning up any contaminated dump sites that might be discovered during construction.

During 2001 the Coast Guard and the Service undertook further efforts to clean up contaminated dump sites exposed by erosion. The Coast Guard contracted for the removal of 785 cubic yards of PCB-contaminated soil, but, as the affected area was larger than had been anticipated, it ended up removing 1,700 cubic yards. Additional contamination was identified during the clean-up operation and will need to be removed before initiation of the seawall project. With the project $800,000 over budget, the Coast Guard was unable to obtain the necessary funds to complete the work in 2002. As of the end of 2001 the Coast Guard, the Service, and the Corps were considering steps to integrate the removal of known contamination sites into the work schedule for replacing the seawall, and the Coast Guard was reconsidering the availability of clean-up funds as part of its FY 2003 budget. During 2001 the Service also submitted applications for required project permits and initiated formal consultations under section 7 of the Endangered Species Act with the National Marine Fisheries Service and the responsible branch of the Fish and Wildlife Service.

Additional construction funds were requested for FY 2002; however, after the terrorist attacks on 11 September additional funding for the project was withdrawn from the FY 2002 budget. As of the end of 2001 the Service was planning to request additional construction funds for the project as part of its FY 2003 budget, complete its section 7 consultation and permit application processes, and, if possible, solicit bids for construction and begin work in the fall of 2002. It was uncertain, however, whether the Coast Guard would be able to secure funding to complete clean-up work at the contaminated dump site in time to avoid delaying the seawall project.

Marine Debris

The reefs and atolls of the Northwestern Hawaiian Islands act as traps that catch floating marine debris circulating in the North Pacific Ocean. As a result, large amounts of debris, including lost and discarded net material, accumulate on its reefs and beaches. Some seals, particularly young ones, may be attracted to debris because of curiosity or other behaviors. Resulting encounters sometimes lead to entanglement. Since 1982 field crews monitoring monk seal haul-out beaches have documented more than 200 entangled

Figure 10. Diver removing derelict trawl net from reefs in the Northrwestern Hawaiian Islands.

monk seals, with a record one-year total of 25 incidents in 1999. In 2001, eight seals were observed entangled.

Although some seals are able to free themselves from minor entanglements, those that cannot do so quickly are likely to die of wounds and infections caused by chafing and cutting lines, exhaustion and drowning due to the drag or weight of attached debris, or an inability to avoid sharks or catch prey. In many instances, field crews have had to catch and remove material — usually ropes, netting, or packing bands — from hauled-out seals. However, those efforts do not address the unknown number of entangled seals that are caught on reefs or otherwise fail to make it back to shore or entangled seals that haul out when field crews are not present.

To help reduce such entanglement, field crews have routinely removed hazardous nets and ropes from seal haul-out beaches for more than 15 years. Recently the National Marine Fisheries Service and other concerned agencies and groups also have sent teams of divers to the Northwestern Hawaiian Islands to recover derelict nets from reefs and lagoons around major monk seal breeding beaches (Fig. 10). The latter effort began after a Service survey of nearshore waters in 1997 found densities of 94 and 64 net fragments per square kilometer on reefs at French Frigate Shoals and Pearl and Hermes Reef, respectively. Most of the debris appears to be derelict trawl netting from unknown locations, possibly including Southeast Asia and/or Alaska. In addition to ensnaring seals, this debris entangles sea turtles, seabirds, crustaceans, and fish and, when caught on reef outcrops, can abrade and damage substantial areas of coral.

Alarmed by the amounts of debris present, in 1998 the Service began coordinating cooperative underwater clean-ups in addition to the beach clean-ups. Funding, ship time, personnel, equipment, and in-kind services for the work have been generously contributed by many agencies and groups in addition to the Service. These include the Center for Marine Conservation (now The Ocean Conservancy), the City and County of Honolulu, the Coast Guard, the Fish and Wildlife Service, the Hawai'i Wildlife Fund, the Hawaii Sea Grant Program, the National Fish and Wildlife Foundation, the Navy, the University of Alaska Marine Advisory Program, and numerous other state and private agencies and groups. Initial clean-up work began at French Frigate Shoals in 1998 six state and private agencies and groups. Initial clean-up work began at French Frigate Shoals in 1998 when six tons (5,440 kg) of debris was

removed and shipped to Honolulu for disposal. In 1999, 25 tons (22,675 kg) was recovered from waters and beaches around Lisianski Island and Pearl and Hermes Reef, and in 2000 an additional 25 tons (22,432 kg) was removed from those atolls plus Midway and Kure Atolls.

In 2001, $3 million was made available for clean-up work, with most of that money coming from an appropriation to the National Oceanic and Atmospheric Administration to address coral reef management issues. With those funds, three vessels were chartered for a 90-day period in the fall. In addition, a 30-day cruise was undertaken aboard a National Oceanic and Atmospheric Administration research vessel to help remove debris and to conduct studies of in-water debris accumulation rates at Pearl and Hermes Reef, Kure Atoll, and Lisianski Island. As a result of these efforts, reefs and beaches at all of the major monk seal colonies received some clean-up attention during the year, and a total of 24 tons (21,365 kg) of debris was removed. As part of this work, studies are being done to assess accumulation rates and to identify sources of the debris. With more than 100 tons (90,700 kg) of derelict netting and fishing gear thought to remain, the Service hopes to increase this clean-up effort in 2002.

Occurrence in the Main Hawaiian Islands

As noted above, Hawaiian monk seals are becoming more common in the main Hawaiian Islands. As a result, they have been hauling out on public beaches with increasing frequency to rest, molt, and give birth to their pups (Fig. 11). Molting seals and mother-pup pairs may remain on a beach for several days to several weeks. On public beaches, this can lead to interactions between monk seals and beachgoers that are difficult to manage. In some cases, people have deliberately molested hauled-out seals, and seals have threatened and, on occasion, bitten people.

The Pacific Island Area Office of the National Marine Fisheries Service is the federal agency responsible for managing such interactions. When seals are reported on beaches, the agency works with state and local agencies to cordon off sections of beach around the seals. During the summer of 2001 the same monk seal hauled out and gave birth to a pup for the second year in a row at a popular swimming beach in Po'ipu, Kauai. In response, the beach, one of the most popular on Kauai, was closed at the request of the Service to protect the seals. This and similar actions at other beaches around Hawaii have adversely affected tourism and have strained relationships between the Service and state and local agencies. In addition, seals need to be monitored closely to ensure that people do not approach or molest them. The Service, however, does not have staff to monitor seals constantly, and therefore it has relied on volunteers to watch seals and educate the public about their endangered status and requirements for their protection.

To date, a long-term strategy has not been developed for responding to haul-out events on public and private beaches in the main Hawaiian Islands. In addition, lines of authority and responsibility among the Service, state and local officials, volunteer groups, and other relevant parties (e.g., lifeguards, local landowners, hotel operators) have not been clearly delineated. The Hawaii Department of Land and Natural Resources, which often receives the first reports of hauled-out seals and marine mammal strandings, has expressed interest in assuming a greater role in coordinating responses to such events; however, this authority now rests with the Service, and the Department has limited funding for this purpose.

Because of the increasing presence of monk seals in the main Hawaiian Islands, the Hawaiian Monk Seal Recovery Team recommended in March 2001 that the Service convene a workshop to develop recommendations on how to manage such situations. In its 13 July 2001 reply to the team, the Service agreed that such a meeting should be held, but it was unable to schedule one in 2001 because of limited funds. It noted, however, that it would keep the team advised of progress to plan such a meeting.

As a related matter, the team also recommended that the Service seek funding under section 6 of the Endangered Species Act for the State of Hawaii to develop a cooperative program on managing monk seals in the main Hawaiian Islands. Section 6 of the Act authorizes the Secretary of Commerce to enter into cooperative agreements with state agencies for the purpose of conserving endangered species. Although the section also authorizes requests for federal funding to help develop and maintain cooperative state programs, such requests have never been made by the National Marine Fisheries Service for endangered marine mammals under the Department of Commerce's jurisdiction.

The Commission also had identified cooperative state programs as an important opportunity to strengthen several marine mammal recovery programs, including the Hawaiian monk seal program. On 19 June 2001, it wrote to the Service noting that state agencies could provide knowledge, personnel, expertise, resources, and legal authorities to help carry out urgent marine mammal recovery tasks. To encourage greater state involvement, the Commission recommended that the Service (1) examine the potential role of state agencies to help carry out recovery programs for Hawaiian monk seals, as well as certain other endangered marine mammals; (2) where appropriate, encourage state agencies to develop cooperative agreements under section 6 to help address marine mammal recovery needs; and (3) annually determine and request appropriate funding levels under section 6 to help support cooperative state programs.

On 16 July 2001 the acting Administrator for the National Oceanic and Atmospheric Administration responded, noting that the National Marine Fisheries Service had cooperative agreements with six states and was pursuing agreements with several other states, and that it intended to request specific funding for section 6 agreements in FY 2003. On 13 July 2001 in its response to the recovery team's recommendations, the Service also advised the recovery team that, although developing a cooperative agreement with the Hawaii Department of Land and Natural Resources was contingent on receiving and approving a request from the state for such an agreement, it would consider budgetary requirements and develop a proposed budget for this purpose during the next funding cycle.

Program Oversight and Guidance

For more than a decade, Hawaiian monk seal research and management efforts have been reviewed annually by a Hawaiian monk seal recovery team composed mainly of scientific experts and resource managers. Team meetings were held annually in early December to consider results of the prior year's field season and to provide recommendations before planning for the next field season, which typically begins in March or April.

As noted in the previous annual report, in November 2000 the Service unexpectedly rescheduled the team's December 2000 meeting for late March 2001 due to demands on program personnel and resources. The team urged the Service not to reschedule the meeting because doing so would prevent timely advice for the coming field season, and by letter of 14 November 2000, the Commission also recom-mended that the meeting not be deferred. The Service, however, did not move the meeting back to the original December date, and it was held on 19–21 March 2001. At the beginning of the meeting, representatives of the Service advised the team that it was reviewing the need to update the Hawaiian Monk Seal Recovery Plan, which had not been revised since it was adopted in 1983. They also noted that consideration was being given to appointing a new recovery team in view of evolving management issues and plans to hire a permanent recovery plan coordinator. The meeting then proceeded to review the status of research and management activities.

After its meeting, the recovery team wrote to the Service on 26 March 2001 providing recommendations. The team suggested that its scientific focus and current membership be retained, subject to a rotational replacement by new members. The team also expressed its full support for hiring a recovery plan coordinator, Figure

11. Hawaiian monk seal on popular swimming beach on the Island of Kauai (photograph courtesy of David Nichols, Honolulu Laboratory, National Marine Fisheries Service)

offered to draft a revised recovery plan, and suggested that evolving management needs be addressed by a separate implementation team with appropriate agency officials and stakeholders appointed after approval of the revised recovery plan. The team also urged that future recovery team meetings be held in December for reasons noted above. Among other things, the team also recommended that the Service:

- convene a workshop to formulate a comprehensive research plan on monk seal foraging ecology;
- take certain steps to complete assessments of monk seal prey preferences using fatty acid signatures as soon as possible;
- assess the potential for using "crittercams" to study the foraging behavior of young monk seals;
- determine the optimal duration of field camps to identify all parturient females and pups;
- continue work to remove debris and disentangle monk seals on beaches and reefs in the Northwestern Hawaiian Islands;
- develop a contingency plan for removing sharks found preying on monk seal pups at French Frigate Shoals;
- ensure that field staff are authorized to remove aggressive male seals they find attacking young seals and adult females;
- station a Service staff member at Midway Atoll year-round to minimize, document, and assess ecotourism impacts on seals;
- develop a cooperative interagency program to monitor contaminant clean-up work on French Frigate Shoals and Midway Atoll;
- take such actions as are necessary to prevent development of a fishery support base at Midway Atoll;
- transfer responsibility for removing debris from reef areas from the Service to the new Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve;
- convene a workshop to identify measures for protecting seals that haul out on public beaches in the main Hawaiian Islands and seek cooperative funding under section 6 of the Endangered Species Act to help support related state activities; and
- take such steps as possible to support actions to replace the Tern Island seawall.

A copy of the team's letter was provided to the Commission and, on 13 April 2001, the Commission wrote to the Service expressing support for all the recommendations put forth by the team. The Commission also endorsed the team's recommendation that the recovery team maintain its scientific focus and current membership, that the recovery plan be updated, and that a separate implementation team be formed after a new recovery plan was adopted.

On 13 July 2001 the Service responded to the team's recommendations and provided a copy of its response to the Commission. The Service noted that it was still reviewing the possibility of changing the recovery team's composition and role. With regard to its specific recommendations, the Service concurred with most of the team's recommendations and identified steps that were being taken or had been taken to address them.

In part, it noted that it had scheduled a foraging ecology workshop for September 2001, it was proceeding with fatty acid signature analyses to identify monk seal prey, and it would continue to work with other agencies to develop contaminant clean-up and monitoring plans. With respect to the proposed fishery support station at Midway, the Service noted that it expected to consult with the Fish and Wildlife Service and would ensure that potential effects of the proposal would not adversely affect monk seals. It also advised the team that it would discuss transferring responsibility for debris removal from reefs with managers of the new coral reef ecosystem reserve. It also noted that a workshop on management needs for monk seals in the main Hawaiian Islands could not be scheduled until funding for the meeting was secured. With respect to developing a cooperative agreement to help support state involvement in managing seals in the main Hawaiian Islands, the Service noted that it would consider budget needs during the next funding cycle.

Following its reply, the Service decided to reconstitute the recovery team and assign the new team responsibility for drafting a revised recovery plan. In mid-September the Service advised existing team members of its decision and in October it invited new members to join the team. The new team, which includes two members of the previous team, has fewer scientific experts and more representatives from involved agencies and stakeholder groups. Terms of reference for the new team charge it with advising the

Service on issues concerning the conservation and recovery of Hawaiian monk seals and, in particular, with developing and overseeing implementation of a revised Hawaiian Monk Seal Recovery Plan. The team also is charged with evaluating monk seal research and management programs, assessing the efficacy of specific recovery efforts, evaluating the species' status and listing classification when appropriate, and recommending emergency actions to enhance recovery as needed. At the end of 2001 the first team meeting was scheduled for early March 2002.

In light of developments and uncertainties affecting monk seal recovery efforts, the Marine Mammal Commission began making plans with the Service to convene a review of the Hawaiian monk seal recovery program during spring 2002.

Monk Seal Litigation

As noted above, on 26 January 2000 several environmental groups filed suit against the National Marine Fisheries Service claiming that the agency had violated the Endangered Species Act, the Administrative Procedure Act, and the National Environmental Policy Act in authorizing lobster and bottomfish fisheries in the Northwestern Hawaiian Islands (*Greenpeace Foundation* v. *Mineta*). The plaintiffs claimed, among other things, that (1) the fisheries were depleting monk seal food supplies, thus jeopardizing the continued existence of the species, (2) operation of the fisheries resulted in the unauthorized taking of monk seals in violation of section 9 of the Endangered Species Act, and (3) the environmental impact statement and environmental assessments prepared by the Service failed adequately to assess the impacts of those fisheries on monk seals. The plaintiffs sought an injunction to close those fisheries until the Service came into compliance with the applicable statutes and regulations. The Service decided to close the lobster fishery while the case was under consideration because of concerns about the collapse of Hawaiian lobster stocks.

In an order issued on 15 November 2000 the court ruled in favor of the plaintiffs that the Service had not complied with section 7(a)(2) of the Endangered Species Act. It found that the Service had failed to ensure that implementation of the lobster fishery management plan would not jeopardize monk seals or result in adverse modification of the species critical habitat. As to section 9 claims, the court found that information in the record was insufficient to establish "as a matter of law" that lobster is a critical element in the diet of monk seals. Because a material fact existed with respect to this issue, the court declined to rule on it pending additional proceedings. In contrast, the court found sufficient evidence in the record that monk seals have been killed, hooked, and poisoned in connection with the bottomfish fishery and that such takings constitute a violation of the Endangered Species Act. Nevertheless, the court determined that it needed additional information before deciding whether to enjoin the fishery on that basis. The court did, however, grant the plaintiffs' motion for an injunction with respect to the lobster fishery until a new biological opinion and an adequate environmental impact statement were completed.

The evidentiary hearing to examine the impact of the bottomfish fishery on monk seals was convened by the court on 13 March 2001. Six witnesses testified, five of whom were either active in the fishery or had been participants in the past. The witnesses provided testimony on their experiences with bottomfishing, their fishing techniques, and their interactions with Hawaiian monk seals.

On 30 March 2001 the court denied the plaintiffs' motion for an injunction against implementation of the bottomfish fishery management plan. The court determined that allowing the fishery to continue while the new biological opinion and environmental impact statement were being prepared would not present a reasonable likelihood of injury or irreparable harm to monk seals in the interim. The court also found that the plaintiffs' claim alleging violations of section 7 of the Endangered Species Act with respect to the bottomfish fishery was moot, inasmuch as the Service had voluntarily reinitiated formal consultation. Moreover, the court declined to set aside the 1986 and 1991 biological opinions on the impacts of bottomfish fishing on monk seals as being arbitrary or capricious because such action was unwarranted based on the evidence before the court.

Steller Sea Lion (*Eumetopias jubatus*)

The Steller sea lion is the only member of the genus *Eumetopias* and is the largest member of the family Otariidae, which includes sea lions and fur seals. Its distribution extends along the rim of the North Pacific from the Channel Islands in southern California to Hokkaido, Japan, and north into the Bering Sea and Sea of Okhotsk. Its center of abun-dance has been in the Aleutian Islands and Gulf of Alaska (Fig. 12), where historically nearly three-fourths of all Steller sea lions in U.S. territory were found. Steller sea lions haul out on land to mate, bear their young, nurse, avoid predators, and rest. The location of rookeries (i.e., sites where reproductive activities occur) is probably based on proximity to food sources, protection from both terrestrial and marine predators, topography, surf conditions, and other factors. Steller sea lions are generally considered non-migratory although some individuals, particularly juveniles and adult males, may disperse widely outside the summer breeding season. Most adult sea lions return to the site of their birth for reproduction. The various rookeries are therefore considered a "meta-population" (i.e., a population of populations) with limited exchange between sites.

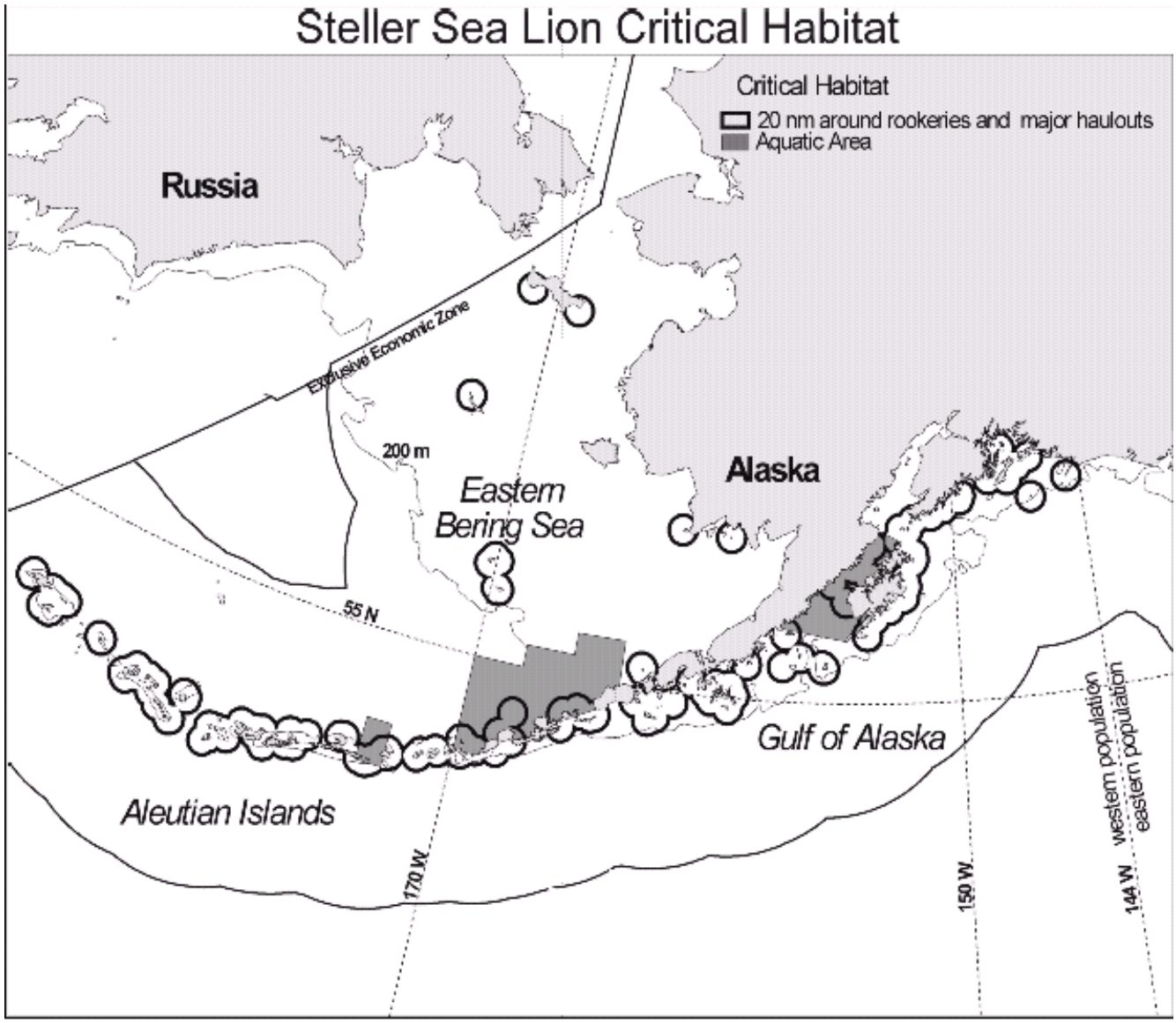

Figure 12. Designated critical habitat for the western population of Steller sea lions.

Table 4. Counts of adult and juvenile (nonpup) Steller sea lions at U.S. rookery and haul-out trend sites by region[1],1975–2000

Year	Gulf of Alaska			Aleutian Islands			Southeast Alaska
	Eastern	Central	Western	Eastern	Central	Western	
1975	–	–	–	19,769	–	–	–
1976	7,053	24,678	8,311	19,743	–	–	–
1977	–	–	–	19,195	–	–	–
1979	–	–	–	–	36,632	14,011	6,376
1982	–	–	–	–	–	–	6,898
1985	–	19,002	6,275	7,505	23,042	–	–
1989	7,241	8,552	3,800	3,032	7,572	–	8,471
1990	5,444	7,050	3,915	3,801	7,988	2,327	7,629
1991	4,596	6,273	3,734	4,231	7,499	3,085	7,715
1992	3,738	5,721	3,720	4,839	6,399	2,869	7,558
1994	3,369	4,520	3,982	4,421	5,790	2,037	8,826
1996	2,133	3,915	3,741	4,716	5,528	2,190	8,231
1997	–	3,352	3,633	–	–	–	–
1998	–	3,346	3,361	3,847	5,761	1,913	8,693
1999	1,952	–	–	–	–	–	–
2000	1,894	3,117	2,842	3,842	5,427	1,071	–

[1] For the Gulf of Alaska, the eastern sector includes rookeries from Seal Rocks in Prince William Sound to Outer Island; the central sector extends from Sugarloaf and Marmot Islands to Chowiet Island; and the western sector extends from Atkins Island to Clubbing Rocks. For the Aleutian Islands, the eastern sector includes rookeries from Sea Lion Rock (near Amak Island) to Adugak Island; the central sector extends from Yunaska Island to Kiska Island; and the western sector extends from Buldir Island to Attu Island. Sources are NMFS (unpublished data) and Sease, J. L., and T. R. Loughlin, 1999, Aerial and land-based surveys of Steller sea lions (*Eumetopias jubatus*) in Alaska, June and July 1997 and 1998; U.S. Department of Commerce, National Oceanic and Atmospheric Administration Technical Memorandum NMFS-AFSC-100.

Trends in Abundance

In the 1950s worldwide abundance of Steller sea lions was estimated at 240,000 to 300,000 animals. Since then, counts have revealed a severe and ongoing decline in abundance throughout the central and western part of the species' range (Table 4). The western population has declined by about 85 percent since the mid- to late 1970s, and at some sites sea lions have all but disappeared. The decline was first noted in the eastern Aleutian Islands, but then spread westward and eastward to include all areas west of 144°W longitude (Cape Suckling, near the eastern edge of Prince William Sound, Alaska). The rate of decline appears to have been most severe in the late 1980s when the number of sea lions in the central and western Gulf of Alaska and eastern and central Aleutian Islands dropped precipitously. However, counts in some areas have continued to decline at high rates since then. Over the last decade, counts in the central and eastern Gulf of Alaska declined at an average of about 8 to 10 percent annually. In addition, in the far-western region of the Aleutian Islands, only 1,071 adults and juveniles were counted in 2000, compared with 1,913 in 1998, indicating a decrease of 40 percent in that area. The large decrease in the count for the western Aleutian region and the continuing decline of the total western population (overall, about 5 percent annually) heighten concern for the status of this population and underscore its vulnerability.

Counts of Steller sea lions at Russian sites reveal a similar decline over the past three decades. Although counts in Russian territory have been infrequent and limited, recent data suggest that abundance in this region currently may be stable or increasing slightly.

In contrast to the observed trends of the western population, combined counts from the eastern population (along the western coast of North America east and south of Prince William Sound) have increased at about 1 to 3 percent annually over the last three decades. The observed population growth in this region probably reflects recovery from periods of intentional sea lion killing in the early to mid-1900s. More than 55,000 sea lions were reported killed in British Columbia alone from 1912 to 1968.

Status under the Endangered Species Act

The National Marine Fisheries Service has lead responsibility for the management of Steller sea lions under the Marine Mammal Protection Act and the Endangered Species Act. In 1990 the Service designated the Steller sea lion species as threatened under the Endangered Species Act. At the recommendation of the Marine Mammal Commission and others, the Service also established the Steller Sea Lion Recovery Team in 1990 and adopted the Steller Sea Lion Recovery Plan in 1992 to help guide recovery efforts. The designation treated the species as a single population. In 1993, critical habitat was designated as (1) all waters within 20 nmi (37 km) of rookeries and major haul-out sites west of 144°W longitude; (2) three special foraging areas in Shelikof Strait, the southeastern Bering Sea, and Seguam Pass in the central Aleutian Island chain; and (3) waters and lands within 0.9 km (3,000 feet) of rookeries and major haul-out sites east of 144°W longitude (Fig. 12).

Subsequent research has indicated that the species comprises at least two populations distinguishable on the basis of geography, demography, and genetic composition. On 5 May 1997 the Service published final rules designating the stock west of 144°W longitude (Fig. 12) as endangered while maintaining the threatened status for the stock east of that line. The Steller Sea Lion Recovery Team and the Marine Mammal Commission supported these revisions because they more accurately reflect the new information on stock structure. The Service concluded that it was not necessary to modify designated critical habitat for Steller sea lions, but noted that it was reassessing the effectiveness of existing protective measures with a view toward improving them.

Key partners in the recovery program include the Alaska Department of Fish and Game, the North Pacific Fishery Management Council, the University of Alaska, the Alaska SeaLife Center, the North Pacific Universities Marine Mammal Research Consortium, and a number of nongovernmental entities including environmental organizations.

Causes of the Decline of the Western Population

The factors causing the decline of the western population of Steller sea lions have been a matter of extensive controversy. Over the past decade, the National Marine Fisheries Service has attempted to evaluate the potential causes, including disease, pollution, entanglement in marine debris, commercial and subsistence harvests of sea lions, predation by killer whales and sharks, illegal killing, natural environmental changes in carrying capacity, and interactions with commercial fisheries (e.g., incidental catch, competition). Disease, pollution, and entanglement in marine debris are not considered significant contributors to the decline. Contributing factors are known to include commercial harvests of sea lions in the late 1950s to early 1970s, subsistence harvests by Alaska Natives, legal and illegal killing (which has not been and probably cannot be quantified), and incidental catch in the trawl fisheries in the Bering Sea and the Gulf of Alaska (which has been reduced to negligible levels). Killer whales are known predators of Steller sea lions and sharks are suspected predators, but their contribution to the ongoing decline cannot be determined from the available data. Modeling studies indicate that such predation probably was not a significant factor in the initial decline, but may be more significant at present because of the reduced size of the western population. Research has been initiated to investigate this possibility.

Additional suspected contributors to the decline include natural environmental changes and competition with commercial fisheries. Data from the 1970s to early 1990s indicate that the decline of the western population was initially characterized by poor growth and survival of juveniles and low reproductive success of mature females. The evidence for poor juvenile growth and survival is based on field observations and modeling efforts. The evidence for low reproductive success is based on observations of slow growth (leading to older age at maturity), high fetal mortality, and low birth rates. These data are all consistent with the hypothesis that the initial period of decline was due,

at least in part, to nutritional stress. Although these observations are outdated and new data are needed, nutritional stress remains a leading hypothesis to explain the ongoing decline.

To a large degree, analyses of the decline have focused on the potential roles of the environment versus fisheries in determining the quality and quantity of prey available to sea lions and, thus, the nature of nutritional stress. Two contrasting views have developed. The first is that if sea lions are nutritionally stressed, it is due to factors unrelated to fisheries. Such factors could include natural ecosystem changes resulting from variation or trends in environmental conditions (i.e., a "regime shift") or changes resulting from previous human activities such as the removal of extensive numbers of large whales in the North Pacific and Bering Sea in the 1950s to 1970s (i.e., the "cascade hypothesis"). Alternatively, nutritional stress may result, at least in part, from competition with commercial fisheries, particularly those for pollock, Atka mackerel, and Pacific cod. The potential for competition between fisheries and Steller sea lions was recognized as a matter of concern when the fishery management plans were developed for the groundfish fisheries of the Bering Sea/Aleutian Islands region and the Gulf of Alaska in the late 1970s and early 1980s.

It is important to take into consideration that these two possibilities, and others, are not mutually exclusive. Multiple factors have contributed to the decline, and the effects of any single factor do not necessarily exclude the influence of other potential factors. Rather, contributing factors may act concurrently, either independently, synergistically, or in a counter-vailing manner. For example, if Steller sea lions are nutritionally stressed, they may spend more time foraging at sea. By increasing foraging time, they also increase their vulnerability to predators (i.e., killer whales and sharks). Similarly, if natural oceanographic changes reduced prey availability for sea lions, then their vulnerability to competition with groundfish fisheries could be increased. Thus, searching for a single cause may belie the complex interactions leading to the decline of the western population of Steller sea lions.

Table 5 Estimates of Steller sea lions harvested and struck and lost in the annual subsistence harvest by Alaska Natives, 1992–2000

Year	Harvested	Struck and Lost	Total
1992	370	179	549
1993	348	139	487
1994	336	80	416
1995	307	32	339
1996	152	34	186
1997	146	18	164
1998	131	47	178
1999	—	—	—
2000	170	35	205

Source: Alaska Department of Fish and Game

Steller Sea Lion Subsistence Harvests and Co-Management

For centuries, Steller sea lions have been hunted by Alaska Natives for subsistence although little is known about historic harvest levels. Since 1992 the National Marine Fisheries Service has contracted with the Alaska Department of Fish and Game to assess annual subsistence harvests of Steller sea lions and harbor seals by interviewing Native households in 60 coastal villages where one or both species are harvested. Virtually all sea lions taken in the subsistence harvest are from the western population. The majority are taken around the Pribilof Islands in the Bering Sea, but harvesting also occurs near Akutan and Kodiak Islands and in Prince William Sound. The estimated number of Steller sea lions harvested in Alaska in recent years has declined from 549 in 1992 to 178 in 1998 and 205 in 2000 (Table 5). Estimates of the 1999 and 2001 harvests were not available at the end of 2001.

In July 2000 and June 2001 the National Marine Fisheries Service signed co-management agreements with the tribal governments of St. Paul and St. George Islands, respectively. The agreements, which cover both Steller sea lions and northern fur seals, establish

a six-member co-management council composed of three representatives from the Service and three from the tribal authority. The council develops annual management plans for the subsistence harvests, identifies monitoring and research needs, and provides for local decisionmaking on the harvests, including which rookery or rookeries to harvest, numbers to be taken, and the timing of the harvests. Under the agreements, tribal ecosystem officers are designated to oversee the harvests and ensure that they are humane and efficient. Measures are being taken to reduce the number of animals struck and lost, fully utilize harvested animals, accurately track hunting effort, and provide biological samples in support of research efforts. Finally, the agreements provide for gradual transfer of some Service activities related to monitoring and management of fur seal and sea lion rookeries and haul-out areas; removal of marine debris from the rookery/haul-out areas and, when possible, disentangling animals caught in debris; management of tourist and other public interactions; and providing mentors and employment opportunities for local youth and adults regarding natural resource research and management.

In 2000 the Service held separate preliminary discussions with the Alaska Sea Otter and Sea Lion Commission, Aleutians East Borough, and the Alaska Department of Fish and Game, Subsistence Division, to consider real-time harvest monitoring at sites where most harvesting occurs. The plan under discussion would integrate annual community-based monitoring data from these primary sites with information from biennial statewide surveys. More accurate real-time estimates of the number of animals harvested would be provided for the primary harvesting areas. The Alaska Sea Otter and Sea Lion Commission and East Aleutians Borough would participate by coordinating the community-based harvest monitoring in much the same manner as the tribal governments in the Pribilof Islands are expected to monitor harvests in those islands.

Fisheries Interactions–Management

Between 1990 and 2001 the Service took a number of actions and established a number of regulations to mitigate possible effects of commercial fisheries on Steller sea lions. In 1990 the Service listed the Steller sea lion as threatened, prohibited the discharge of firearms within 91.4 m (100 yds) of a sea lion, prohibited most vessel transit within 3 nmi (5.5 km) of major rookeries in the Aleutian Islands and Gulf of Alaska, monitored incidental mortality; and reduced the allowable annual quota from 1,350 to 675 sea lions killed. From 1991 to 1993 the Service established no-trawl zones within 10 nmi (18.5 km) of 37 sea lion rookeries in Alaska with seasonal extensions to 20 nmi (37 km) of six major rookeries in the eastern Aleutian Islands and Bering Sea, and initiated efforts to adjust time and area catch allocations to prevent concentrated fishing effort in foraging areas beyond the no-trawl zones. Various adjustments have been made to the time/area catch allocations over the past decade. In 1998 the Service and the North Pacific Fishery Management Council established a forage fish category to prevent development of new fisheries on some of the fish stocks that are prey for marine mammals including the Steller sea lion. The Service and the Council also split the Atka mackerel fishery into two even seasons and reduced the portion of the seasonal catch that could be taken in critical habitat to 40 percent (to be achieved incrementally over a 4-year period). In 1999 the Service began implementation of a reasonable and prudent alternative to the pollock fisheries in the Bering Sea/Aleutian Islands Region and Gulf of Alaska to prevent jeopardy and adverse modification, as determined by a section 7 consultation (3 December 1998) under the Endangered Species Act. The reasonable and prudent alternative was based on the principles of prohibiting fishing in the immediate vicinity of major rookeries and haul-out areas, prohibiting fishing during the winter period from 1 November to 20 January, better dispersing the catch inside and outside sea lion critical habitat according to the distribution of the stock, and better distributing the catch temporally during the fishing seasons. The Aleutian Islands region was closed to directed fishing for pollock, the number of rookeries and haul-out areas protected in summer and/or winter by adjacent no-trawl zones was increased in the Bering Sea and Gulf of Alaska, and trip limits were imposed in regions of the Gulf of Alaska to slow the rate of pollock catch in those areas. In 2001 the Service and the Council began implementation of measures required by the reasonable and prudent alternative of the 30 November 2000 programmatic biological opinion. Those measures were phased in according to constraints imposed by legislation passed and signed into law in December 2000. The measures

modified protection strategies around rookeries and haul-out areas, added time/area constraints to the Pacific cod fishery, and modified the existing harvest control rule (i.e., the global control rule) to reduce the allowed fishing mortality rate when the spawning biomass of the fished stock declines below 40 percent of its expected level in the absence of fishing and prohibits it when the biomass is less than 20 percent of that reference level.

Fisheries Interactions – A Chronology of Recent Events

Debate about the potential role of the Alaska groundfish fisheries on the decline of the western population of Steller sea lions has increased since 1998. The controversy has been heightened by the fact that, in aggregate, the fisheries generate about one billion dollars of revenue and are therefore of considerable importance to the economies of Alaska, Washington, and (to a lesser extent) Oregon. The fisheries are managed and conducted under fishery management plans required by the Magnuson-Stevens Fishery Conservation and Management Act of 1976. Because the fishery management plans establish the conditions and constraints under which the fisheries are conducted, they ultimately determine the nature and extent of fishery effects that may occur on the associated marine ecosystems, including listed species and critical habitat.

For major federal actions that may have significant effects on the environment, such as the management of these fisheries, the National Environmental Policy Act requires preparation of a statement describing, among other things, the action's environmental impact, any unavoidable adverse environmental effects should the action be implemented, alternatives to the action, and the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity. Section 7 of the Endangered Species Act requires each federal agency to ensure that the actions it authorizes, funds, or carries out are not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat. The analyses conducted under these Acts are the primary means by which the potential environmental effects of federal actions are evaluated and disclosed to decision-makers and the public. The National Marine Fisheries Service has recently endeavored to update its environmental analyses pertaining to the Alaska groundfish fisheries, particularly for pollock, Atka mackerel, and Pacific cod, by completing a supplemental environmental impact statement and conducting a series of section 7 consultations.

Because of concerns that management of the fisheries does not provide adequate protection of the affected marine ecosystems generally, and Steller sea lions specifically, the fisheries and their effects also have been the subject of litigation in the U.S. District Court for the Western District of Washington at Seattle. The following is a brief chronology of these environmental analyses and associated litigation since early 1998.

In February 1998 the Service determined that the previous (1996) section 7 consultation for the Bering Sea/Aleutian Islands groundfish fisheries provided sufficient and up-to-date assessment of fishery effects on Steller sea lions and other listed species, and therefore did not reinitiate consultation on these fisheries. The following month, the Service completed a consultation on the Gulf of Alaska pollock fishery, concluding that the shift of 10 percent of the pollock total allowable catch from the winter season to the summer/fall season would neither jeopardize the western population of sea lions nor adversely modify its critical habitat. The consultation covered 1998 only, requiring reinitiation of section 7 consultation for the 1999 fisheries.

In April 1998 Greenpeace, the American Oceans Campaign, and the Sierra Club filed suit against the Service, alleging inadequate protection of Steller sea lions from the effects of the Alaska groundfish fisheries. A number of fishing companies and communities intervened on behalf of the Service.

In June 1998 the North Pacific Fishery Management Council revised the inshore/offshore allocation of pollock catch for the Bering Sea fishery and prepared new regulations for the Atka mackerel fishery in the Bering Sea/Aleutian Islands region. The regulations were deemed necessary because of evidence that the fishery resulted in local depletion of a major sea lion prey. The regulations split the Atka mackerel fishery into two seasons and reduced the portion of the seasonal quota that could be taken in critical habitat from 80 percent or more to no more than 40 percent

(the reduction to be achieved incre-mentally over a four-year period).

In October 1998 President Clinton signed the American Fisheries Act, which modified management and allocation of the pollock fishery in the Bering Sea. Key provisions of the Act included a new allocation scheme for the pollock fishery in the Bering Sea/Aleutian Island region, reduction in the associated fleet size through the buyout and scrapping of nine catcher/processor vessels, increased U.S. ownership requirements for participating vessels, increased observer coverage, additional scale requirements for assessing catch weight, provisions and constraints for the creation of pollock fishery cooperatives, constraints on vessels fishing under the Act to prevent them from accruing advantages in other fisheries as an inadvertent consequence of the Act, and caps on the share of total catch that could be taken by any one vessel or processor.

On 3 December 1998 the Service completed a section 7 consultation on the Atka mackerel and pollock fisheries in the Bering Sea/Aleutian Islands region and the pollock fishery in the Gulf of Alaska. The consultation concluded that the Atka mackerel fishery was not likely to jeopardize the western population of Steller sea lions or adversely modify its critical habitat (largely on the basis of the new regulations developed in June 1998), but that the pollock fisheries, as proposed for 1999 to 2002, were likely to jeopardize the western population and adversely modify its critical habitat. The Service and Council developed a set of measures to avoid jeopardy and adverse modification. The measures were implemented by emergency rule for the first half of 1999. The measures were subsequently challenged in court by both plaintiffs and interveners.

The Service completed a second section 7 consultation (22 December 1998) on total allowable catch specifications for the 1999 groundfish fisheries in the Bering Sea/Aleutian Islands region and the Gulf of Alaska. The consultation concluded no jeopardy or adverse modification based, in part, on the reasonable and prudent alternatives to be implemented for the pollock fisheries. The Service also completed a supplemental environmental impact statement for the Alaska groundfish fisheries.

In April 1999 the North Pacific Fishery Management Council, together with the Marine Mammal Commission, the National Marine Fisheries Service, and the Alaska Department of Fish and Game, held a review of the 3 December 1998 biological opinion. The review panel, a group of independent marine scientists, determined that, based on the best available data, the conclusions of the opinion were reasonable. In June 1999 the Service and Council developed emergency measures for the latter half of 1999 and for a permanent rule to ensure that the pollock fisheries do not result in jeopardy and adverse modification.

In July 1999 the court ruled on the 3 December 1998 biological opinion and the supplemental environmental impact statement completed the previous December. The court upheld the no jeopardy/ adverse modification conclusion for the Atka mackerel fishery and the jeopardy/adverse modification con-clusions for the pollock fisheries, but found the reasonable and prudent alternative for the pollock fisheries to be arbitrary and capricious for lack of sufficient explanation of how it avoided jeopardy and adverse modification. The court remanded the opinion back to the Service with orders to revise, as necessary, the reasonable and prudent alternative and explain how it avoids jeopardy and adverse modification. The court also ruled that the supplemental environmental impact statement was insufficient in scope, and also remanded that document back to the Service. On 15 October 1999 the Service presented a revised final reasonable and prudent alternative to the court. Elements of the alternative were challenged in the lawsuit by both plaintiffs and interveners, but have not yet undergone judicial review.

On 23 December 1999 the Service completed a section 7 consultation on the 2000 total allowable catch specifications for the groundfish fisheries and the regulations implementing the American Fisheries Act. The consultation concluded that the catch specifications and the measures implemented under the American Fisheries Act would not jeopardize listed species or adversely modify critical habitat.

In January 2000 the Service implemented measures consistent with the revised final alternative. In the same month, the court ruled that the 22 December 1998 biological opinion completed by the Service (on 1999 total allowable catch specifications) was not of sufficient scope and did not provide the broad overview of the fisheries and associated fishery management plans expected by the court. Accordingly,

the court ruled that the Service was out of compliance with the Endangered Species Act until such time as a comprehensive biological opinion was in place. At the court's direction, the plaintiffs, defendants, and interveners attempted to mediate their differences regarding management of the Alaska groundfish fisheries, but were not successful.

Based on the court's finding that the Service was in violation of the Endangered Species Act, plaintiffs moved to enjoin the groundfish fisheries in Steller sea lion critical habitat. In July 2000 the court granted that motion by enjoining all groundfish trawl fishing in Steller sea lion critical habitat west of 144°W longitude (the dividing line between the eastern and western populations). The injunction went into effect on 8 August 2000 and was dissolved on 5 December 2000 after completion of a programmatic biological opinion on the fishery management plans for the groundfish fisheries of the Bering Sea/Aleutian Islands region and the Gulf of Alaska.

The programmatic opinion was completed on 30 November 2000. It concluded that the fishery management plans and the fisheries, as implemented under those plans, both jeopardized the western population of Steller sea lions and adversely modified their designated critical habitat. The opinion, therefore, also contained a reasonable and prudent alternative to avoid jeopardy and adverse modification.

On 15 December 2000 Congress passed an appropriations bill with attached provisions to modify implementation of the reasonable and prudent alternative in the 30 November 2000 biological opinion. The bill confirmed the fisheries management authority of the regional councils and the Secretary of Commerce as established in the Magnuson-Stevens Fishery Conservation and Management Act, and clarified that (1) this authority pertains to changes required by the Endangered Species Act, and (2) the implementation of such changes must follow the procedures and requirements of the Magnuson-Stevens Act. The bill directed the North Pacific Fishery Management Council and the National Academy of Science to conduct an independent scientific review of the 30 November 2000 biological opinion, its underlying hypotheses, and its reasonable and prudent alternative. A National Academy of Science panel has been convened, has held information-gathering meetings in Seattle and Anchorage, and is expected to produce a final report in June 2002. To protect the fishing industry, and particularly smaller vessels, the bill also included provisions (described in the Commission's previous annual report) for phasing in the measures of the reasonable and prudent alternative in the 30 November 2000 opinion. Finally, the bill provided an increase in funding for development of a comprehensive research and recovery plan for the Steller sea lion, and additional funding for distribution to fishing communities, businesses, community development quota groups, individuals, and other entities to mitigate the economic losses caused by sea lion protection measures.

Also in December 2000 the North Pacific Fishery Management Council voted to appoint a committee to devise various reasonable and prudent alternatives that would be consistent with the requirements of the Endangered Species Act and the Magnuson-Stevens Act. The "RPA" committee was to report back to the Council in April 2001. The Council also moved to sponsor an independent peer review of the 30 November 2000 programmatic biological opinion and associated incidental take statement.

On 22 January 2001 the National Marine Fisheries Service published emergency interim rules for Steller sea lion protection measures, 2001 harvest specifications, associated management measures, and revisions of the American Fisheries Act. The interim rules were intended to implement the reasonable and prudent alternative of the 30 November 2000 programmatic biological opinion, as constrained by the legislation described above to phase in the measures of that alternative. The measures of the alternative were based on the four principles of protection around rookeries and haul-out areas, spatial dispersion, temporal dispersion, and a global control rule to reduce fishing when the target stock is less than 40 percent of its expected level in the absence of fishing and to prohibit fishing when the stock is less than 20 percent of that reference.

On 2 February 2001 the Service published a notice of the availability of a draft programmatic supplemental environmental impact statement on the Alaska groundfish fisheries. The comment period for the draft document was originally set for 26 April, but was subsequently extended two times and finally ended on 25 July 2001.

On 26 July 2001 the Service reinitiated consultation on the effects of the Alaska groundfish fisheries on the western and eastern populations of Steller sea lions. Reinitiation was based on new analyses of scientific data and the need to examine the potential effects of a new set of measures developed by the Council's RPA committee to avoid jeopardy and adverse modification, as had been concluded in the 30 November 2000 programmatic biological opinion. In August 2001 the Service sought public comment on a draft biological opinion examining the effects of these new measures and published a draft supplemental environmental impact statement on the measures.

In September 2001 the Council received the final report of a group of four scientists it had contracted to review the November 2000 biological opinion and incidental take statement, and comment on the August 2001 draft biological opinion on fishery measures developed by the Council's RPA committee to avoid a jeopardy/adverse modification finding under the Endangered Species Act. A brief summary of their review is provided at the beginning of the next section. On 19 October 2001 the Service signed the biological opinion on the conservation measures developed by the Council's RPA committee. The final environmental impact statement on the measures in that alternative was issued in November 2001.

On 27 November 2001 the Service published a *Federal Register* notice stating that substantial changes would be required to respond to the 21,000 comments received on its draft programmatic supplemental environmental impact statement on the Alaska groundfish fisheries. The Service announced that it would make such changes and reissue another draft statement. The schedule for issuance of the final statement and record of decision will be changed accordingly.

At the end of 2001 the National Marine Fisheries Service and the North Pacific Fishery Management Council were preparing to implement the conservation measures developed by the Council's RPA committee and approved by the Council.

Fisheries Interactions – A Review and Recommendations

The North Pacific Fishery Management Council arranged for a review by four independent scientists of the November 2000 programmatic opinion. The report provided by the review panel was completed in September 2001. In the report, the panel noted that the fisheries may have negative effects on Steller sea lions, but few data have direct bearing on key hypotheses and most of the data indicating effects are circumstantial. They also noted that many of the data indicating potential effects are outdated and it is possible that the factors driving the current decline are entirely different from important factors in the earlier stages of the decline. They noted the lack of crucial information on vital rates and sea lion distribution, and were skeptical about the utility of scat studies as a tool for monitoring seasonal trends in sea lion diets. With regard to the design of field experiments to investigate Steller sea lion/fishery interactions, the panel was pessimistic about the utility of the design in the November 2000 opinion. They also considered a range of response variables that could be used to investigate these interactions and concluded that it would be very difficult to distinguish fishery effects from ecosystem effects and the effects of other fish predators. They questioned whether large-scale manipulative experiments were timely given the limited fine- and meso-scale data on sea lion foraging and the effects of fishing on prey behavior, but also noted that the desire to learn whether fishing is having an effect on sea lions may outweigh the desire to conduct preliminary studies leading to the large-scale experiment. With regard to reports on other stressed pinnipeds, the panel was unaware of direct evidence that prey depletion by fisheries had affected the demography of seal populations, although there is clear evidence that environmentally induced changes in prey availability have had such effects. From their review they concluded that changes in demography from prey reductions either are clearly apparent without scientific study or are relatively subtle and require time series of monitoring data. They also noted that changes had occurred in first-year survival of affected pinnipeds in all the examples they identified. With regard to the draft biological opinion on the conservation measures developed by the Council's RPA committee, the panel expressed little confidence in the new analyses of telemetry data as a sound basis for drawing conclusions about the effectiveness of the reasonable and prudent alternative on the dynamics of Steller sea lions. They attempted to simulate the effects of the proposed measures but concluded that there were considerable doubts about the reliability of such simulations. They

also noted that under all the alternatives they simulated, local populations at the western and eastern extremes of the range were predicted to continue their decline over the next 20 years. The panel reviewed the biomass ratio estimate used by the Service to address the question of whether the fishery caused adverse modification of critical habitat and concluded that this analysis did not address the central issue of local depletion and is inconsistent with the Service's position that such depletion is a likely cause of the recent decline of sea lions. They concluded that the biomass ratio analysis has little merit with respect to the assessment of adverse modification. With respect to research recommendations, the panel gave priority to assessment of population trends and vital rates, and better understanding of mechanisms underlying the current decline in the western population of Steller sea lions. Their research recommendations were listed as (not in order of priority) monitoring of trends in population size and distribution, estimation of vital rates, investigation of the temporal and spatial scales of foraging, investigation of sea lion diet, modeling efforts to integrate foraging and reproductive energetics, retrospective data analysis, and investi-gation of the hypothesis of local depletion of prey.

In 2001 the Marine Mammal Commission also provided recommendations to the Service regarding the management of Steller sea lions and the fisheries in view of the potential for competition between the two. Since 1998, the potential for competition has been assessed on the basis of two questions. First, do the fisheries and sea lions use the same resources (same prey or target species, in the same geographic regions, during the same seasons, of the same size, from the same depth), and second, does removal of those resources by the fisheries contribute to the decline of the western population or impede its recovery. The first question has been confirmed for pollock, Atka mackerel, and Pacific cod fisheries.

The second question has been addressed by considering the potential for fisheries to cause local depletion of prey relative to the needs of Steller sea lions. That is, the term "local depletion"has been used to describe a reduction in available prey occurring as a result of fishing concentrated in time (within a given season or year) or space (particularly in Steller sea lion critical habitat) and of sufficient magnitude to diminish foraging success of sea lions and, consequently, their ability to reproduce and survive. The potential for such depletion cannot be evaluated directly because (1) information on prey stocks is not sufficiently precise and reliable to assess their local abundances, (2) stock assessments have been conducted during the summer and stock distributions change between the time of assessment and the fall, winter, and spring seasons when most fishing occurs, and (3) the absolute abundance or density of prey needed to support a recovered Steller sea lion population is unknown. Because the absolute abundance or density of prey, and fisheries-induced changes in such, cannot be described reliably by season and location, relative measures of change have been used to indicate the potential for local depletion. Specifically, local depletion has been considered more likely when a local harvest rate significantly exceeds the overall harvest rate, or when various measures of the fisheries (e.g., catch per unit effort) indicate a detectable and significant reduction of the target stock during a particular fishing season or in a particular area.

The manner in which the concept of local depletion has been used to date for analyzing fishery effects has two important implications. First, because the potential for local depletion has been evaluated only in the context of annual fishery effects, the assumption is being made that long-term effects of fishing (i.e., those that occur over periods longer than a year) do not contribute to local depletion or are otherwise not an important consideration in evaluating reductions in prey availability and their effects on Steller sea lions. This is an important issue because, under a fishing strategy based on maximum sustainable yield (MSY), the long-term effect of fisheries is to reduce spawning biomass of target stocks to 40 percent of the level expected in the absence of fishing. The assumption that such a reduction is ecologically safe was formalized in the global control rule incorporated into the reasonable and prudent alternative of the 30 November 2000 programmatic biological opinion and later, in modified form, into the substitute alternative developed by the Council's RPA committee. However, this assumption has not been thoroughly analyzed in either section 7 consultations or in environmental impact statements on the fisheries. In its letters of 31 July 2001 and 19 October 2001 to the Service the Marine Mammal Commission commented on these analytical shortcomings and recommended that the Service

conduct the required analyses of the ecological effects of the MSY-based fishing strategy used to manage these fisheries.

The second implication is that the appropriate baseline to use for assessment of fishery effects is, in essence, the environment under fished or status quo conditions. The draft supplemental environmental impact statement on the fisheries evaluated the effects of various alternatives relative to the environment as it exists under current, fished conditions. In its 31 July 2001 letter to the Service, the Commission noted that comparisons of alternatives based on the status quo may indicate potential effects relative to current conditions, but may not indicate the full effects of the alternatives because the comparisons fail to take into account the long-term effects of the fishing under the MSY-based fishing strategy. For that reason, the Marine Mammal Commission recommended that the Service revise its supplemental environmental impact statement to include a no-fishing (i.e., no-action) alternative to ensure that the proper baseline is used for assessment and the full effects of different fishery management alternatives are disclosed.

The concept of local depletion of prey has also provided the primary basis for reasonable and prudent alternatives developed by the Service and the North Pacific Fishery Management Council to avoid jeopardizing the western population of Steller sea lions and destroying or adversely modifying its critical habitat. The measures composing these alternatives were designed to (1) avoid competition for prey in areas around sea lion rookeries and haul-out sites and during the winter period when sea lions have been considered particularly vulnerable to reductions in prey availability, (2) disperse fishing spatially (in accordance with the distribution of the stock) over the remaining area of the fishery, (3) disperse fishing temporally during the remainder of the year, and (4) linearly reduce fishing mortality when target stock spawning biomass is between 40 and 20 percent of the expected level in the absence of fishing and prohibit fishing when it drops below 20 percent of that reference level. In its 19 October 2001 letter to the Service, the Commission pointed out that the first three of these principles are based largely on temporal and spatial measures that may mitigate the within-year effects of the fisheries, but do not address the long-term effects of catch levels set under an MSY-based fishing strategy. Although the global control rule (the fourth principle) is directed at the long-term reduction, it assumes that a long-term reduction in biomass of 60 percent is safe but does not provide the analytical rationale necessary for this assumption and, ultimately, necessary for ensuring that the fisheries are not likely to cause jeopardy or adverse modification.

In addition to the above recommendations regarding analysis of the MSY-based fishing strategy and incorporation of a no-fishing alternative in the programmatic supplemental environmental impact statement, the Commission's 19 October 2001 letter made three other recommendations to the Service. The first pertained to the Service's purported ability to relate specific management measures to actual changes in the rate of population growth (or decline). In its 19 October 2001 biological opinion on the conservation measures developed by the Council's RPA committee, the Service based its no-jeopardy determination on an analysis of the expected growth rates under the RPA committee's alternative and under the alternative in the 30 November 2001 biological opinion. The analyses assumed an understanding of the efficacy of management measures that does not accurately reflect the uncertainty associated with the Service's ability to explain the past decline of the western population or predict the near-term population trend. Because the analysis may therefore mislead decisionmakers and the public regarding the confidence they can have in the proposed reasonable and prudent alternatives, the Marine Mammal Commission recommended that the Service revise its supplemental environmental impact statement either to include a basis for the implied level of understanding or to more accurately reflect the uncertainty associated with the expected effects of the measures being considered.

In its 19 October 2001 letter to the Service the Commission also pointed out the general need for explicit descriptions of important uncertainties regarding fishery effects, the studies needed to address those uncertainties, and the power of existing studies to detect and explain significant effects when they occur. Finally, in the letter the Commission noted important uncertainties regarding the telemetry data and the assumptions made by the Service in support of its new strategy for protecting sea lions and their prey around rookeries and haul-out areas. The Commission recommended that the Service review its interpretation of the

satellite telemetry data and corresponding protective measures in light of (1) the uncertainties associated with the existing data and (2) its obligation to assure that the western population of Steller sea lions is not jeopardized and its critical habitat not adversely modified by the effects of the groundfish fisheries.

Research

The Steller Sea Lion Recovery Team and Recovery Plan, the National Marine Fisheries Service, the Alaska Department of Fish and Game, the North Pacific Universities Marine Mammals Research Consortium, the Alaska SeaLife Center, and the North Pacific Fishery Management Council have provided the direction for research on the Steller sea lion and its decline. Between December 1997 and February 1999, the recovery team held two meetings and four workshops to consider past and future research directions. The workshops focused on four main areas: behavior, telemetry studies, physiology, and foraging ecology. The motivation behind these workshops and other recovery team recommendations was to provide a basis for updating research and recovery objectives in the revised recovery plan. In general, those recommendations emphasized that Steller sea lions and associated research efforts be considered in a broader ecological or ecosystem context; the research agencies should develop a strategic plan to guide and coordinate research efforts; and the plan should include a Steller sea lion model with both demographic and bioenergetic components; research should be continued and expanded on life history patterns (particularly with respect to pups and juveniles), vital rates (reproduction and survival), age structure, physiological condition, and foraging ecology; management and research efforts should address the effects of state fisheries (e.g., salmon and herring) as well as federal fisheries; pollock removals from critical habitat should be reduced; adaptive management strategies should be developed to assess the efficacy of existing protection measures including exclusion zones; and assessment methods for subsistence harvests of Steller sea lions should be improved. In 2001 the National Marine Fisheries Service reconstituted and expanded the Steller Sea Lion Recovery Team and one of its first priorities will be completion of a revised Steller Sea Lion Recovery Plan.

At the Commission's 2001 annual meeting, staff from the National Marine Fisheries Service provided an overview of research related to Steller sea lions to be conducted in 2001. Based on earmarked funding provided by Congress at the end of 2000, the research program for Steller sea lions jumped from $4.85 million in 2000 to $43.15 million in 2001, an increase of $38.30 million. This funding is being dispersed among 25 different research institutions for a total of about 150 different studies. A research coordinator was appointed at the Service's Alaska Fisheries Science Center, and coordination meetings were held in January, July, and September 2001. The overall research framework is described as including both top-down approaches based on factors potentially contributing to the decline and bottom-up approaches based on research projects and themes. Potential or known factors contributing to the decline are described as indirect effects of fisheries, environmental changes, direct anthropogenic effects, predation, disease, contaminants, and synergies or combinations of these factors. Research themes include studies to investigate life history, foraging, vital rates, fish stock assessment, ecosystem composition and dynamics, predation, disease, contaminants, management, communications, and other anthropogenic effects.

At its meeting, the Commission noted that the marked increase in funding for research related to Steller sea lions provides an important opportunity to (1) investigate the species' decline, the known or potential factors contributing to the decline, and the ecosystems in general, and (2) develop management regimes that avoid jeopardy to the western population and adverse modification of its critical habitat. At the end of 2001 the Commission was considering possible recommendations to the Service regarding its research plans related to the decline of Steller sea lions.

Pacific Walrus (*Odobenus rosmarus divergens)*

The Pacific walrus, one of two walrus subspecies, is thought to consist of a single population that inhabits the Bering and Chukchi Seas between Alaska and Russia. Pacific walruses migrate over a wide geographic range following the annual advance and retreat of the pack ice (see Fig. 13). In spring adult females, calves, and juveniles move north through the Bering Strait into the Chukchi Sea and return to the Bering Sea in late fall. Most Pacific walruses haul out on sea ice, where they rest, molt, and give birth to their calves. However, some animals, mostly adult males, remain year-round in the Bering Sea, where they haul out on land at several sites in Alaska and Russia. Some walruses also haul out on shorelines along the north coast of the Chukhotka Peninsula and Wrangel Island in the Chukchi Sea. The four major haul-out sites in Alaska are Round Island, Cape Peirce, Cape Newenham, and Cape Seniavin, all of which are in Bristol Bay in the southeastern Bering Sea. The most recent abundance estimate for Pacific walruses is slightly more than 200,000 animals based on a 1990 survey.

The other subspecies of walrus is the Atlantic walrus (*O. r. rosmarus*), which is distributed among several small discrete populations scattered between eastern Canada and the Laptev Sea off the Siberian coast of north-central Russia. The total size of these populations is much smaller than the Pacific walrus population. Together, all Atlantic walrus populations are thought to represent perhaps 10 to 20 percent of all walruses worldwide.

Walruses are large animals; adult females can weigh up to 2,500 lbs (1,134 kg), and adult males can reach as much as 3,500 lbs (1,588 kg). They feed principally on clams, snails, worms, and other benthic invertebrates in soft muddy or sandy habitats at depths of about 100 m (330 ft) or less. Walruses use their flippers and suction from their snouts to root in soft sediments, feeling for prey with their sensitive whiskers. Their foraging behavior and the consumption of large amounts of prey make walruses a key component of the ecology of the Bering and Chukchi Seas.

Perhaps the most recognizable feature of walruses is their tusks. Although there is no single accepted theory to explain their function, tusks are not used as a tool to excavate for food. Rather, scientists speculate that walrus tusks evolved as an aid for hauling out on sea ice, dragging themselves along the surface, fighting between themselves to establish dominance, orienting their snouts while rooting for food, or defending against predators, which now include humans. On one occasion, a walrus reportedly used its tusks to punch holes in a hunter's metal boat. On occasion they also use their tusks to kill seals, which are later eaten.

Walruses are a vital economic and cultural resource for Native communities in both Alaska and Russia. Annual walrus hunts help maintain Native cultural and subsistence traditions and provide food, ivory, and other raw materials for handicrafts and to sustain Native lifestyles. Ivory carvings are a particularly important source of income for some Native villagers.

Pacific walruses have undergone a series of major population declines and recoveries since the mid-1800s. Those cycles were caused by episodes of excessive harvesting for commercial purposes by U.S. and Russian hunters. The depletion of walruses in the 1870s was particularly severe and led to widespread starvation among Native villages around the Bering Sea. The most recent decline occurred in the decades before and after World War II and resulted mostly from a commercial harvest by Russian hunters. The population recovered during the 1960s and 1970s under hunting restrictions imposed by the former Soviet Union and the State of Alaska. Although no rangewide surveys have been conducted since 1990 and the population's current size and trend are uncertain, recent analyses of past walrus counts and life history data suggest that Pacific walrus abundance may have peaked in the 1980s and has possibly declined since then due to reduced reproductive and juvenile survival rates. Well-documented declines of other marine mammal species in the Bering Sea, including Steller sea lions, northern fur seals, harbor seals, and sea otters lead to concern that walruses also could be experiencing a decline due to factors, such as climate warming, that may be affecting the regional ecosystem. Section 117 of the Marine Mammal Protection Act requires that the Secretaries of Commerce and the Interior prepare and periodically update stock assessment reports for each marine

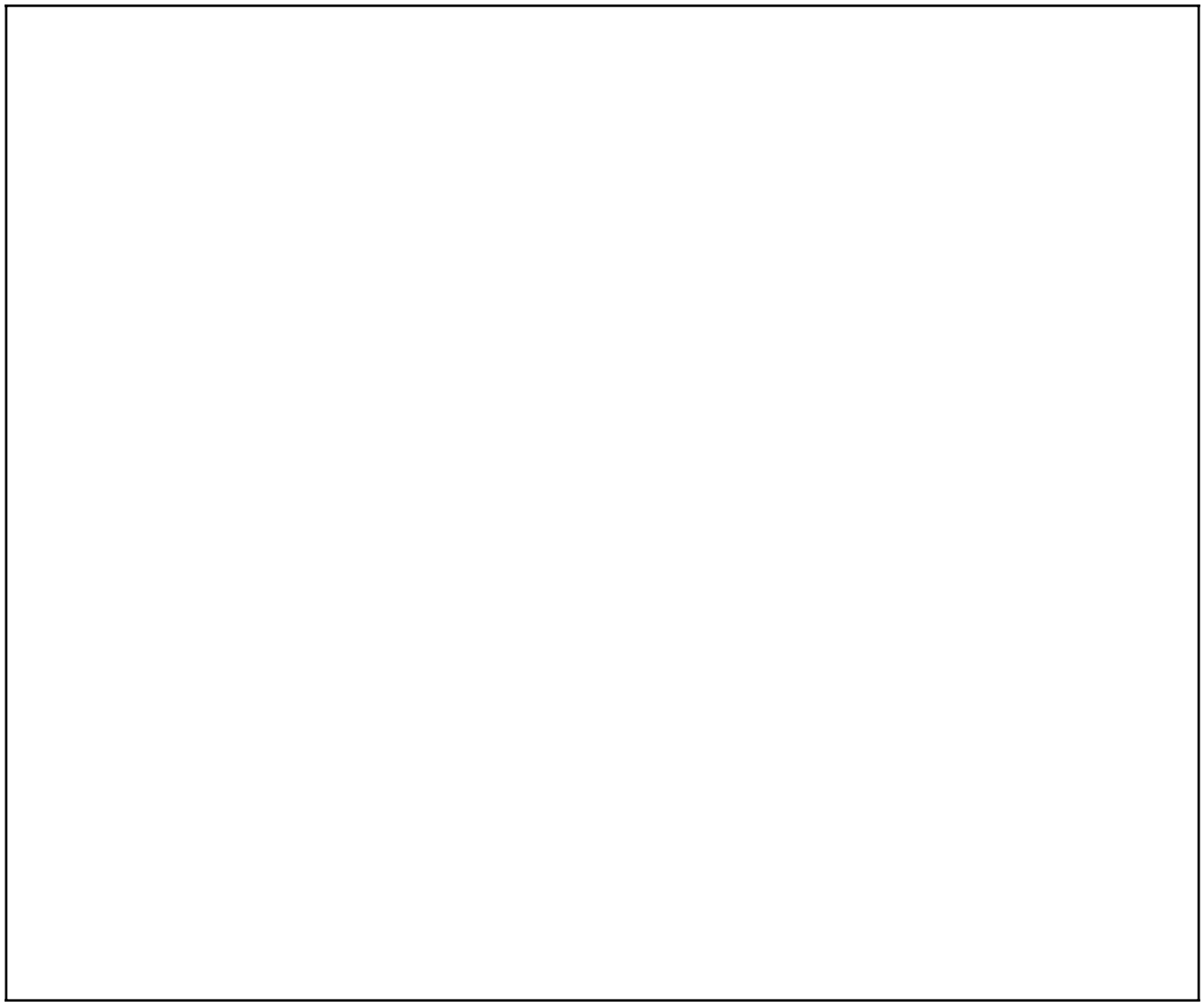

Figure 13. Range of the Pacific walrus (courtesy of Fish and Wildlife Service).

mammal population in U.S. waters. These reports are to be used to help manage interactions between marine mammals and commercial fisheries and must take into account all sources of human-related mortality. The reports must include estimates of each population's size and a potential biological removal (PBR) level. The latter is calculated using a formula designed to estimate how many animals can be removed annually from the marine mammal stock (not including natural mortality) while maintaining a high degree of assurance that it will remain at or increase toward its optimum sustainable population level. The formula's variables include the best estimate of minimum population size.

The most recent stock assessment for Pacific walruses was completed by the Fish and Wildlife Service in 1998. Based on the 1990 rangewide survey, the Service determined that the best estimate of the population is 201,039 walruses and the best estimate of minimum population size is 188,316 animals. Using this information, the Service calculated a PBR level of 7,533 walruses per year.

In the United States, Pacific walruses are managed cooperatively under a co-management agree-ment

between the Fish and Wildlife Service, which has lead responsibility under the Marine Mammal Protection Act, and the Eskimo Walrus Commission, an Alaska Native organization formed in 1978 to help conserve walruses. Other key partners in walrus research and management include the Alaska Biological Science Center of the U.S. Geological Survey, the Alaska Department of Fish and Game, scientists at various universities and research organizations, and environmental groups. To help direct walrus conservation work, the Service adopted a Pacific walrus conservation plan in 1994 at the recommendation of the Marine Mammal Commission.

Native Subsistence Harvest of Pacific Walruses

The Marine Mammal Protection Act includes provisions that preserve the rights of Alaska Natives to hunt walruses and other marine mammals for purposes of subsistence or to obtain marine mammal parts for making traditional Native handicrafts. Such hunting, however, cannot be done in a wasteful manner. The number of walruses harvested annually in Alaska is monitored using two sources of data collected cooperatively by the Service, the Eskimo Walrus Commission, and Native hunters.

One source is a harvest monitoring program that involves personnel located in the five hunting villages that take the largest number of walruses (Gambell and Savoonga on St. Lawrence Island, Diomede on Little Diomede Island in the Bering Strait, and Wales and Shishmarev on the Seward Peninsula) who record catch data and collect biological samples for research as hunters return to their villages. The program, which began in 1980, continued a harvest monitoring program operated by the Alaska Department of Fish and Game in the 1960s and 1970s. The other source is data from a marking, tagging, and reporting program started by the Fish and Wildlife Service in 1988. Under this program, Native hunters are required to have all walrus tusks tagged within 30 days of the date the walrus was killed. Because calves, which lack tusks, are also taken, and because compliance with tagging requirements is less than 100 percent in some villages, tagging data do not reflect all walruses taken.

Based on the harvest monitoring program, the estimated catch level in Alaska for 2000 (the latest year for which complete data are available) was 2,334 walruses. Preliminary data from the marking, tagging, and reporting program for 2001, which include tagging records for 1,095 walruses as of the end of the year, suggest that the 2001 catch level may be well below the number taken in 2000, when 2,132 sets of tusks were tagged.

Pacific walruses also are hunted in Russia, where management responsibility lies with the Fishery Department in the Russian Federation's Agricultural Ministry. Since 1992 walrus hunting has been limited to Native people. Under current harvest limits set by the Fishery Department, up to 3,000 Pacific walruses may be taken annually. However, because of funding constraints, the Fishery Department has suspended funding to monitor and manage the Russian hunt. Recognizing the importance of obtaining harvest data for Russia, as well as for Alaska, in 1999 the Eskimo Walrus Commission, the Fish and Wildlife Service, the State of Alaska, and the North Slope Borough jointly provided funds to train harvest monitors and support the collection of harvest data in six major walrus hunting villages in Russia. Support for this monitoring program was extended in 2000 under a three-year grant from the National Park Service's Beringia Program through the Eskimo Walrus Commission, and with technical support from the Fish and Wildlife Service. For 2000 harvest monitors reported a Russian catch of 1,212 walruses.

During Native walrus hunts, some animals that are shot escape or sink before they can be retrieved. These deaths are not reflected in the catch data. Because few walruses are found with healed bullet wounds, it is thought that most animals that are struck and lost die of their wounds. Recent data on struck/lost rates are not available; however, based on data collected between 1952 and 1972, it was estimated that 42 percent of the walruses shot during hunts in Alaska were not recovered. Applying that ratio to available catch data with the assumption that all animals that are shot die of their wounds leads to the total number of walruses killed in U.S. and Russian walrus hunts between 1992 and 2000 shown in Table 6.

Marine Mammal Commission Walrus Review

In light of new developments concerning the conservation of several marine mammal species in Alaska, the Commission held its 2001 annual meeting in Anchorage, Alaska, on 16–18 November. During its meeting, the Commission reviewed the status of the

Table 6. Estimated catches of Pacific walruses in Alaska and reported catch of walruses in Russia, 1992–2000

Year	Alaska		Russia		Total Catch	Total Catch Struck/ Lost[2]
	Catch[1]	Struck/Lost[2]	Catch[3]	Struck/ Lost[2]		
1992	1,884	1,364	1,670	1,209	3,554	6,127
1993	1,385	1,003	856	620	2,241	3,864
1994	1,624	1,176	1,071	776	2,695	4,647
1995	1,692	1,225	1,071	776	2,763	4,764
1996	2,541	1,840	941	681	3,482	6,003
1997	1,739	1,259	731	529	2,470[3]	4,258
1998	1,840	1,332	950[4]	688	2,790	4,810
1999	2,829	2,049	1,670[5]	1,209	4,499	7,757
2000	2,334	1,690	1,212	878	3,546	6,114

[1] Estimates provided by the Fish and Wildlife Service following method described in J. Garlich-Miller and D. M Burns, 1999, Estimating the harvest of Pacific walrus, *Odobenus rosmarus divergens*, in Alaska. Fish. Bull. 97(4):1043–1046.

[2] Based on a struck/lost ratio of 42 percent cited in F. H. Fay 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.

[3] Smirnov, G. P., 1999, Monitoring the Pacific walrus harvest in Russia: History and present time. Pages 29–34 in: Proceedings of a workshop concerning walrus harvest monitoring in Alaska and Chukotka. J. Garlich-Miller and C. Pungowiyi (eds), USFWS Technical Report MMM 99-1. 59 pp.

[4] Data from Smirnov, G. Chukotka TINRO. Otke, 56, Anadyr, P.O. Box 29, Chukotka, Russia.

[5] Rinteimit, V., M. Agnakisyak, and G. Smirnov. 2000. Walrus harvest monitoring in Chukotka in 1999. Technical Report available from the U.S. Fish and Wildlife Service, 1011 East Tudor Road, Anchorage, AK 99503.

Pacific walrus conservation program. Major issues examined included efforts to update information on the population's abundance and trends, the status of harvest monitoring programs, international cooperation, and co-management activities between the Service and the Eskimo Walrus Commission. Information on these issues was provided by representatives of the Fish and Wildlife Service, the U.S. Geological Survey, and the Eskimo Walrus Commission.

After considering the information provided at its meeting, the Commission, in consultation with its Committee of Scientific Advisors, wrote to the Fish and Wildlife Service on 28 December 2001 to provide its findings and recommendations. The results of the review are summarized below.

Population Assessment – The greatest challenge confronting the Pacific walrus management program is developing an accurate assessment of the population's status and trends. With walrus harvest levels near the population's calculated PBR level – a level based on data now more than 10 years old – a good estimate of abundance is urgently needed to ensure that harvests do not exceed sustainable levels or adversely affect walrus availability to meet future Native subsistence needs. From 1975 to 1990 population estimates were developed from counts of hauled-out walruses made during rangewide aerial surveys. Conducted jointly by U.S. and Soviet agencies at five-year intervals, those surveys were undertaken in fall when walruses gather along the edge of the pack ice in the Chukchi Sea and at haul-out sites along U.S. and Russian coasts.

No surveys have been conducted since 1990. This is due in part to the high cost (a comparable survey today could cost in excess of $1.5 million) and in part because the resulting survey data produced abundance estimates with such wide confidence intervals that their usefulness was questionable. Factors complicating interpretation of the survey counts include the vast and remote areas to be surveyed; frequent fog and bad weather in the survey area; the patchy, unpredictable distribution of walruses along the ice edge; uncertainty as to the proportion of walruses at sea and thus not

visible to observers at the time of a survey; and difficulty in counting animals that are visible only briefly from passing survey planes and that tend to haul out in closely packed groups, sometimes in numbers that can exceed 1,000 animals at a single location.

For these reasons, the Service has deferred efforts to conduct a new rangewide survey. Limited progress was made during the 1990s to identify alternative or improved population monitoring methods and, on 27–28 March 2000, the Fish and Wildlife Service and the U.S. Geological Survey held a Pacific Walrus Survey Workshop. The purpose of the workshop was to examine alternative approaches and research needs for determining the size and trend of the Pacific walrus population. Participants included walrus biologists, scientists and managers from federal and state agencies (including the Marine Mammal Commission), representatives of the Eskimo Walrus Commission, Native walrus hunters, and university scientists.

Workshop participants evaluated three population monitoring approaches: (1) a count that could provide a minimum population estimate suitable for stock assessments and calculating the PBR level, (2) a population index (e.g., the age-sex composition of a segment of the population) to detect population trends, and (3) an estimate of total population size with an acceptable measure of precision. In general, the participants agreed that the latter was the most useful approach, that a rangewide survey would be necessary to generate that estimate even though it would be expensive, and that new information, research tools, and survey techniques would be needed to develop an estimate with acceptable variance.

At the Commission's annual meeting, representatives of the Service and the U. S. Geological Survey reviewed results of the workshop (see also the Commission's previous annual report) and described the status and available results from recommended follow-up studies to develop new survey correction factors and survey techniques. These studies included work to (1) deploy satellite tags on walruses to track their movements and develop survey correction factors to account for walrus haul-out and distribution patterns, (2) investigate remote sensing technologies (i.e., satellite imaging and thermal sensors) to count walruses on land and to assess haul-out distribution patterns in sea ice, (3) assess mark-recapture methods as an alternative to rangewide surveys, (4) reexamine past surveys for insights into optimal survey design, and (5) evaluate the capability of video equipment to verify and document observer counts during aerial surveys. In addition they reviewed the status of ongoing work being done in cooperation with Russian scientists and Native hunters to study genetic markers as a means of determining population structure and movements between terrestrial haul-out areas. In part, that study is examining the feasibility of using genetic markers to conduct a mark-recapture analysis of the population. Representatives of the Service also noted that they planned to examine results of the various research activities at the end of 2002 to develop research protocols for a population survey that might be done in 2003 or 2004.

Overall, the Commission was impressed by the direction of these studies and the progress that was being made. With no current means to reliably determine population size or trends, and the high cost of a new rangewide survey, the Commission agreed with the Service's decision to defer a new population survey despite the need for a new abundance estimate. Although most lines of investigation to improve survey techniques require additional work and evaluation, the Commission found that study results to date hold great promise for significantly improving the design of future walrus population surveys.

The Commission also found that the Service's intent to plan for a new rangewide survey in 2003 or 2004 was appropriate and reasonable, but felt that an additional delay of up to one year may be warranted if there is a strong prospect that, at the end of 2003, another year of work would significantly improve the design of a new survey. In this regard, the Commission noted that although a new population estimate is urgently needed, it is also important that the next survey produce the best possible estimate, given its cost and the likelihood that it will not be repeated for at least another five years. Therefore, the Commission recommended that the Service design, schedule, and complete a new walrus population survey by 2005, or sooner if prospects for effective new survey techniques prove promising. In addition, the Commission recommended that, as soon as a determination is made that a new survey can be scheduled, the Service (1) develop a discussion draft paper setting forth a proposed survey design and sampling protocol, and (2) convene a meeting with its research and management

partners, including Russian scientists and officials, to review the merits of the proposed survey design and identify any changes that may be warranted.

As a related matter, the Commission noted an area in which additional work seemed likely to yield important benefits: the collection, analysis, and archiving of tissue samples from the Native harvest for long-term biomonitoring. Although the Service and the Eskimo Walrus Commission already cooperate to collect and analyze a number of important tissue samples from harvested walruses, the Commission noted that, with a modest commitment of additional funding, a more complete time series of tissue samples extending across decades could be collected, analyzed, and archived. This could provide important information on age-specific reproduction, prey selection, contaminant levels, and perhaps other life history parameters and thereby offer valuable insights not otherwise possible into the population's status and trends.

Development of an expanded biomonitoring program might appropriately be organized under the leadership of the Eskimo Walrus Commission, with technical assistance from the Service, the U.S. Geological Survey, and the Alaska Department of Fish and Game. Therefore, the Marine Mammal Commission recommended that the Service and the Eskimo Walrus Commission organize and implement an expanded long-term program to annually collect and archive a representative sample of walrus tissues from walruses harvested at villages in Alaska and, as possible, Russia. As an initial step, the Commission suggested that a workshop be held during the coming year to identify key components of an optimal biosampling program and offered its assistance in holding such a workshop.

Harvest Monitoring – Reliable data on walrus harvest levels are essential to ensure that subsistence needs of Native hunters will be met on a sustainable basis and that the walrus population remains a healthy, functioning part of the regional ecosystem. During the Commission's annual meeting, representatives of the Service and the Eskimo Walrus Commission described the Alaska harvest monitoring programs mentioned above. The Commission found those cooperative efforts to be effective and well organized, and commended both the Service and the Eskimo Walrus Commission for their work in this regard. It also found that their efforts to support harvest monitoring in Russia through at least 2002 were particularly important and constructive, given the suspension of funding for the program by the Russian government.

The Commission also noted that the combined harvests in recent years in Alaska and Russia have approached the calculated PBR level, which, as noted above, is based on data from a 1990 survey. In this regard, some studies have raised the possibility of a walrus population decline since 1990, which raises concern about the possible effects of future harvests at levels approaching the PBR level. However, the Commission also observed that the results of those studies have been equivocal, and that the PBR estimate was likely a conservative number relative to the size of the walrus population in 1990 because of conservative approaches that were used to estimate the walrus population abundance based on the 1990 survey results.

In light of these points and the importance of preventing a population decline, the Commission concluded that the walrus conservation program should seek to ensure that harvest levels do not increase before a new walrus population estimate is developed. Accordingly, the Commission recommended that the Service and the Eskimo Walrus Commission advise Native hunters that walrus population trends are uncertain, that recent harvest levels in Alaska and Russia combined appear to be close to the level that can be sustained safely, and that it would be unwise to increase harvests above recent levels until a new population estimate is available.

International Cooperation – In 1994 U.S. and Russian officials signed a protocol of intent to negotiate a bilateral agreement on the conservation of Pacific walruses. For a variety of reasons, including economic constraints limiting Russian support of walrus conservation work, little has been done to follow up on that intent even though several constructive efforts for joint U.S.–Russian work on harvest monitoring and scientific research have been undertaken. After considering information on the status of joint U.S.–Russian activities, the Commission concluded that more should be done to encourage and, as possible, assist Russian officials in reinitiating a walrus research and management program. Noting the need to determine whether the Russian government intends to resume support for harvest monitoring after 2002 and the impending need for U.S.–Russian cooperation in

planning a new rangewide survey, the Commission concluded that it would be appropriate and timely to formally contact Russian officials to express interest in expanding cooperative U.S.–Russian activities on walrus conservation.

The Commission therefore recommended that the Service, through the State Department, formally contact appropriate Russian officials to encourage their support and request information on their plans for future walrus conservation work. In doing so, the Commission noted that appropriate Russian officials should be invited to participate and assist in collaborative planning for walrus research, including the development of a new rangewide walrus survey. In addition, it suggested that cooperation might be appropriate with regard to investigating satellite imaging technology to monitor land-based walrus haul-out sites in Russia and the collection of tissues from annual harvests for stock structure and biomonitoring analyses.

Co-Management Activities – The Eskimo Walrus Commission was formed in 1978 by Native walrus hunters in Alaska to coordinate efforts to conserve Pacific walruses. In 1994 the Eskimo Walrus Commission signed a cooperative agreement with the Fish and Wildlife Service to formalize and strengthen cooperative efforts. During the Marine Mammal Commission's annual meeting, representatives of the Service and the Eskimo Walrus Commission reported on various joint undertakings, such as harvest monitoring, the collection of biological samples, the sharing of traditional knowledge acquired by walrus hunters, and the convening of research planning workshops. These activities are supported largely through funding provided by the Service under authority of the Marine Mammal Protection Act. In recent years the Eskimo Walrus Commission has received about $80,000 a year from this source.

The Commission was impressed by the constructive efforts of the Eskimo Walrus Commission. As noted above, it also believed that an expanded bio-monitoring program organized under the leadership of the Eskimo Walrus Commission to collect and archive tissues from the annual subsistence harvest could be a cost effective and exceedingly important long-term undertaking. To provide the Eskimo Walrus Com-mission with the financial resources for this work and to assist with other research and management needs it deems appropriate, the Commission recommended that the Service request and provide to the Eskimo Walrus Commission a substantial increase in funding (a total of $160,000 a year) under the applicable Marine Mam-mal Protection Act funding provisions.

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Harbor Seals in Alaska (*Phoca vitulina richardsi*)

Harbor seals are nonmigratory marine mammals found in subarctic and temperate waters of the North Atlantic and North Pacific Oceans, and contiguous seas. In the North Pacific, their distribution extends from San Ignacio Lagoon, Mexico, around the North Pacific rim to Hokkaido, Japan, and into the Bering Sea to the Pribilof Islands and northern Bristol Bay. They generally are found near shore in estuaries or protected waters, but may range far out to sea in deep pelagic waters or into freshwater rivers and lakes.

Main events in the annual cycle of harbor seals are pupping and nursing, mating, and molting. Pupping occurs from early May to late July, and mothers nurse their pups for three to six weeks. After weaning their pups, adult females mate within a few weeks. After fertilization, development of the embryo slows and its implantation in the uterus is delayed for a period of weeks to several months. This delayed implantation presumably enables the birth and weaning of pups to coincide with environmental conditions conducive to their survival. The delay also reduces postnursing demands on the adult female while she recovers her condition and molts. Although the full molting process occurs over a period of four to six months, molting is most apparent from late July to early September when old hair is shed and new hair is exposed. Because nursing and molting seals spend extended periods of time hauled out on land, counts to assess the status and trends of harbor seals generally are made during the molting period.

Status and Trends

In Alaska, the Service estimates statewide abundance by dividing the state into five regions and counting a different region each year. Thus, the harbor seal population of the entire state is assessed every five years. In addition, the Alaska Department of Fish and Game assesses trends in certain areas by conducting annual or biennial counts near Ketchikan and Sitka, in

Prince William Sound, around the Kodiak Archipelago, and in Bristol Bay. Supplemental research is conducted on the effects of various covariates (e.g., tide, time of day, weather, wind speed, direction, cloud cover, and visibility) that may affect harbor seal behavior and, therefore, the counts. Additional research aims to characterize haul-out patterns so that the number of seals counted can be adjusted or expanded to a total abundance estimate.

Southeastern Alaska – The Service's most recent estimate of harbor seals in the southeastern region of Alaska was 37,450 based on adjusted counts during the autumn molt in 1993. Trend surveys have shown that harbor seal numbers near Ketchikan increased about 7.4 percent annually from 1983 to 1998, with a slowing of population growth to about 5.6 percent annually from 1994 to 1998. Near Sitka, adjusted counts increased at about 0.7 percent annually from 1984 to 2001, but suggest a decrease from 1995 to 2001 at about -0.4 percent annually.

Before passage of the Marine Mammal Protection Act, tens of thousands of harbor seals were killed in Alaska for commercial purposes and because they were considered competitors for commercially valuable fish species. The recent increase in harbor seal abundance in southeastern Alaska probably represents recovery from this preceding period of population reduction. Although the trends in this region are generally thought to be positive, recent counts in Glacier Bay are an exception. The number of harbor seals in Glacier Bay increased into the mid-1980s, but then exhibited a decline of about 7.5 percent annually from 1992 to 1998. The causes for this decline have not been determined.

Gulf of Alaska and Aleutian Islands – The Service's most recent estimate of harbor seal numbers in the Gulf of Alaska (including the Aleutian Islands) was 29,175, based on surveys during the autumn molt in 1994 and 1996. With respect to trends, the number of harbor seals in the Gulf of Alaska appears to have declined significantly over the past several decades. Counts in Prince William Sound decreased by about 57 percent from 1984 to 1992. The decline, which started before the *Exxon Valdez* oil spill in 1989, was most severe in the year of the spill and has continued at a slower rate since then. Counts in the Kodiak Archipelago from 1976 to 1992 revealed an even more severe decline. During that period, counts on Tugidak Island (south of Kodiak Island) dropped from nearly 7,000 to fewer than 1,000, a decline of 85 to 90 percent. From 1993 to 2001 adjusted counts in the Kodiak area increased at about 6.6 percent annually although the number of harbor seals in this region still remains significantly depressed relative to numbers observed in the 1970s.

The first survey specifically designed to census harbor seals in the Aleutian Islands was conducted by the Service in 1994 and resulted in a population estimate of 3,489 (unadjusted). Because counts were not conducted in the Aleutian Islands before 1994, trends in this region cannot be assessed. The Service conducted harbor seal surveys in the Aleutian Islands in 1999 and in the Gulf of Alaska in 2001. The results of these surveys were not available at the end of 2001.

Bering Sea – The Service's most recent estimate of harbor seal abundance in the Bering Sea is 13,312, based on surveys conducted during the autumn molt in 1995. In this region, the status and trends of harbor seals are less clear due to limited baseline data and the undetermined influence of co-variates (e.g., some counts were conducted during the pupping season whereas others were conducted during the molting season; the effects of tides may be considerable but were not accounted for in the surveys). Nonetheless, the available data suggest a significant decline, at least in some areas. Counts on Otter Island in the Pribilof Islands declined by more than 80 percent from 1,175 in 1974 to 202 in 1995. Counts on the northern side of the Alaska Peninsula declined by more than about 60 percent from 1975 to 1995, or about 3.5 percent per year. Harbor seal numbers in northern Bristol Bay also declined in the 1970s and 1980s. In the 1990s counts during the pupping and molting periods in Nanvak Bay in the northern Bristol Bay region increased at 9.2 percent and 2.1 percent annually, respectively, indicating that some reversal of the previous decline may be occurring. However, adjusted counts in Bristol Bay from 1998 to 2001 indicate that harbor seal numbers in this region may be stable at best or even declining at about 1.3 percent annually. The Service conducted a survey of harbor seals in the Bering Sea in 2000; the results were not available at the end of 2001.

Factors Contributing to Harbor Seal Decline – A range of factors may have contributed to the observed declines of harbor seals in Alaska. However, factors causing the decline in Prince William Sound may not be the same as those responsible for the decline in the Bering Sea, and factors causing the

declines in the 1970s and 1980s may not be the same as those influencing population trends in the 1990s or at present. Natural factors could include ecosystem changes that alter the quality and quantity of available food or habitat; predation by killer whales, sharks, and Steller sea lions; disease; and emigration. Human-related factors could include past commercial harvests, illegal killing, subsistence harvests by Alaska Natives, incidental mortality in fisheries, reduced fitness due to contaminants, entanglement in marine debris, and changes in the quality or quantity of available food or habitat due to fisheries removal of prey (e.g., competition for important prey species). Available data are not sufficient to evaluate the importance of each of these factors in the observed decline of harbor seals in Alaska.

Management

The National Marine Fisheries Service is the lead federal agency responsible for the conservation of harbor seals. The Protected Resources Division of the Alaska Regional Office has the lead management responsibility in Alaska. Research support is provided by the Service's National Marine Mammal Laboratory of the Alaska Fisheries Science Center and the Southwest Fisheries Science Center. Research is also conducted by the Alaska Department of Fish and Game, the Alaska Native Harbor Seal Commission, the Alaska SeaLife Center, scientists from various universities, and the National Park Service in Glacier Bay National Park and Preserve.

Redefinition of Stocks – The National Marine Fisheries Service currently recognizes three management units of harbor seals in Alaska: southeastern Alaska, the Gulf of Alaska (including the Aleutian Islands), and the Bering Sea. However, the Service has conducted research indicating that these management units are not consistent with genetics data and likely do not reflect biological or ecological stocks. For that reason, the Alaska Regional Scientific Review Group wrote to the Service on 13 December 2000 recommending that the Service continue genetics studies of harbor seal stocks in Alaska, but that it also move forward with redefining stock boundaries based on the information available. The Service responded on 26 October 2001 that it was "ill-prepared to use the new stock information effectively and consistently, and that it planned to develop a national framework for incorporating such information into management of marine mammals." The Alaska Regional Scientific Review Group replied on 15 December 2001 that it did not understand the Service's position because the new genetic information resulted from scientific work conducted by Service scientists, the research had been conducted over a period of years, and the Service has the expertise to evaluate the new data and proceed with redefinition of harbor seal stocks.

Redefinition is essential to (1) establish appropriate management units, (2) interpret counts and trends and determine stock status, (3) identify stock-specific research needs, and (4) ensure that all stocks are sufficiently protected and, where required, appropriate recovery measures are taken. At the Commission's 14–16 November 2001 annual meeting in Anchorage, the results of the new genetic studies were presented and representatives of the Service indicated that the Service was preparing to proceed with efforts to redefine stock structure for harbor seals in Alaska. Subsequently, the Commission wrote to the Service on 31 December 2001, concurring with its decision and recommending that the Service proceed as an essential precursor for further research and management actions.

Status Review – Once stock structure has been redefined, the next important management step will be to review the available information on each stock to assess its status and trends, identify important research questions and management issues to be addressed, determine if listing under the Marine Mammal Protection Act or Endangered Species Act may be appropriate, and develop a plan for research and management. For that reason, in its 31 December 2001 letter to the Service, the Commission recommended that the Service follow stock redefinition with a status review of the newly defined stocks of harbor seals in Alaska.

Conservation Plan – Redefinition of stocks and a status review of those stocks should form the basis for a conservation plan for harbor seals in Alaska. The Marine Mammal Commission first wrote to the Service in June 1994 to recommend that a conservation plan be developed. The Service agreed and drafted a plan that was forwarded for comment to the Alaska Native Harbor Seal Commission in 1995. The plan was not finalized and, after its November 1997 annual meeting in Fairbanks, Alaska, the Commission wrote again to the Service urging its completion. In its 23 December 1997 letter, the Commission offered to help in developing the plan and noted that input from the

Alaska Native Harbor Seal Commission would be particularly important in guiding conservation efforts and laying the groundwork for a harbor seal co-management agreement. The Service responded on 12 February 1998, indicating that the 1995 draft plan was out of date and would require significant revision. The Service shifted its focus toward development of a co-management agreement and, more recently, a research plan (both of which are described below). Although the co-management agreement and the research plan represent significant progress in the management of harbor seals in Alaska, they do not provide the comprehensive management overview expected in a conservation plan. As of the end of 2001 a conservation plan had not been completed.

Co-Management of Harbor Seals – Beginning in 1992 the Service contracted with the Alaska Department of Fish and Game to survey Native households to estimate the number of seals taken annually. From 1992 to 1998 and in 2000, estimates of the annual harvest were between about 2,200 and 2,900 animals. The most recent estimate was for the year 2000 and included 1,979 seals harvested and 250 struck and lost for an estimated total harvest of 2,229 seals. Information on the subsistence harvests in 1999 and 2001 is not yet available.

Because harbor seals are a traditional subsistence resource for Alaska Natives, the Service works with Alaska Native groups on matters pertaining to subsistence hunting and related research. On 29 April 1999 the Service and the Alaska Native Harbor Seal Commission signed a co-management agreement pursuant to section 119 of the Marine Mammal Protection Act. The purposes of the agreement were to (1) develop an annual action plan for co-management of the subsistence harvest of harbor seals, (2) promote the sustained health of harbor seal populations to protect Alaska Native culture, (3) promote scientific research to support management decisions, (4) identify and resolve management conflicts, and (5) provide information to subsistence hunters and the public at large to increase understanding of the sustainable use, management, and conservation of harbor seals. The agreement establishes a Harbor Seal Co-Management Committee comprising three members each from the Alaska Native Harbor Seal Commission and the National Marine Fisheries Service. The primary purpose of the committee is to develop the annual action plan, the main elements of which are population monitoring, harvest management, education, research recommendations, and other recommendations.

In September 2000 the Service and the Alaska Native Harbor Seal Commission held a workshop in Juneau, Alaska, to identify specific objectives for the first action plan under the co-management agreement. Workshop participants were from academia, the government, and Alaska Native tribes and were chosen for their expertise in population monitoring, harvest management, and education. The workshop resulted in the formulation of an action plan for 2001. The plan consists primarily of an agreement by both parties to accomplish their respective responsibilities as delineated by the workshop.

The co-management agreement between the Service and the Alaska Native Harbor Seal Commission provides an opportunity for cooperative monitoring of the subsistence harvest and an opportunity for researchers and Alaska Native hunters to conduct cooperative research by "bio-sampling" the harvested animals. Potentially, bio-sampling provides tissues and information useful for addressing research questions on a range of topics including, but not limited to, stock structure, diet, health and condition, contaminant loads, and age and sex composition of harvested animals and the wild population. By taking advantage of the sampling opportunities provided by the subsistence harvests, scientists and hunters can provide important information that is difficult to collect with nonlethal study methods.

At its 2001 annual meeting, the Marine Mammal Commission was informed that the Alaska Native Harbor Seal Commission and the Service were working toward better cooperation on research opportunities provided by the subsistence harvest. The Alaska Department of Fish and Game, which has played a key role in harbor seal research in Alaska, has also participated in such cooperative research on harbor seals. The contributions of these and other research participants (e.g., the Alaska SeaLife Center and researchers from various universities) may be enhanced considerably through cooperative bio-sampling, but the infrastructure for such cooperation appears to require additional development. For that reason, in its letter of 31 December 2001 the Commission recommended that the Service continue to work closely with the Alaska Department of Fish and Game and the Alaska Native Harbor Seal Commission to ensure that they are able to

take full advantage of the sampling opportunities resulting from the subsistence harvest.

Research Plan – In August 2000 the Service and the Alaska Department of Fish and Game completed an Alaska harbor seal research plan. The plan is to be revised annually but is intended to provide a five-year perspective on research to address management needs pertaining to harbor seals in Alaska. The objectives of the plan are to better coordinate and consolidate research efforts, identify needed but unfunded research, increase communication and collaboration among scientists and managers, and ensure that the research conducted satisfies management objectives. The plan focuses research on stock identification, abundance and trends, habitat, health and condition, food habits, life history and general biology, and human interactions.

There are a number of concerns with respect to assessment of stock status and trends. Harbor seal stocks must first be properly identified. Each stock must be included in the assessment strategy to ensure that baseline information is collected and available for future review and potentially significant declines do not go undetected. Surveys must be conducted with sufficient frequency and regularity, and must be of sufficient accuracy and precision, that declines are detected in a timely fashion and the efficacy of measures to facilitate population recovery can be determined. Given the wide range of harbor seals in Alaska and the dispersion of the seals within that range, these are significant challenges. In addition, harbor seal counts are known to be highly variable as a function of their biology (e.g., pupping and molting schedules, haul-out patterns), as well as other factors such as location, season, environmental conditions, and prey availability.

Research related to harbor seal habitat is important because such habitat may be adversely affected by a range of human activities, including disturbance at haul-out sites, fouling by pollution such as the *Exxon Valdez* oil spill, coastal development, discharges from cruise ships, and fisheries, particularly fisheries in nearshore waters. Similarly, studies of health and condition may help to identify problems related to disease, contaminants, or nutritional stress.

Research related to food habits is also important, because nutritional stress has been one of the leading hypotheses to explain the decline of harbor seals in Alaska. Nutritional stress may occur as a result of changes in the quality or quantity of available prey, and such changes may result from natural causes (e.g., the environmental regime shift) or from human activities (e.g., fisheries competition for prey). Although additional studies of the harbor seal diet are needed, seals are known to consume a range of species including herring, walleye pollock, Pacific cod, squid, shrimp, octopus, salmon, eulachon, and capelin.

Similarly, research related to life history characteristics and general harbor seal biology (e.g., pupping and molting patterns, vital rates [survival and reproduction], and movement patterns) is essential to interpretation of stock assessment data and identification of factors affecting status. Here too these studies are complicated by variation due to a range of factors such as size, age, sex, season, location, environmental conditions, disease, changes in quality of habitat, and human interactions.

Finally, harbor seals may be affected by a range of human interactions including disturbance at haul-out sites, subsistence harvests, coastal development, anthropogenic contaminants or pollutants, and direct and indirect fisheries interactions. The Alaska harbor seal research plan addresses questions related to such interactions, including the disturbance and incidental take associated with commercial fisheries and the need for better accounting of the subsistence harvest by Alaska Natives.

Funding

In 2001 Congress reallocated funding for harbor seal research in Alaska. Funds that historically had been directed to the harbor seal program of the Alaska Department of Fish and Game were reallocated to the Alaska Native Harbor Seal Commission and the Alaska SeaLife Center. The shifting of these funds has important implications for the programs involved, for the research that will be conducted, and for conservation and management efforts for harbor seals in Alaska. Therefore, in its 31 December 2001 letter to the Service, the Commission recommended that the Service work closely with the Alaska Department of Fish and Game and other research partners to ensure continuity of the Department's harbor seal program in 2002 and future years.

Polar Bear (*Ursus maritimus*)

Alaska is home to two discrete stocks of polar bears: the western or Chukchi/Bering Seas stock, shared with Russia, and the southern Beaufort Sea stock, shared with Canada. In addition, there are several other stocks that occur throughout the Arctic in Canada, Greenland, Norway, and Russia. Polar bears can traverse vast territories, often crossing over borders and into international waters. The southern Beaufort Sea stock numbers about 1,800 animals. Although an accurate estimate of the size of the Chukchi/Bering Seas stock is not currently available, U.S. officials charged with polar bear conservation are using a figure of 2,000 to 5,000 animals as their best estimate. Worldwide polar bear numbers have been estimated at 21,000 to 28,000 animals.

It has been difficult to obtain accurate estimates of polar bear stocks for several reasons, including the difficulty in detecting dens hidden under snow, the general inaccessibility of their habitat, the movement of bears across international boundaries, and the sheer size of the territory that the animals may cover. Political and financial considerations have also tended to impede survey projects, which are costly and have in the past been hampered by breakdowns in international cooperation. It is thought, however, that intense sport hunting before enactment of the Marine Mammal Protection Act in 1972 contributed to reducing both the Chukchi/Bering Seas and the Beaufort Sea stocks. In September 1998 the Fish and Wildlife Service published stock assessments for these two stocks, suggesting that both have grown since passage of the Act.

Historically, polar bears in Alaska were taken primarily by Alaska Natives for subsistence purposes and for the sale of hides. Late in the 1940s trophy hunters began taking polar bears using professional guides and sometimes aircraft to make the hunt easier. As a result, pressure on polar bear stocks in Alaska and elsewhere increased substantially. In 1961 the State of Alaska adopted regulations restricting the sport-hunting season and requiring hunters to present all polar bear skins and skulls for tagging and examination. Preference was provided to subsistence hunters, and a prohibition was placed 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.

The Marine Mammal Protection Act of 1972 established a moratorium on the taking of polar bears and other marine mammals, and management responsibility for these species was transferred to the federal government. Under the Act, Alaska Natives are allowed to take polar bears and other marine mammals for subsistence purposes and for 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 depleted. The Act also established a general prohibition on the import of polar bear parts, such as hides, into the United States.

As with efforts to survey the stocks, efforts to conserve polar bears require international cooperation, at least for those stocks that cross international boundaries. Recognizing this, and because of concern over the dramatic increase in polar bear harvest levels in the 1950s and 1960s, the United States and other countries where polar bears occur negotiated 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.

Amendments enacted to the Marine Mammal Protection Act in 1994 added a number of measures pertaining to polar bears. A framework for issuing permits to import sport-hunted polar bear trophies legally taken by U.S. citizens in Canada was established for those populations approved by the Fish and Wildlife Service, in consultation with the Marine Mammal Commission. Efforts by the Fish and Wildlife Service to promulgate regulations allowing imports from certain stocks and further amendments enacted in 1997 are discussed in this report and in previous annual reports.

Polar Bear Stock Assessments

The Fish and Wildlife Service is required under the Marine Mammal Protection Act to prepare and periodically update assessment reports for the polar bear stocks that occur in U.S. waters. Initial stock assessments for the two stocks in Alaska were

published by the Fish and Wildlife Service in October 1995 and updated in September 1998. In its 1998 report, the Service estimated the size of the Beaufort Sea polar bear stock at 1,765 (CV = 0.10). However, no reliable stock estimate could be made for the Chukchi/Bering Seas stock in either 1995 or 1998. In 2001 the Service drafted revised assessment reports for the two polar bear stocks. It is expected that they will be made available for public review and comment during the first part of 2002.

At the Marine Mammal Commission's annual meeting in November 2001, officials of the Fish and Wildlife Service emphasized the pressing need to obtain more accurate information about both the Chukchi/Bering Seas and Beaufort Sea stocks. The Service reported that in 2000 it had been able to conduct aerial surveys of polar bears in the Chukchi Sea area in cooperation with the U.S. Coast Guard, which made space available and facilitated the work of researchers on one of its cruises. Transects were flown over a study area bordered by 147°W longitude to the east and the international dateline to the west, and from 75°20'N latitude to the southern extent of the sea ice. Polar bear density estimates derived from the 2000 survey were approximately 153 km^2/bear for areas where the ice was greater than 10 percent of surface coverage and 168 km^2/bear for all areas with some ice cover. Unfortunately, the Service was unable to conduct surveys in 2001. However, the Service has indicated its intention to continue these surveys in 2002, contingent on securing ship time and sufficient funding.

In 2000 the Service convened a workshop of U.S. and Russian scientists to develop a protocol for conducting den surveys on Wrangel Island, north of the Chukotka Peninsula. Wrangel Island is one of the areas within the range of the Chukchi/Bering Seas stock that is most frequently used by polar bears for denning. Although a protocol was agreed to, joint surveys are not likely to be conducted until the new bilateral U.S.–Russian polar bear agreement has been implemented and the parties have agreed on procedures for authorizing, funding, and conducting such projects. As an interim step, the Service has contracted for development of a habitat suitability index of polar bears on Wrangel Island that would be used to focus survey effort on those areas that, because of topography and other factors, are most likely to be used for denning.

New information is also needed to refine and update the Service's abundance estimates for the Beaufort Sea polar bear stock. The data currently being used are about 10 years old, and the Fish and Wildlife Service hopes to work with Canadian scientists to carry out a systematic mark-and-recapture study to help assess the current status of that stock. At the Commission's 2001 annual meeting, a scientist from the U.S. Geological Survey's Alaska Biological Science Center informed the Commission about a technique the Center is developing to use forward-looking infrared sensors to detect dens hidden under ice and snow. In preliminary experiments, the sensors were able to detect 10 out of 12 known dens and three dens that had previously gone undetected. Ambient light, atmospheric moisture, uneven snow surface temperatures, and the experience level of observers were found to limit the effectiveness of this technology.

Polar Bear Conservation Plan

In 1988 Congress amended the Marine Mammal Protection Act to require the Secretaries of the Interior and Commerce to develop conservation plans for depleted marine mammal species and populations. That amendment also encouraged the Secretaries to prepare conservation plans for other populations that could benefit from such a plan. In January 1989 the Fish and Wildlife Service agreed with a Marine Mammal Commission recommendation to prepare a conservation plan for polar bears. From 1992 through 1994, the Commission worked closely with the Service to ensure that the conservation plan identified research and management actions necessary to maintain populations in Alaska within their optimum sustainable ranges.

The final conservation plan for polar bears in Alaska was released in 1994. At that time, the Service noted that the plan would be reviewed annually with the idea of updating it, if necessary, in three to five years. Although it has been more than five years since the polar bear conservation plan was published, and the Service still intends to review and, as necessary, update the plan, other responsibilities related to polar bear management have been more pressing and have prevented use of staff time and resources for this task.

Co-Management Agreements

In 1994 Congress enacted section 119 of the Marine Mammal Protection Act to provide for the establishment of cooperative agreements between the Secretaries of the Interior and Commerce and Alaska Native organizations to conserve marine mammals and provide for co-management of their subsistence use by Alaska Natives. That provision enables the Secretary to make grants to Native organizations for collecting and analyzing data, monitoring the taking of marine mammals for subsistence, participating in research, and developing co-management programs.

The Fish and Wildlife Service and the Alaska Nanuuq (Polar Bear) Commission signed a cooperative agreement on 19 February 1997 for the co-management of polar bears pursuant to this authority. Subsequent agreements have been entered into on an annual basis. In each of the first five years under these agreements between $80,000 and $95,000 has been provided to the Alaska Nanuuq Commission to help fund its participation in efforts to conclude a bilateral agreement between the United States and Russia on conservation of polar bears in the Bering and Chukchi Seas (see discussion later in this section) and other activities related to polar bear conservation and management. Among other things, the Alaska Nanuuq Commission has been working with the National Park Service to assist the Traditional Subsistence Hunters Association of Chukotka in gathering traditional ecological knowledge about polar bear habitat use in the Russian portion of the Chukchi/Bering Seas stock's range. As part of this project, 48 Alaska Native hunters in Chukotka were interviewed during 2001 to help map information related to polar bear feeding, migration, and denning areas. The Alaska Nanuuq Commission hopes to have the information from this study published in 2002.

Another project being conducted under the cooperative agreement involves the collection of samples from polar bears taken by subsistence hunters for the assessment of contaminant levels. Two bears taken by Alaska Native hunters were sampled during the 2000–2001 hunting season, bringing the total number of bears sampled over the past five years to 27. The Service has obtained preliminary results from the analyses of these samples, which indicate that organochlorine levels do not appear high when compared with concentrations found in bears from other polar regions. However, some concentrations of hexachlorocyclohexane (HCH) found in samples from polar bears in the Chukchi, Bering, and Beaufort Seas are among the highest reported in the Arctic region. With respect to heavy metal concentrations found in Alaskan polar bears, mercury and cadmium levels were somewhat higher than those reported in bears from western Canada.

Marking, Tagging, and Reporting Program

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 enacted in 1981, the Fish and Wildlife Service was given specific authority to create a marking, tagging, and reporting program to monitor the Native harvest of polar bears, walruses, and sea otters. Such a program was established by the Service in 1988. Its purpose is to estimate annual harvest levels, obtain biological data needed to manage the species and stocks, and help control illegal trade in products from those species.

The Service's regulations require that Native hunters report the take to an authorized Service agent and present specified parts, including polar bear hides and skulls, to be marked and tagged, within 30 days of taking. The Service works closely with Native groups to implement the program, and data obtained from the program are maintained by the Service in a computerized database. During the 2000–2001 harvest year, running from 1 July 2000 to 30 June 2001, 52 polar bears were presented for marking and tagging by Alaska Natives. The numbers of polar bears tagged each harvest year since inception of the program are shown in Table 7.

Agreement on the Conservation of Polar Bears

As noted earlier, the United States and other Arctic nations signed the Agreement on the Conservation of Polar Bears in 1973. 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 those related to habitat protection. Accordingly, in 1992 the Commission con-

Table 7. Numbers of polar bears tagged during Alaska Native harvests, 1989–2001

Harvest Year	Number Tagged	Harvest Year	Number Tagged
1989–1990	99	1995–1996	40
1990–1991	76	1996–1997	69
1991–1992	59	1997–1998	49
1992–1993	66	1998–1999	90
1993–1994	121	1999–2000	39
1994–1995	92	2000–2001	52

Source: U.S. Fish and Wildlife Service.

tracted for an examination of the Agreement's provisions, the Marine Mammal Protection Act, and other domestic legislation to identify possible inconsistencies and how they might be reconciled. The report of that study was provided to the Fish and Wildlife Service in January 1994 and was subsequently updated to reflect amendments to the Marine Mammal Protection Act enacted later that year (see Baur 1995, Appendix B).

In response to concerns that the Agreement 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 a review of the effectiveness of the Agreement and to work with the contracting parties to establish a process by which future reviews of the Agreement would be conducted. The amendments also required that the Secretary, in consultation with the Secretary of State and the Marine Mammal Commission, review the effectiveness of U.S. implementation of the Agreement, particularly with respect to habitat protection. A report based on the review was to be submitted to Congress by 1 April 1995.

In June 1995 the Service convened a meeting of representatives of interested governmental agencies and nongovernmental organizations to review U.S. implementation of the Agreement. The Service subsequently prepared a draft report assessing U.S. compliance with each of the provisions of the Agreement and with a resolution adopted by its parties concerning the taking of female bears, cubs, and denning bears. A full discussion of the draft report and the Commission's comments thereon can be found in past annual reports. Among the key issues under review was whether the United States was in full compliance with the habitat protection provisions of the Agreement and whether the issuance of incidental take authorizations under the Marine Mammal Protection Act was consistent with the terms of the Agreement. The final report has yet to be transmitted to Congress. However, at the end of 2001 the Division of Parks and Wildlife of the Department of the Interior's solicitor's office was in the process of completing an analysis of these issues for incorporation into the report. The Service expects to complete the report and transmit it to Congress during 2002.

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. In May 1997 the Fish and Wildlife Service wrote to the other parties seeking assistance in conducting the review. The Service received final reviews from Canada, Norway, and Greenland, but, as of the end of 2001, was waiting for a final response from the Russian Federation. A preliminary response from Russia suggested that there may be some sentiment to open up the 1973 agreement for modification. Once all final responses are in hand, the Service will prepare a report on international compliance with the Agreement and the other parties' views on further steps that are needed.

Bilateral Polar Bear Agreements

As discussed earlier, two discrete polar bear stocks occur in Alaska, and both are shared with other countries. The southern Beaufort Sea stock is shared with Canada and the western (Chukchi/Bering Seas) stock is shared with Russia. Efforts to develop and implement cooperative programs with these countries for the management and conservation of polar bears are discussed below.

North Slope Borough/Inuvialuit Polar Bear Agreement – Native hunters in both Alaska and northwestern Canada have traditionally hunted polar bears in the Beaufort Sea area. Because both groups were targeting polar bears from the same stock, unregulated hunting, by itself and in combination with other activities, could have caused the stock to decline. Recognizing this possibility, 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.

The agreement is more restrictive than the Marine Mammal Protection Act because it calls for protecting cubs, females with cubs, and all bears inhabiting or constructing dens, and prohibits airborne hunting. 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, both Alaska and Canadian Natives have largely complied with the mutually agreed conservation measures. The subsistence harvest of Beaufort Sea polar bears has remained well below the calculated sustainable level, and the take of female bears and cubs has been reduced significantly since establishment of the agreement. After more than 10 years of experience with the agreement, it is considered to be a model for cooperative, voluntary management of a resource by user groups. An assessment of the effectiveness of the agreement during its first 10 years has been prepared by the parties and technical advisors from the Fish and Wildlife Service and the Canadian Wildlife Service. The assessment is expected to be published in the journal *Arctic* during 2002.

The parties to the agreement held a meeting of commissioners and technical advisors on 11 March 2001 in Anchorage, Alaska, to review management and research activities under the agreement. Technical advisors from U.S. and Canadian government agencies presented information on a wide range of topics, including recent harvest data, contaminants monitoring, the results of aerial surveys, revised population estimates, efforts to classify polar bear denning habitat, oil spill modeling, and climate change. The Commissioners agree to retain existing harvest limits and to take steps to promote full compliance with marking, tagging, and reporting requirements in all communities.

U.S.–Russian Polar Bear Agreement – The western or Chukchi/Bering Seas polar bear stock, which ranges between Alaska and Russia, has traditionally been used for subsistence by Native people in both the United States and Russia although hunting has been banned in Russia since 1956. In 1992 the Fish and Wildlife 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 a bilateral agreement on the conservation and regulated use of polar bears from the shared stock. The protocol called on both governments to create special working groups composed of representatives of government agencies and Native communities to prepare proposals for the agreement and to convene the working groups to prepare a draft agreement.

The 1994 amendments to the Marine Mammal Protection Act added a new provision, section 113(d), which specifically addresses conservation of the shared U.S.–Russian polar bear stock. The provision directed the Secretary of the Interior, in consultation with the Marine Mammal Commission and the State of Alaska, to consult with Russian officials on the development and implementation of enhanced cooperative research and management programs for the shared polar bear stock. In 1994 representatives of Native organizations and government agencies from the United States and Russia held technical discussions concerning joint conservation of the shared stock of polar bears occupying the Chukchi, Bering, and eastern Siberian Seas. As a result of those discussions, the parties signed the Protocol on U.S./Russia Technical Consultation for the Conservation of Polar Bears of the Chukchi/Bering Sea Regions on 9 September 1994. Further scientific and technical discussions concerning the proposed government-to-government agreement were held with Russian officials during 1995 and 1998, culminating in the adoption, on 12 February 1998, of an ad referendum text of a bilateral agreement for submission to the two national governments for approval. Participants in those negotiating sessions included both government officials and representatives of the affected Native communities.

After reviewing the text, both the U.S. Department of State and the Russian Federation suggested certain revisions. The parties agreed that a

Figure 14. Female Alaska polar bear with cubs (photograph by Steven Amstrup, courtesy of Fish and Wildlife Service).

further negotiating session was needed. Final face-to-face negotiations were held in Anchorage, Alaska, on 7–9 March 2000. As with past negotiating efforts, the U.S. delegation included a representative of the Commission. These negotiations resulted in a new text that was circulated for approval within the respective governments and provided to the other three parties to the Agreement on the Conservation of Polar Bears for their review. After incorporating technical changes to reconcile the English and Russian texts, the Agreement between the Government of the United States of America and the Government of the Russian Federation on the Conservation and Management of the Alaska-Chukotka Polar Bear Population was signed in Washington, D.C., on 16 October 2000.

The Agreement specifies that subsistence taking by Native residents of Alaska and Chukotka are to be the only allowable consumptive uses of the affected stock of polar bears. Under the Agreement, a joint commission composed of four members — a governmental official and a Native representative from each jurisdiction — is to establish annual taking limits that may not exceed the sustainable harvest level determined for the stock. The allowable taking limit will be divided equally between the two parties, but, subject to approval by the joint commission, either party may transfer a portion of its allowable take to the other party. It is expected that the joint commission will establish a scientific working group to assist in setting annual sustainable harvest levels and identifying scientific research to be carried out by the parties. Other provisions of the Agreement prohibit the taking of denning bears, females with cubs, or cubs less than one year old, and the use of aircraft and large motorized vessels for hunting polar bears. Also, the Agreement directs the parties to undertake all efforts necessary to conserve polar bear habitats, particularly denning areas and those areas where polar bears concentrate to feed or migrate. Implementation of these provisions is expected to help ensure that the United States is in full compliance with the provisions of the multilateral 1973 polar bear treaty. The full text of the agreement and related information can be found at the web site maintained by the Fish and Wildlife Service's Alaska Region (http://www.r7.fws.gov/ea/pbsigning/).

Before the Agreement enters into effect, the advice and consent of the Senate is needed. Also, legislation to implement certain provisions of the Agreement will be needed. As of the end of 2001 the Department of State was in the process of drafting the documents necessary for formally transmitting the Agreement to the Senate for its advice and consent. In addition, the Department of the Interior, in consultation with the Commission and others, developed draft implementing legislation during 2001. At year's end, the Interior proposal was undergoing interagency review and clearance before submission to Congress. It is expected that the President will submit the Agreement to the Senate in 2002 for its consideration. The transmission of proposed implementing legislation to Congress is also expected during 2002.

Although the Agreement has yet to enter into force, the parties plan to meet to share information concerning the Chukchi/Bering Seas polar bear stock and to discuss issues related to the establishment and organization of the bilateral commission. Such a meeting, originally scheduled for the fall of 2001, has been postponed until 2002.

Polar Bear Trophy Imports

In 1994 the Marine Mammal Protection Act was amended to allow the Secretary of the Interior to issue permits to import sport-hunted polar bear trophies from Canada, provided that certain findings are made. Among other things, it must be found that Canada has an enforced sport-hunting program consistent with the purposes of the Agreement on the Conservation of Polar Bears and based on scientifically sound quotas that will ensure the maintenance of the affected population stock at a sustainable level. The amendments also direct the Secretary to charge a reasonable fee for permits and to use the receipts to develop cooperative research and management programs for the conservation of polar bears in Alaska and Russia.

Regulations to implement the polar bear import provision were published by the Fish and Wildlife Service on 18 February 1997. The Service determined that 5 of the 12 Canadian polar bear management units met the Marine Mammal Protection Act's criteria and that parts from those subpopulations could be imported. The management units from which imports were originally authorized included the southern Beaufort Sea, the northern Beaufort Sea, Viscount Melville Sound, western Hudson Bay, and M'Clintock Channel. A key feature of the final rule was establishment of a $1,000 permit issuance fee, in addition to a $25 processing fee, to be used for polar bear conservation activities.

As discussed in previous annual reports, the regulations were not well received by hunters, who expected findings also to be made for other management units, or by animal welfare groups, who believed the Service had erred by making any affirmative findings. This prompted the House Resources Committee to convene a hearing early in 1997 to review the Service's implementation of the polar bear import provisions. That hearing led to an amendment to the Marine Mammal Protection Act to allow imports of all polar bear trophies legally taken in Canada before 30 April 1994, regardless of where the hunt occurred.

Shortly after publication of the final regulations in February 1997, the Commission requested and received from the Service additional information on Canada's polar bear program. Among other things, Canada had revised the boundaries of some polar bear management units. What previously had comprised three management units (Queen Elizabeth Islands, Parry Channel, and Baffin Bay) had been realigned into smaller Baffin Bay and Queen Elizabeth Islands units and three new management units (Kane Basin, Lancaster Sound, and Norwegian Bay). In light of the new information, the Commission contracted for a review of Canada's polar bear management program, particularly as it relates to the current status and sustainability of those populations for which the Fish and Wildlife Service deferred making findings under the 1997 final rule (see Testa 1997, Appendix B).

The Commission transmitted a copy of the contract report to the Service in late April 1997 and, based on the information in the report and its independent review of the available data, recommended that the Service initiate a rulemaking to make affirmative findings for the Lancaster Sound and Norwegian Bay management units. The Service considered this recommendation and, on 2 February 1998, published a proposed rule to make affirmative findings for these two management units. A final rule allowing the import of polar bear trophies from the Lancaster Sound and Norwegian Bay management units was published by the Service on 11 January 1999. Approval of the Baffin Bay and Kane Basin populations was deferred pending the establishment of cooperative management arrangements between Canada and Greenland. The Service also deferred making a finding on the revised Queen Elizabeth Islands population that now contains land only in the far northern part of the Canadian Arctic Archipelago.

In October 2000 the Fish and Wildlife Service received a report from the Canadian Wildlife Service concerning the status of the M'Clintock Channel polar bear population. That report indicated that a new survey of this population had begun in 1998 to update the 1978 population estimate, which was still being used in setting harvest limits. Based on a preliminary analysis of three years of data from the survey, it appeared that the population size was considerably lower than originally believed (the best estimate was 288 bears) and that the sex ratio of the adult population was heavily skewed toward female bears (65 percent females). The analysis in the report explained that these data suggest that the adult male population had been reduced by hunting and that any continuing

harvest would be increasingly composed of adult females. The report projected that, at the current rate of exploitation, the population would be extirpated within 10 years. The report concluded that the M'Clintock Channel polar bear population should be considered depleted and recommended that the maximum sustainable harvest level be reduced from 32 to 8 bears per year. However, the report indicated that, even at that reduced level, the removal of bears would not allow the population to recover. Therefore, the territorial government of Nunavut intended to pursue discussions with local communities to establish new harvest limits before the hunting season began in February 2001.

In response to the information it had received from the Canadian authorities, the Fish and Wildlife Service on 10 January 2001 published an emergency interim rule finding that the M'Clintock Channel management unit no longer met the import requirements of the Marine Mammal Protection Act. Thus, permits to import polar bears taken from this management unit after 31 May 2000 would no longer be available. The Service also noted that the five-year moratorium on taking polar bears from the Viscount Melville Sound management unit had been lifted by Canada. The import of legally taken trophies from this management unit had been authorized by the Service in February 1997, pending the lifting of that moratorium.

The Commission, in consultation with its Committee of Scientific Advisors, provided comments on the interim rule by letter of 10 April 2001. The Commission concurred with the Service's determination that Canada's management program for the M'Clintock Channel management unit no longer appeared to meet the statutory criteria under which imports may be authorized. More specifically, the Commission noted that the hunting program for this population did not appear to be based on scientifically sound quotas ensuring the maintenance of the stock at a sustainable level. As such, the Commission recommended that the interim rule be adopted as a permanent rule.

The Commission also believed that the new survey data for this population underscored the need for setting conservative quotas that reflect the uncertainties in the available information and for rigorous population monitoring programs capable of detecting any adverse effects of the allowable harvests. In this regard, the Commission called the Service's attention to its 1995 comments on the original proposed import regulations concerning abundance estimates and population assessments. In light of the decline in the M'Clintock Channel population despite the adoption of what were believed to be sustainable harvest quotas, the Commission recommended that the Service encourage Canadian authorities to consider using more conservative population estimates (such as a minimum population estimate, rather than a midpoint estimate) in setting quotas. The Commission further recommended that assessments of the Canadian polar bear populations be conducted more frequently, particularly for those populations for which the available data are characterized as being "fair" or "poor." The Commission's letter also noted that the current situation concerning the M'Clintock Channel population pointed to the need for the Fish and Wildlife Service to complete the scientific review of the impact of issuing import permits on the polar bear population in Canada, required by section 104(c)(5)(C). This provision is designed to ensure that the issuance of such permits is not having a significant adverse effect on Canadian polar bear stocks.

The Fish and Wildlife Service published a final rule to replace the emergency interim rule on 5 October 2001. No substantive changes were made. The preamble to the final rule contained updated information concerning the status and management of the M'Clintock Channel population. The Service noted that Canadian authorities had provided a revised best estimate of the population of 367 bears. Despite this increased estimate, the Service continued to be concerned that the population had been severely reduced. Also, it was noted that on 16 January 2001 the Nunavut minister of sustainable development had accepted the recommendation of the Nunavut Wildlife Management Board to reduce the allowable harvest of polar bears from the M'Clintock Channel population to 12 (8 males and 4 females) for the 2000–2001 season, followed by a one-year moratorium on hunting in 2001–2002. Further consultation about future harvest levels is expected. Although the Service indicated that these reduced limits might keep the population from declining further, it did not believe that they would bring about the population's recovery. In this regard, the Service cited the projections provided by Nunavut

officials that, even with no harvest, it would take 25 years for the population to double, assuming a 4 percent annual growth rate.

The Service did not think that the problems associated with the M'Clintock Channel population were indicative of a problem with Canada's polar bear management program as a whole. Moreover, Nunavut was in the process of developing a new management approach based on population viability analysis. This approach will consider the reproductive potential of the population, the uncertainty of the underlying demographic information, and statistical uncertainty when making harvest level determinations.

Under the 1994 amendments to the Marine Mammal Protection Act, the Fish and Wildlife Service was directed to undertake a scientific review of the impact of issuing import permits on the polar bear populations in Canada. The review was to be completed by 30 April 1996. No permits could be issued after 30 September 1996 if the review indicated that issuing such permits would have a significant adverse effect on Canadian polar bear stocks. Because the regulations authorizing imports had not been issued by the time the review was to be completed, no review was undertaken. Instead, the regulations published by the Service on 18 February 1997 specified that the review would be undertaken within two years of 20 March 1997. As of the end of 2001 the review had yet to be completed. The Fish and Wildlife Service expects to finalize the review in 2002.

Since regulations authorizing the import of polar bear trophies took effect in 1997, 482 import permits have been issued. Of these, 132 were issued in 1997, 60 in 1998, 143 in 1999, 76 in 2000, and 71 in 2001.

Sea Otter (*Enhydra lutris*)

Before the beginning of commercial hunting in the late 1700s, sea otters occurred in coastal waters throughout the rim of the North Pacific Ocean from northern Japan to Baja California, Mexico. Hunting was prohibited under the terms of the North Pacific Fur Seal Convention concluded in 1911 by the United States, Japan, Great Britain, and Russia. By then, only a few thousand animals remained from preexploitation populations estimated to have totaled between 150,000 and 300,000 individuals. These remnants were scattered in small colonies in remote areas of Russia, Alaska, British Columbia, and central California.

Since the prohibition on commercial hunting in 1911, sea otters have recolonized or have been reintroduced into much of their historic range. By the time the Marine Mammal Protection Act was enacted in 1972, the California population had grown from as few as 50 to more than 1,000 individuals (an average annual growth rate of about 5 percent) and had recolonized more than 200 mi (370 km) of the California coast. Remnant groups in Alaska grew even more rapidly and, in the late 1960s and early 1970s, several hundred otters were moved from Amchitka Island and Prince William Sound to try to reestablish populations in southeastern Alaska and the outer coasts of Washington and Oregon. In 1995 the Fish and Wildlife Service estimated that there were approximately 100,000 sea otters in Alaska, more than 2,300 in California, and more than 300 in Washington, and that all the populations were growing. Subse-quently, however, both the California and southwestern Alaska populations were found to have declined, the latter by as much as 90 percent in some areas.

Efforts by the Marine Mammal Commission to identify and recommend actions necessary to protect and restore depleted sea otter populations and their habitat since its establishment by the Marine Mammal Protection Act are described in previous annual reports. Background information and efforts by the Commission and others to determine and eliminate or mitigate the cause or causes of the recent population declines are described below.

The Alaska Sea Otter Populations

Three subspecies of sea otters are generally recognized: *E. l. lutris*, whose range includes northern Japan, the Kuril and Commander Islands, and the Kamchatka Peninsula; *E. l. kenyoni*, whose range includes the Aleutian Islands, the Alaska Peninsula, Kodiak Island, Prince William Sound, southeastern Alaska, British Columbia, Washington, and Oregon; and *E. l. nereis*, the remnant population in California. Recent phylogeographic studies (Gorbics and Bodkin, *Marine Mammal Science*, Vol. 17, No. 3) indicate that there are three relatively discrete populations or stocks in Alaska: a southeast stock inhabiting the area from

Dixon Entrance to Cape Yakataga; a southcentral stock inhabiting the area from Cape Yakataga to Cape Douglas, including Prince William Sound and the Kenai Peninsula; and a southwestern stock inhabiting coastal areas around Kodiak Island, the Alaska Peninsula, Bristol Bay, and the Pribilof and Aleutian Islands.

As noted in previous annual reports, the Fish and Wildlife Service advised the Commission in 1996 that there had been a dramatic decline in sea otter numbers in the area around Adak Island in the central Aleutians and that the cause of the decline was not known. Because of the magnitude and uncertainty concerning the cause of both the decline in Alaska and the decline in California described below, the Commission has reviewed the status of both the Alaska and California sea otter populations and related research and conservation programs at every annual meeting since 1997.

At its meeting in Fairbanks, Alaska, in November 1997, the Commission was advised by the Fish and Wildlife Service that the decline in sea otter numbers observed at Adak Island may also have occurred at other areas in southwestern Alaska, that the decline appeared to be continuing, and that the Biological Resources Division of the U. S. Geological Survey, the federal agency with research responsibilities regarding sea otters, had requested, but had not received, funding for studies to investigate the geographic extent and cause of the decline. At its meeting in Portland, Maine, in November 1998, the Commission was advised by the Fish and Wildlife Service that killer whale predation appeared to be the most likely cause of the decline and that funding necessary to document the magnitude and extent of the decline had yet to be made available. At its meeting in Seaside, California, in October 1999, the Commission was advised that the decline was continuing and that, although the extent of the decline had not been determined, abundance in parts of the Aleutian Islands had declined by 90 percent or more. The Commission also was advised that, although a survey of the entire range of the southwestern stock had been planned for 1999, funding necessary to carry out the survey had not been obtained.

Aware that reliable information on the magnitude and extent of the continuing decline was critical to the development of an effective conservation strategy, the Commission recommended in a 23 November 1999 letter to the Fish and Wildlife Service that the Service either reprogram funds or seek a supplemental appropriation to conduct a census of sea otters throughout their Alaska range in the spring or early summer of 2000. Aware also that killer whale predation had been identified as a possible cause of the decline, the Commission further recommended that the Service consult with the National Marine Fisheries Service, the federal agency responsible for assessing and monitoring the status of killer whale and other cetacean stocks in U.S. waters, to determine if there had been any observed changes in the abundance or behavior of killer whales in or near the area where the sea otter decline was occurring. The Commission also recommended that the Service explore with its sister agency the possibility of conducting a killer whale survey along with the recommended rangewide sea otter survey.

The Fish and Wildlife Service responded to the Commission's recommendations by letter of 18 January 2000. The Service indicated that it shared the Commission's concerns regarding the sea otter decline in the central Aleutians, that funding had been obtained to conduct an aerial survey of sea otters in the Aleutian Archipelago in spring 2000, and that funding was being sought to survey the Alaska Peninsula and Kodiak Archipelago as well. The Service also indicated that it was working with colleagues in Russia to include the Commander Islands in the aerial survey and to find funding to continue boat surveys of sea otters in the Commander Islands. In addition, the Service indicated that it had consulted the National Marine Fisheries Service and learned that it was not conducting and had no plans to conduct studies of killer whales in the Aleutians. Recognizing the need to document whether killer whale predation is responsible for the sea otter decline, the Service indicated that it had, in cooperation with the Alaska Native Sea Otter and Steller Sea Lion Commission, enlisted the aid of a killer whale expert to train Native residents to collect information on interactions between sea otters and killer whales.

An aerial survey of sea otters in the Aleutian Islands was carried out in the spring of 2000. The number of otters seen was approximately 70 percent less than the number seen during a comparable survey in 1992 (2,442 compared with 8,048). Because the decline appeared to be continuing and the cause remained uncertain, the Fish and Wildlife Service in

Table 8. Trends in sea otter counts in southwestern Alaska; 1986–2001

	1986	1992	1994	2000	2001	% Decline
Aleutian Islands[1]	—	8,044	—	2,442	—	70
Rat Islands[1]	—	1,461	—	192	—	87
Alaska Peninsula, North[2]	9,061–13,091	—	—	5,756	—	36 to 56
Alaska Peninsula, South[1,2]	15,345–17,835	—	—	—	1,344	91 to 92
Kodiak Archipelago[2]	—	—	9,817	—	5.893	40
Combined Totals		43,726 – 50,248		15,627		31 to 36

[1] Shoreline counts [2] Ship transects

August 2000 designated the sea otters in the Aleutian Islands as a candidate for listing as endangered or threatened under the Endangered Species Act. A *Federal Register* notice announcing the action was published on 9 November 2000. The notice indicated that as few as 6,000 otters may remain in the entire Aleutian chain, down from an estimated 50,000 to 100,000 in the 1980s, and that the Service had requested funds to prepare a proposed listing rule. However, the necessary funding was not forthcoming and, as a consequence, no action on the listing proposal was taken in 2001.

Given this delay, the Center for Biological Diversity petitioned the Fish and Wildlife Service on 9 August 2001 to conduct a status review and list the Alaska stock of northern sea otters, *E. l. kenyoni*, as depleted under the Marine Mammal Protection Act. The petition noted that sea otters in Alaska were classified as a single stock and estimated that the stock had declined from 100,000–150,000 to approximately 38,000 individuals since the mid-1970s (i.e., had declined to somewhere between 25 and 38 percent of its mid-1970 size). It noted further that 60 percent of historic or carrying capacity levels was considered the lower limit of optimum sustainable population levels as defined in the Marine Mammal Protection Act and that sea otter numbers in Alaska clearly were below 60 percent of their historic abundance in the state. Notice of receipt of the petition was published by the Service in the *Federal Register* on 6 September 2001. On 2 November 2001 the Service published notice in the *Federal Register* that the best available information indicates that there are multiple stocks of sea otters in Alaska, that the statewide population is larger than was estimated in the petition (about 74,000), and that it therefore had determined that the petitioned action was not warranted.

The Marine Mammal Commission and its Committee of Scientific Advisors held their 2001 annual meeting in Anchorage, Alaska, on 14–16 November 2001. The meeting was held in Alaska to obtain the most up-to-date information possible on the status and efforts to conserve sea otters and other marine mammals and their habitat in Alaska waters and the Bering Sea. Representatives of the Alaska Region of the Fish and Wildlife Service, the Biological Resources Division of the U.S. Geological Survey, and the Alaska Sea Otter and Steller Sea Lion Commission were invited to present information and participate in the discussions concerning sea otters. Among other

things, representatives of the Fish and Wildlife Service presented the results of the most recent surveys of the southwestern sea otter stock and reviewed their rationale for proposing that the stock be afforded protection under the Endangered Species Act. They also described sea otter–related projects being carried out under the co-management agreement with the Alaska Sea Otter and Steller Sea Lion Commission.

Data from the most recent surveys of the Aleutian Islands and adjacent areas are summarized in Table 8. The rationale for Endangered Species Act listing is apparent from these data and is outlined in the 9 November 2000 *Federal Register* notice announcing that the sea otter stock in the Aleutians had been designated a candidate for listing under the Act. In this regard, Fish and Wildlife Service representatives indicated, as noted earlier, that the decline had spread beyond the Aleutians and that they therefore believed that the entire southwestern sea otter stock should be considered for listing under the Endangered Species Act. They also indicated that they were proposing that the stock be listed as a strategic stock under the Marine Mammal Protection Act and that listing as either endangered or threatened under the Endangered Species Act would afford them management tools and funding not available under the Marine Mammal Protection Act. They noted that there was no reason to believe that Native subsistence hunting had caused or contributed to the decline and, as indicated earlier, described a number of sea otter–related projects being carried out under the co-management agreement with the Alaska Sea Otter and Steller Sea Lion Commission. Those projects include biological sampling of sea otters taken by Alaska Natives for subsistence and handicraft purposes, surveys and necropsies of dead sea otters washed up on selected beaches to estimate natural mortality rates and causes, small-boat surveys to monitor sea otter distributions and abundance in and near areas where subsistence hunting occurs, training of Natives and provision of equipment and supplies necessary to carry out the bio-sampling and survey programs, and development of local and regional conservation plans to ensure that subsistence hunting does not lead to depletion of any sea otter stocks.

The Fish and Wildlife Service representatives who participated in the Commission's meeting were uncertain as to whether the funding necessary to proceed with the Endangered Species Act listing and to initiate related research and management actions would be available in fiscal year 2002. Therefore, by letter of 31 December 2001 to the Director of the Service's Alaska Region, the Commission recommended that the Service make the budgetary adjustments necessary to enable the listing process to proceed expeditiously. The Commission also recommended that, pending constitution of a recovery team and formulation of a recovery plan as would be required following listing of the southwestern sea otter stock as either endangered or threatened, the Service should immediately initiate efforts to identify the causes of the decline and, where possible, the appropriate steps to reverse it. Further, the Commission noted that information presented at its November 2001 meeting indicated that most of the recent sea otter research effort in Alaska has been focused on the southeastern stock, which is increasing, rather than on the southwestern stock, which is declining. The Commission therefore recommended that the Service review its research plans and make such adjustments as necessary to ensure that issues of highest priority are afforded precedence.

The California Sea Otter Population

Completion in 1976 of the pipeline carrying oil from the North Slope of Alaska to its terminus at Valdez, in Prince William Sound, led to a substantial increase in oil tankers transiting areas inhabited by the recovering sea otter population in California. Sea otters are particularly vulnerable to oil spills, and the increase in tanker traffic increased the risk of accidents and associated oil spills. Because of the increased risk of oil spills and the small size and limited distribution of the remnant population, the California sea otter population was listed in January 1977 as threatened under the Endangered Species Act. As noted in previous Commission reports, the Fish and Wildlife Service in February 1982 adopted a recovery plan incorporating a zonal management strategy recommended by the Commission.

The zonal management strategy was intended to reduce oil spill threats by reintroducing otters into one or more West Coast areas not then inhabited by sea otters, and at the same time minimize the impacts of sea otter range expansion on commercial and recreational shellfish fisheries by preventing otters from re-

colonizing areas where important shellfish fisheries had developed in their absence. Implementing the strategy required capturing and moving otters to one or more designated translocation zones and removing them from designated no-otter fishery zones. At that time, the Marine Mammal Protection Act prohibited taking of depleted marine mammal species, except for purposes of scientific research. Species listed as endangered or threatened under the Endangered Species Act are considered to be depleted under the Marine Mammal Protection Act. Therefore, the zonal management strategy could not be implemented unless the Marine Mammal Protection Act was amended or other statutory authority was provided. After considering the alternatives, Congress in 1986 enacted Public Law 99-625, which among other things provided authority to capture and move sea otters for management purposes.

Following passage of the statute, the Fish and Wildlife Service, in consultation with the Commission, the California Coastal Commission, and the California Department of Fish and Game, developed a translocation plan and promulgated regulations to establish a reserve sea otter colony at San Nicolas Island, one of the California Channel Islands. As part of the process, the Service prepared an environmental impact statement, conducted consultations and prepared a biological opinion in accordance with section 7 of the Endangered Species Act, and signed a memorandum of understanding with the California Department of Fish and Game setting out responsibilities for the translocation and related activities. Between August 1987 and July 1990, 139 sea otters were moved from the mainland sea otter range to San Nicolas Island.

As noted in previous Commission reports, most of the otters moved to San Nicolas Island subsequently left the translocation zone. Since the spring of 1998 substantial numbers of otters from the parent population have moved in and out of the designated no-otter management zone south of Point Conception. Also, as indicated in Table 9, the numbers of sea otters in the mainland California range began to decline in 1996. Neither the cause of the decline nor the reason for the movement of otters into the management zone were apparent. The Fish and Wildlife Service therefore held public meetings in Santa Barbara and Monterey in August 1998 to seek public input concerning possible

Table 9. California sea otter population counts, 1984–2001

Year		Independent Otters	Dependent Pups	Total
1984	Spring	1,180	123	1,303
	Fall	–	–	–
1985	Spring	1,119	242	1,361
	Fall	1,065	150	1,215
1986	Spring	1,358	228	1,586
	Fall	1,091	113	1,204
1987	Spring	1,435	226	1,661
	Fall	1,260	110	1,370
1988	Spring	1,504	221	1,725
	Fall	–	–	–
1989	Spring	1,571	285	1,856
	Fall	1,492	115	1,607
1990	Spring	1,466	214	1,680
	Fall	1,516	120	1,636
1991	Spring	1,700	241	1,941
	Fall	1,523	138	1,661
1992	Spring	1,810	291	2,101
	Fall	1,581	134	1,715
1993	Spring	2,022	217	2,239
	Fall	1,662	143	1,805
1994	Spring	2,076	283	2,359
	Fall	1,730	115	1,845
1995	Spring	2,095	282	2,377
	Fall	2,053	137	2,190
1996	Spring	1,963	315	2,278
	Fall	1,858	161	2,019
1997	Spring	1,919	310	2,229
	Fall	2,008	197	2,205
1998	Spring	1,955	159	2,114
	Fall	1,726	211	1,937
1999	Spring	1,858	232	2,090
	Fall	1,808	162	1,970
2000	Spring	2,053	264	2,317
	Fall	1,678	199	1,877
2001	Spring	1,863	298	2,161
	Fall	1,825	188	2,012

Source: U.S. Fish and Wildlife Service, California Department of Fish and Game, and U.S. Geological Survey.

management options. At the meetings, the Service announced that it was reinitiating consultation pursuant to section 7 of the Endangered Species Act to re-examine the translocation and containment program in light of the referenced new information. In March 1999 the Service made available for public comment a draft evaluation of the Southern Sea Otter Translocation Program and a draft memorandum on re-initiation of formal section 7 consultations on the containment program. The Commission's comments on these documents are described in previous reports.

There were conflicting views and substantial uncertainties about the status of, and the optimal strategy for, protecting both sea otters and potentially affected shellfish fisheries in California. To better understand the nature and basis of the differing views, the Commission held its 1999 annual meeting in Seaside, California, and invited representatives of the involved state and federal agencies, fisheries, and environmental groups to attend the meeting and make known their views on the various issues. From information gathered at the meeting, it was clear that it was not known why the attempt to establish a reserve sea otter colony at San Nicolas Island had been unsuccessful, why the mainland sea otter population was declining, or what had caused the movement of substantial numbers of otters into and out of the no-otter management zone south of Point Conception in 1998 and again in 1999. It also was clear that funding and personnel constraints had prevented doing everything necessary to resolve the conflicts and uncertainties. The Commission, in consultation with its Committee of Scientific Advisors, therefore developed and on 23 December 1999 forwarded to the Fish and Wildlife Service a draft action plan to promote recovery of, and identify the optimal conservation strategy for, the California sea otter population. The content of this draft action plan and related recommendations are described in the Commission's previous report.

Representatives of the Commission met with representatives of the Service on 6 March 2000 to discuss components of the draft action plan as they related to recommendations in a draft revision of the Southern Sea Otter Recovery Plan, which had been released by the Service for public comment on 8 February 2000. It was noted at that meeting that there were both similarities and differences in the research and management recommendations in the Commission's draft action plan and the draft recovery plan revision. It was agreed that the Commission would review and provide comments to the Service on the draft recovery plan revision as soon as possible. The Commission, in consultation with its Committee of Scientific Advisors, subsequently reviewed and, by letter of 3 April 2000, provided the Service comments on the draft revision. Among other things, the Commission pointed out that the draft did not focus on the tasks that appeared to be of greatest immediate importance — identifying and eliminating the cause or causes of the population decline — and did not indicate precisely what the Service was proposing or recommending to meet that objective. The Commission recommended that the revision be restructured to afford priority to measures necessary to identify the cause and reverse the decline. The Commission also recommended that the Service convene a meeting of representatives of the various agencies and organizations with related interests and responsibilities to agree on the priority research and recovery tasks and the agencies or organizations responsible for undertaking the various tasks.

As noted earlier, the Commission invited representatives of the state and federal agencies and private organizations with related interests and responsibilities to attend and present their views on sea otter– related matters at the Commission's meeting in Seaside, California, in October 1999. Representatives of several fishery and environmental groups used the meeting as a forum to identify common goals and to initiate discussions on ways the groups might work cooperatively to meet those goals. Those discussions were fruitful and were continued after the meeting. However, they were suspended on 21 April 2000 when the Commercial Fishermen of Santa Barbara, Inc., and several other groups filed suit in the U.S. District Court for the Central District of California seeking to compel the Fish and Wildlife to remove the sea otters that had moved into the designated no-otter management zone south of Point Conception. The plaintiffs contended that the Service's failure to remove the otters violated the regulations promulgated by the Service to implement Public Law 99-625.

On 20 July 2000 the Service released its biological opinion concerning the southern sea otter

containment program. It concluded that "the continued existence of southern sea otters is likely to be jeopardized by removing them from the area of the Pacific Ocean south of Point Conception on the California coast to the U.S.–Mexican border and relocating them to the north of this designated 'otter-free' management zone." On the same day the Service issued a press release indi-cating that it was undertaking a comprehensive review in accordance with the National Environmental Policy Act to determine whether the translocation and containment program should be continued, modified, or terminated. On 22 January 2001 the Service published notice in the *Federal Register* that it would not capture and remove otters from the area south of Point Conception pending completion of its reevaluation of the translocation and containment program, including preparation of an environmental impact statement to supplement the one done to assess the environmental consequences of the original translocation plan.

In July 2001 the Commercial Fishermen of Santa Barbara and other plaintiffs withdrew their court suit seeking to compel the Fish and Wildlife Service to remove otters from the management zone, pending the Service's final decision as to whether the translocation program should be continued, modified, or terminated. Also, on 11 October 2001 the House of Representatives Subcommittee on Fisheries Conservation, Wildlife and Oceans held an oversight hearing on reauthorization of the Marine Mammal Protection Act. During the hearing, a Fish and Wildlife Service representative described the history of the translocation program and the ongoing efforts to determine whether it should be continued, modified, or terminated. Representatives of environmental and fisheries groups presented their views on the subject. At the end of the year, it was the Commission's understanding that the Fish and Wildlife Service did not anticipate completing the evaluation of the translocation program or the update of the Southern Sea Otter Recovery Plan until late in 2002. The Commission also was aware that, following suspension of the aforementioned lawsuit, there was interest in resuming the discussions to identify and determine how the various interest groups might work cooperatively to meet common conservation goals.

Florida Manatee (Trichechus manatus latirostris)

The Florida manatee, a subspecies of the West Indian manatee, occurs only in the southeastern United States. It occupies the northern limit of the species' range, which extends south along the eastern coast of the Americas to Brazil. Manatees are slow-moving aquatic herbivores that feed in freshwater systems and the ocean. They rarely venture into nearshore ocean waters except to travel between adjacent rivers or estuaries. Prolonged exposure to water temperatures below 18°C (65°F) can be lethal to manatees and, therefore, during winter, Florida manatees are largely confined to the lower two-thirds of the Florida Peninsula. There they aggregate around warm-water springs and thermal outfalls from power plants, or remain in the Everglades at the southern tip of the state. As water temperatures rise in spring and summer, manatees disperse widely throughout the state, although individual animals rarely move from one coast to the other. A few east coast animals range northward into coastal Georgia and the Carolinas, and west coast manatees occasionally travel westward to Louisiana. Movements beyond those limits are unusual.

Although historical information on manatees in Florida is sparse, it is believed that their abundance was greatly reduced by commercial and subsistence hunting in the 1800s. In 1893 Florida enacted a law prohibiting the killing of manatees, thus making them one of the first wildlife species in the United States to receive protection. Since passage of the Endangered Species Act in 1973, West Indian manatees, including the Florida manatee, have been listed as endangered.

In the mid-1970s, when research on Florida manatees began in earnest, abundance estimates based on limited data conservatively suggested that there were perhaps 600 to 1,000 animals. As winter aggregation sites began to be identified at power plants and two major warm-water springs (Blue Spring on the St. Johns River and Kings Bay at the head of the Crystal River on Florida's west coast), surveys of those sites during cold periods provided a new minimum estimate of about 1,200 animals. In 1989 the State of Florida began conducting statewide winter surveys in an attempt to count as many manatees as possible. These surveys have provided a better minimum

Table 10. Known manatee mortality in the southeastern United States (excluding Puerto Rico) reported through the manatee salvage and necropsy program, 1978–2001

Year	Vessel-Related Deaths No. (%)	Flood Gate and Lock Deaths No. (%)	Other Human-Related Deaths[1] No. (%)	Perinatal Deaths No. (%)	Other Deaths[2] No. (%)	Total Deaths in the Southeastern United States
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)[3]	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)	1 (0)	61 (15)	284 (68)[4]	416
1997	55 (22)	8 (3)	9 (4)	61 (25)	113 (46)	246
1998	67 (28)	9 (4)	7 (3)	52 (21)	108 (44)	243
1999	83 (30)	15 (5)	8 (3)	52 (19)	116 (42)	274
2000	79 (28)	7 (3)	9 (3)	58 (21)	126 (45)	279
2001[5]	82 (24)	1 (0)	7 (2)	63 (19)	183 (54)	336

[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 149 deaths attributed to a spring red-tide event in southwestern Florida.

[5] Data for 2001 are preliminary.

Source: Florida Fish and Wildlife Conservation Commission.

population estimate; however, they have not been useful for estimating total population size or for measuring population trends over time. Because of unquantifiable effects of variables such as weather, water clarity, and manatee behavior, successive statewide counts even within a few weeks of each other have varied by nearly a thousand animals. In addition, experience and refined survey designs since 1989 have improved the ability of survey teams to locate and count manatees, thereby adding another variable and making it inappropriate to compare statewide survey counts over time.

Nevertheless, the raw counts identify the minimum number of Florida manatees. Before 2001 the highest

single statewide count was 2,639 manatees recorded in February 1996. That total was surpassed in 2001 by a count of 3,276 manatees on 5–6 January during what were described as near-perfect survey conditions. The count included 1,756 manatees on the west coast and 1,520 on the east coast, both of which were record highs. Sixty percent of these manatees — nearly half on the west coast and more than three- fourths of those on east coast — were seen at power plant outfalls. Although the survey results have not been useful for calculating a statistically meaningful population trend, it is a widely held view among manatee scientists and resource managers that the total manatee abundance throughout Florida is now greater than it was in the mid- to late 1970s. How much greater is unknown.

A manatee carcass salvage and necropsy program begun in the mid-1970s, however, provides a firm basis for documenting trends in manatee mortality (see Table 10). Total deaths over the past five years are about two and a half times greater than they were in the first half of the 1980s. Although a large part of this increase may be due to an increase in manatee abundance, rapid growth in human activities and development also may be significant factors. Over the past five years, human-related manatee mortality has accounted for 33 percent of all manatee deaths, with watercraft-related deaths accounting for nearly 27 percent. These rates are about 5 to 6 percent higher than in the early 1980s, when about 28 percent of all deaths were human-related and 21 percent were due to watercraft.

The high level of human-related manatee mortality has been one of two principal focuses of attention by resource managers. The other has been destruction and alteration of manatee habitat. Up until the 1950s and 1960s, the center of manatee habitat in Florida was assumed to be the rivers and estuaries of the Florida Everglades. The construction of canals, gates, dams, and other flood control structures during that period, however, significantly altered water flow and habitat in the Everglades. At the same time, thermal effluents from new power plants were introduced along the coast of Florida. Over the years, manatees have learned to rely on plant outfalls to survive cold winter periods. In fact, the warmth and reliability of outfalls at those plants may have enhanced the survival of manatees during cold weather and perhaps contributed to their increased abundance over the past 25 years. Many of those power plants, however, have reached or exceeded their planned operational life. With regulatory restrictions precluding such effluents from new plants, the continued availability of warm-water power plant outfalls on which a large majority of manatees now depend is becoming less and less certain.

In addition, Florida's human population, which has grown in the past three decades from 6.7 million in 1970 to 16 million in 2000, continues to grow at a rate of about 1,000 people a day. This growth has supported a major coastal development boom that continues to alter manatee habitat and to increase the number of watercraft on the state's waterways. Even natural warm-water springs used by manatees are threatened; increased pumping of groundwater for agriculture and household uses has drawn down water tables and reduced spring flow rates.

In recent years manatee conservation has become increasingly contentious. On the one hand, some people believe manatee recovery needs are becoming increasingly urgent for reasons noted above, and they believe not enough is being done to secure the species' long-term survival. On the other hand, some people note that the minimum estimates of manatee abundance have increased significantly over the past decade. They equate the magnitude of those changes with the magnitude of actual population growth even though such comparisons are not scientifically valid. Given the level of recent estimates, they believe manatees should no longer be considered endangered, efforts to further strengthen boat speed regulatory zones are no longer needed, and restrictions on the development of new marinas and other coastal projects to protect manatees should be eased.

To press the former view, Save the Manatee Club and 17 other environmental organizations joined in two lawsuits filed late in 1999, one against the Fish and Wildlife Service and the Army Corps of Engineers and the other against the Florida Fish and Wildlife Conservation Commission. As discussed below, both suits alleged violations of statutory provisions requiring protection of manatees. To press the latter view, the Coastal Conservation Association, a group representing recreational fishermen in Florida, petitioned the Florida Fish and Wildlife Conservation Commission in the fall of 2001 to reevaluate the status of the Florida manatee and to downlist its status from endangered to threatened under state law.

Because essential manatee habitats often become urbanized in coastal Florida, manatees pose one of the nation's most difficult marine mammal conservation challenges. Responsibility for most work in this regard is shared by two federal and two state agencies. The two federal agencies, both in the Department of the Interior, are the Fish and Wildlife Service and the Sirenia Project in the Biological Resources Division of the U.S. Geological Survey. The Service has lead responsibility under both the Endangered Species Act and the Marine Mammal Protection Act for activities, including the development and implementation of the Florida Manatee Recovery Plan, ensuring that actions by federal agencies, such as permits for development projects, do not adversely affect manatees or their habitat; enforcement of boat speed zones established to protect manatees; and overseeing the rescue and rehabilitation of injured and distressed manatees. The Sirenia Project has the lead in addressing certain manatee research needs, including the development of population models, assessments of life history information from manatee photo-identification records, and research on feeding ecology and habitat needs.

The two state agencies sharing lead responsibility for manatee protection are both components of the Florida Fish and Wildlife Conservation Commission: the Bureau of Protected Species Management and the Florida Marine Research Institute. The Bureau oversees state regulatory, planning, and public education activities related to manatees, including the development of boat speed regulatory zones and county manatee protection plans. The Institute is the state's marine research arm and has the lead in conducting the manatee salvage and necropsy program, aerial surveys of manatees, maintaining a geographic information system for archiving and synthesizing data on manatees and manatee habitat, and coordinating rescues of distressed manatees.

Many other agencies and nongovernmental groups also have major roles in carrying out certain important recovery tasks. The Army Corps of Engineers and the South Florida Water Management District have the lead in developing and installing devices to prevent manatees from being crushed and drowned in flood gates and navigation locks, the Florida Inland Navigation District erects and maintains signs for manatee-related boat speed regulatory zones, the Coast Guard and Florida Division of Law Enforcement enforce those zones, various marine parks and aquariums provide facilities and treatment for rehabilitating injured manatees, the Florida Power & Light Company has funded public education materials and projects to investigate alternatives to warm-water refuges for manatees, and the Save the Manatee Club has funded research and donated equipment to address various management needs.

The Marine Mammal Commission has supported various manatee research and management projects and conducted periodic reviews of recovery activities. Its most recent review of the manatee recovery program was at its 10–12 October 2000 annual meeting. Following that review, the Commission wrote to key agencies and groups in November and December 2000 providing its findings and recommendations. Those letters, sent to the Fish and Wildlife Service, the Florida Fish and Wildlife Conservation Commission, Governor Jeb Bush, the South Florida Water Management District, and the Florida Power & Light Company, are described in the previous annual report.

Results of recent activities through 2001, including responses to the Commission's letters, are discussed below.

Evaluation of the Status of the Florida Manatee Population

Effective ways to monitor the status and trend of the population have been difficult to develop. To address this need, the Fish and Wildlife Service convened a workshop on manatee population biology in 1992. The focus of that workshop was to synthesize information on manatee population biology, review approaches to manatee population biology research, and develop future research recommendations. To build on the results of that workshop and develop a scientifically sound method for assessing the status and trend of the Florida manatee population, the 1996 revision of the Florida Manatee Recovery Plan called for the establishment of a manatee population status working group. As discussed below under the section on the manatee recovery plan, this group, chaired by the Sirenia Project of the U.S. Geological Survey, developed a set of recommended population benchmarks to gauge the status of the manatee population and in 2001 undertook steps to convene another manatee population biology workshop in the spring of 2002.

To help evaluate data relevant to the population's status, the Marine Mammal Commission, in cooperation with the Florida Marine Research Institute, provided funding in 2001 for a study to update a 1992 analysis of Florida manatee mortality data. Among other things, that analysis will summarize information on the number and causes of manatee mortality, assess mortality trends over time and in different geographic areas, and incorporate that information into a life history analysis. In addition, the project will critique the strengths and weaknesses of recent models and data analyses prepared to assess trends in the Florida manatee population (see also Chapter VIII).

Statewide manatee counts of 2,639 manatees in February 1996 and 3,276 manatees in January 2001 also prompted the submission of a petition to the Florida Fish and Wildlife Conservation Commission in the fall of 2001 to review the status of Florida manatees and to downlist the species to threatened on the state list of endangered and threatened species. The Florida Commission agreed to reexamine the species' status, but a report is not expected to be developed until after the spring 2002 population biology workshop. As discussed below, in 2001 the Fish and Wildlife Service also adopted a revised recovery plan for Florida manatees. The revised plan includes new criteria for reclassifying and eventually delisting Florida manatees on the list of endangered and threatened species under the federal Endangered Species Act. The revised plan also calls for completing a status review of the Florida manatee population pursuant to provisions of the Endangered Species Act by 2003.

Watercraft-Related Manatee Deaths

Collisions with watercraft are the largest source of human-related manatee mortality and are responsible for about 25 percent of all documented manatee deaths. Some manatees are killed by tugs and large commercial vessels that crush them between hulls and waterway bottoms or cut them to pieces with their large propellers. Most watercraft-related deaths, however, appear to be due to the impact of hulls or cuts from propellers of fast-moving recreational vessels. To address these impacts, the State of Florida has developed countywide speed zones in 13 key counties where manatees occur in large numbers or where watercraft-related deaths have been most numerous. Recognizing that vessel operators cannot reliably detect and avoid manatees, the speed zones were developed to allow manatees time to avoid oncoming boats.

Rules for the speed zones were developed over a 12-year period through negotiations between state, local, and county officials and members of the public. The negotiations, often contentious, sought to balance manatee protection needs and boater interests. The rules were developed waterway-by-waterway, county-by-county by weighing factors, such as manatee habitat-use patterns, boating activity patterns, and waterway geography. Rules for some counties were adopted as early as the early 1990s and have been subject to legal challenges and amendment and now cover thousands of waterway miles. Several different types of zones have been established: channel-exempt, channel-inclusive, and shoreline-only speed zones with differing speed limits, high-speed water sports zones, and in a few cases at major warm-water refuges, small no-entry areas. Additional zones have been established by the state in portions of 11 counties other than the 13 key counties, and by the Fish and Wildlife Service in and around certain national wildlife refuges. The cost of developing and posting the county speed zones has been several million dollars.

As indicated in Table 10, vessel-related manatee deaths have increased steadily despite these boat speed limits. Although the rules have undoubtedly prevented some manatee deaths, the effect has been minimal, and this may be due to a number of factors. For example, rules have not been developed for all areas where manatees have been killed by boats. In addition, efforts to accommodate local boating interests have, in some cases, resulted in rules that are weaker than initially proposed in key areas. Poor boater compliance, however, seems to be a particularly important factor. Recent compliance studies indicate that, in some areas, noncompliance rates have been high, particularly for operators of small outboards and jet skis. Poor compliance may be due to inadequate regulatory signs, confusion over the numerous types of regulatory zones, and limited enforcement. Regarding the latter factor, enforcement was generally spotty and lax for most of the 1990s.

Because operators of large boats seem more likely to recognize and comply with posted speed requirements than those operating smaller boats, enforcement appears to be a more important factor than signage or rule complexity with regard to raising compliance

levels. To improve enforcement, in 1997 the Fish and Wildlife Service began conducting a series of two- and three-day law enforcement operations in counties where vessel-related manatee deaths and compliance concerns have been greatest. In 2000 the Service received a congressional appropriation of $500,000 for manatee enforcement. With these funds, the Service increased its efforts, conducting 26 enforcement operations and issuing more than 800 notices of violation, each carrying a fine of $100.

Based on its October 2000 review of the manatee recovery program, the Marine Mammal Commission concluded that the effectiveness of existing boat speed zones could be evaluated only when boater compliance rates reached the best levels possible. It therefore concluded that enforcement was one of the highest, if not the highest, priorities for the manatee recovery program. In its 1 December 2000 letter to the Fish and Wildlife Service, the Commission recommended that the Service strengthen its law enforcement work by providing at least $1 million annually for manatee enforcement over the next five years, that it hire or assign at least four full-time officers to conduct manatee enforcement operations around the state, and that it form an interagency task force with the Coast Guard and the Florida Division of Law Enforcement to coordinate enforcement strategies for manatee-related rules. In a letter of the same date to the Florida Fish and Wildlife Conservation Commission, the Marine Mammal Commission also urged that the state increase its enforcement efforts and coordinate those efforts with the Service. To improve efforts to assess and monitor boater compliance, the Commission offered to help fund a study to assess the feasibility of video-monitoring systems that could be moved from site to site as needed.

In its 7 November 2001 reply, the Service advised the Commission that it had received $1 million for each of fiscal years 2001 and 2002 to continue its work on manatee enforcement and that it planned to hold a meeting with representatives of the Coast Guard and the Florida Division of Law Enforcement to arrange closer cooperation on enforcement work. Initial meetings in this regard were held late in 2001, and additional coordination meetings were planned for early in 2002. Despite the significant increase in funding, Service enforcement of speed zone regulations did not increase in 2001. A total of 12 targeted enforcement operations was undertaken in five counties, and 786 citations were issued, about the same as in 2001. Some of the additional funding was used to hire three additional enforcement officers for Florida national wildlife refuges with manatee habitat, rather than forming a full-time enforcement strike team to operate statewide.

Beginning in 1998 the U.S. Coast Guard, in cooperation with the Service, also began issuing tickets (259 in 1998, 697 in 1999, and 645 in 2000) for violations of manatee-related boat speed zones. In 2001 the Coast Guard maintained its enforcement efforts, issuing 711 citations.

The agency with perhaps the most resources to focus on manatee-related law enforcement is the Division of Law Enforcement (formerly the Florida Marine Patrol) within the Florida Fish and Wildlife Conservation Commission. The division has about 600 investigators, lieutenants, and law enforcement officers in the field interacting with the public. Since the mid-1990s, it has roughly doubled its manatee-related law enforcement effort. In 2001 the division devoted nearly 23,000 patrol hours to manatee-related enforcement during which it issued nearly 2,500 citations, more than 4,300 written warnings, and more than 8,800 verbal warnings for excessive speeds in manatee-related speed zones. Also during 2001, due largely to concern over enforcement needs for manatees, the division was authorized and funded to add 25 new law enforcement officers to its staff. These officers, representing about a 5 percent increase in the division's field staff, are expected to come on line in mid-2002. In addition, the division reassigned about 25 officers and allocated $2 million in overtime money to help enforce manatee speed zones.

With regard to compliance monitoring, the Florida Fish and Wildlife Conservation Commission accepted the Commission's offer of assistance to determine if new surveillance cameras could address monitoring needs more cost-effectively. In 2001 the Marine Mammal Commission therefore provided funding to the Florida Marine Research Institute to investigate the feasibility of using remotely operated cameras to collect and analyze compliance data and to identify areas where greater enforcement efforts would be most useful. Field testing of equipment is expected to take place in 2002 (see also Chapter VIII).

Manatee Litigation

As mentioned briefly in the Commission's previous annual report, environmental groups have pursued litigation in an effort to conserve manatees. On 13 January 2000 several environmental groups filed suit against the U.S. Army Corps of Engineers and the Fish and Wildlife Service *(Save the Manatee Club* v. *Ballard)* alleging violations of the Endangered Species Act, the Marine Mammal Protection Act, and other federal statutes bearing on the management and protection of manatees. The plaintiffs alleged that management actions by federal agencies to protect manatees and essential manatee habitat have not been adequate. The plaintiffs sought to compel the adoption of regulations and other measures for the better protection of manatees. Among other things, they claimed that the agencies impermissibly were allowing activities to go forward that were likely to result in the incidental taking of manatees without securing or issuing the necessary authorizations.

A settlement was reached between the parties in January 2001 requiring the federal agencies to undertake a number of actions to promote better manatee protection. Major points of the settlement include an agreement that (1) the Service will pursue development of incidental take regulations under section 101(a)(5) of the Marine Mammal Protection Act to ensure that taking incidental to boating activities will have no more than a negligible impact on the manatee population, (2) the Corps will cooperate in the incidental take regulations process, (3) the Service will prepare either an environmental assessment or an environmental impact statement on the issuance of the regulations, (4) the Service will develop new guidance for use in consultations under section 7 of the Endangered Species Act concerning permitting activities by the Corps for watercraft access facilities, (5) the Service will publish a proposed rule to establish new manatee refuges and sanctuaries throughout Florida, and (6) the Service will complete a revised recovery plan for manatees.

In addition to their lawsuit against the federal agencies, the environmental groups filed suit against the State of Florida's Fish and Wildlife Conservation Commission, also in January 2000 *(Save the Manatee Club* v. *Egbert)*. A settlement among the parties in this case was reached on 23 April 2001. The State of Florida agreed to establish rules to regulate the speed of motorboats and to establish protected areas called "hot spots" and "safe havens" in certain manatee habitats in Brevard County.

The state published these rules for public review on 7 March 2001 and finalized the rules later in the year. Following publication of the rules, however, several Florida boating interests filed suit to have them withdrawn. As of the end of 2001 no further action had been taken by the court in this case.

Effects of Watercraft Access Projects

Watercraft-related manatee deaths are affected by boat traffic patterns, which, in turn, are influenced by the location and size of marinas, docks, boat ramps and launches, dry storage facilities, and other watercraft access facilities. When these projects are located near warm-water refuges, feeding areas, travel corridors, or other habitats of special importance to manatees, they can indirectly affect the likelihood of manatees being hit by boats or affect manatee use of those areas. Ensuring that such effects are considered before facilities are constructed is therefore an essential part of the manatee conservation program. Two related approaches have been used to address these impacts: the review of federal and state permits required for their construction, and the incorporation of manatee protection needs into county growth management plans.

As part of the 5 January 2001 settlement agreement on the lawsuit filed by 18 environmental groups against the Fish and Wildlife Service, the Service published two *Federal Register* notices in March 2001 on actions to improve the way in which it reviews proposals for building new watercraft access facilities. The first, published on 12 March, was an advanced notice of proposed rulemaking for authorizing the incidental taking of manatees under section 101(a)(5)(A) of the Marine Mammal Protection Act by government activities related to watercraft and watercraft access facilities. The second, published on 14 March, was an interim policy on Service obligations under section 7 of the Endangered Species Act to review permit applications to the Army Corps of Engineers for constructing new watercraft access facilities.

With certain exceptions, the Marine Mammal Protection Act prohibits activities that result in the taking of marine mammals. For specified activities other than commercial fishing, however, section

101(a)(5)(A) allows for the authorization for periods of up to five years of actions that may incidentally take small numbers of marine mammals. To apply that exception, the responsible agency (the Fish and Wildlife Service for manatees) must find that the activity in question would have a negligible impact on the species and it must develop regulations to govern that taking to ensure that impacts would be negligible. Since the incidental taking of manatees by boats — and indirectly by some watercraft access facilities — has never been authorized, the 12 March notice advised that the Service was considering the development of regulations under section 101(a)(5)(A) to authorize the incidental taking of manatees associated with government activities related to watercraft and possibly watercraft access facilities. Once regulations were developed to ensure that such activities are negligible, the Service would then issue letters of authorization to applicable entities conforming with those regulations.

The second notice announced an interim policy on its review of permits for watercraft access facilities. Under section 7 of the Endangered Species Act, the Service is required to review federal actions that fund, permit, or otherwise authorize such projects that may affect manatees to determine whether they are likely to jeopardize manatees or adversely modify their critical habitat. If it is determined that the action is likely to adversely affect the species or its critical habitat, formal consultation under section 7 is required and a biological opinion must be prepared. The 14 March notice set forth guidelines the Service intended to follow when reviewing those facilities to determine their likelihood of incidentally taking manatees (i.e., altering boat traffic in a way that would cause the death or injury of manatees).

The Service advised that, to find that a proposed facility was not likely to result in the taking of manatees, the following four prerequisites would have to be met: (1) adequate speed zones exist in the area affected by the facility, (2) adequate signage of those zones is in place to ensure that boaters are aware of those zones, (3) adequate enforcement of the zones, and (4) assurance that those measures are in place before project implementation. For facilities that did not meet these prerequisites, the Service advised that it would have to enter into formal section 7 consultations and, as part of that process, to recommend appropriate conservation measures. Recognizing that determinations on the likelihood of taking manatees would vary depending on a facility's location relative to the occurrence of manatees, the policy statement also identified counties of high, medium, or low risk based on recorded manatee mortality levels.

The policy statement also advised that the Service believed increased enforcement of speed zones was the primary conservation measure needed to ensure that proposed projects would be unlikely to result in the incidental taking of manatees, and that existing enforcement levels were not adequate to address this need for new facilities. It therefore developed a formula for estimating the additional enforcement levels and costs required per additional boat and advised that developers of new facilities would need to provide that level of additional enforcement either through agreements with a law enforcement entity or through monetary contributions to an enforcement fund.

On 16 May 2001 the Commission commented to the Service on both notices. With regard to developing regulations to authorize the incidental taking of manatees, the Commission noted that past levels of unauthorized taking by watercraft had clearly been significant, and it therefore supported the Service's efforts to satisfy the statutory requirements concerning this unauthorized taking. To do so under section 101(a)(5)(a), however, the Commission noted that the Service would have to ensure that boating activity and new boat access facilities in manatee habitat would have no more than a negligible impact on the survival and recovery of the species. It also would need to clarify who would be required to apply for incidental take authorization (the permitting agency, the facility developer, or individual vessel owners), how the activities would be conducted, and what would need to be done to reduce incidental take to negligible levels. The Commission noted that it was not clear whether or how these findings and needs could be met.

With regard to developing incidental take regulations, the Commission suggested that the Service develop a list of alternative mitigation measures under three categories of measures that had been used to date: (1) speed zones (including rulemaking to establish zones, posting the zones, and enforcing them), (2) boater education and awareness, and (3) restrictions on boating facilities (e.g., their location and the number and type of watercraft able to use them). Once that was

developed, the Commission suggested that the regulations identify the number or set of mitigation measures from that list that should be required for a project based on its type (e.g., marina, boat ramp, etc.) and the relative risk of boats encountering manatees in different areas (e.g., in high-, medium-, or low-risk counties as identified in the Service's 14 March policy statement). Although this approach may be complex, the Commission noted that such a scheme may be the only way to scale the number and type of management actions to the level of risk for manatees and the type and location of the facility.

With regard to the interim policy statement, the Commission agreed that additional enforcement may be the best way to protect manatees in most situations, but that there would be some situations where other measures, such as new or modified boat speed zones or location restrictions, would be needed. The Commission therefore recommended that the policy be revised to provide guidance on when measures other than enforcement would be needed. The Commission also recommended that the Service's three-tiered system for classifying risks to manatees by area (i.e., counties with high, medium, and low risks) be expanded to include counties in Georgia where manatees have been killed by watercraft, and that a fourth risk category be added to identify local areas, such as warm-water refuges and major feeding areas, where risks would be especially high. The Commission also questioned the formula used by the Service to calculate enforcement costs for new facilities and its finding that a 10 percent increase in enforcement over current statewide enforcement levels would prevent an increase in manatee mortality due to watercraft.

The Service made no further announcements in 2001 concerning the development of regulations under the Marine Mammal Protection Act to authorize the incidental take of manatees by watercraft and watercraft access facilities. However, on 21 August 2001 it issued a new interim policy for section 7 consultations on new watercraft access proposals in Florida. In its new guidelines, the Service advised that, because of efforts by the Florida Division of Law Enforcement to increase enforcement of manatee-related boat speed zones, it was eliminating the need for facility developers to contribute funds for additional enforcement. It advised that it would continue to review permit applications on a case-by-case basis to ensure that the four prerequisites noted above were addressed. Although the criteria it planned to use to evaluate prerequisites for adequate boat speed zones, signage, and enforcement were not identified, the Service announced that it had reviewed relevant information on Florida waterways (e.g., manatee habitat, manatee mortality, boat speed zones) and prepared maps identifying those areas where it considered the prerequisites to be satisfied and where they were not. The new interim policy did not address areas in Georgia.

Entrapment in Flood Gates and Navigation Locks

The second largest source of human-related manatee mortality is from animals being crushed or drowned in flood gates and navigation locks. Some of these water control structures are owned and operated by the South Florida Water Management District and others are under jurisdiction of the U.S. Army Corps of Engineers. To address entrapment risks, the two agencies, in cooperation with the Florida Bureau of Protected Species Management and the Fish and Wildlife Service, initiated efforts to develop mechanisms to automatically stop and reverse closing flood gates and lock doors when a manatee becomes caught in them. Functionally similar to elevator doors, a reversing mechanism developed by the water management district was installed for the first time on a flood gate in mid-1997. A comparable mechanism for navigation locks developed by the Corps was installed for the first time at a lock in 1998.

Based on promising results with these devices, the Army Corps of Engineers developed a plan to install these devices at 20 flood control structures and seven navigation locks. Technical problems slowed installation of both types of devices; however, those problems seem to have been resolved and, by the time of the Marine Mammal Commission's October 2000 review of the manatee recovery program, reversing mechanisms had been installed at two locks and gates at five water control structures. Those structures alone had been responsible for more than 60 percent of all previous structure-related manatee deaths. In addition, the U.S. Army Corps of Engineers had developed a schedule to retrofit all of the identified structures plus an additional navigation lock by the end of 2004.

As indicated in Table 10 only one manatee died at a water control structure in 2001, the lowest annual total on record. The one death in 2001 involved a manatee caught in a flood gate that had not yet been fitted with a gate-reversing mechanism. During 2001 one additional flood gate operated by the water management district was fitted with the new mechanism. In addition, the Army Corps of Engineers completed negotiations with a contractor to begin installing devices at other flood gates in 2002. The Corps also expects to complete a contract by the end of 2002 to begin installing reversing mechanisms at the six remaining navigation locks to be retrofitted.

Management Strategies for Warm-Water Refuges

Almost all manatees depend on natural warm-water habitats or warm-water power plant outfalls to survive winter cold periods (see Fig. 15). As noted above about 60 percent of the manatees counted in the 2001 statewide manatee census used thermal effluents from power plants. Single-day counts at several of these outfalls in recent years have exceeded 300 manatees, and, at one location more than 500 animals were counted. Many of these power plants have now reached or exceeded their expected operational life or have become marginal plants. At the same time, the State of Florida is considering steps to deregulate its power industry, which could hasten the closure or cause intermittent operation of older plants due to economic considerations. Such changes could eliminate warm-water refuges vital to large numbers of Florida manatees or make their discharges unreliable. Regulations adopted since those plants were constructed preclude the development of similar outfalls. As noted above, flow rates from natural warm-water springs also are being affected by wells that have lowered water tables and by development that has shunted water from recharge areas.

The future availability of these warm-water refuges is therefore a matter of grave and growing concern. If key power plants were to be taken off-line and their effluents eliminated, it likely would cause a significant increase in cold-related deaths the following winter. That is, animals that have learned to rely on them may be unable to find alternative warm-water areas before succumbing to cold stress, or may simply remain at a shut-down outfall waiting for it to reappear.

Figure 15. Natural and artificial warm-water refuges with at least one count of 40 or more Florida manatees (power plants in Roman and natural springs in *italic*) (figure by Leslie Ward, courtesy of the Florida Marine Research Institute).

If all such sites were eliminated, it is uncertain whether remaining habitat in Florida with naturally warm water suitable for winter survival of manatees could support the numbers of animals that now rely on power plant outfalls. Without such outfalls, it is possible that water temperatures even in southernmost Florida may not be adequate in the coldest winters to prevent cold-related mortality levels far greater than they have been in recent decades.

To address this situation, in August 1999 the Fish and Wildlife Service convened a workshop involving industry officials, resource managers, manatee scientists, and environmental groups to identify possible research and management actions concerning warm-water refuges. Following the workshop, the Service formed a warm-water task force with industry and agency officials to help plan needed work. The task force, which has met periodically since the workshop, met several times in 2001. Among the actions and approaches being considered are enhancing manatee access to natural springs that are now unused or underutilized by manatees; investigating the feasibility of developing non-industry-dependent artificial refuges designed to retain rather than dissipate heat so as to minimize thermal impacts on adjacent aquatic eco-

systems; developing strategies to wean manatees from their reliance on power plants scheduled to be closed; preventing the establishment of industry outfalls used by manatees in northern or central Florida; and investigating the potential availability and enhancement of habitats that retain solar heat (e.g., dredged water basins and shallow areas where sediments tend to hold heat).

During 2001 the warm-water task force reviewed a study to improve understanding of habitat-use patterns of manatees at a major power plant outfall. Among other things, this study, which began in the fall of 2001 and is being done cooperatively by the Sirenia Project and the Florida Marine Research Institute, is designed to resolve uncertainties about when and under what conditions manatees leave and return to core warm-water areas, how far and to what areas they move, and how those movements vary given factors such as the length, intensity, and periodicity of cold spells. In addition the working group began developing a four-part adaptive management strategy involving the development of a set of possible management actions, an explicit management objective, a model to predict likely outcomes of different management actions, and a monitoring system to evaluate those actions and determine whether and how those actions should be modified.

To encourage investigation of non-industry-dependent artificial refuges, in 2001 the Florida Power & Light Company sponsored a cash award competition challenging graduate engineering students to develop innovative alternative conceptual designs for generating warm water for manatee refuges that would not be dependent on industrial warm-water sources. The winning entry was a solar water-heating design whose practicality was being evaluated by the company at the end of 2001. In 2002 the company expects to complete assessment of the design's engineering feasibility, land requirements, operational and construction costs, and possible constraints. In 2000 the company also supported a study in southeastern Florida (its main operating area) to identify possible sites where alternative warm-water refuges might be located. In 2001, for the twenty-fourth consecutive year, the company also continued its support for winter surveys of manatees at its plant outfalls.

Manatee Sanctuaries and Refuges

In 1979 the Fish and Wildlife Service adopted regulations for designating manatee sanctuaries and manatee refuges. Manatee sanctuaries are areas in which all human activities are prohibited; manatee refuges are areas in which specified human activities that could adversely affect manatees are regulated. To date the Service has designated seven small manatee sanctuaries in Kings Bay, covering a combined area of about 50 acres. Kings Bay, at the head of the Crystal River, is fed by numerous warm-water springs that are used by more than 300 manatees as a winter refuge. The purpose of the sanctuaries is to provide manatees a place to escape harassment by human activity, particularly divers. No manatee refuges have yet been designated.

Late in 1999 several environmental groups filed suit against the Service alleging that the Service was not adequately carrying out its obligations to protect manatees. Pursuant to a settlement agreement, the Service published an advance notice of proposed rule-making on 1 September 2000 requesting comments and suggestions on new areas to be designated as manatee sanctuaries and refuges.

In its 1 December 2000 letter to the Service following its manatee program review, the Commission recommended that the Service work toward building an integrated network of manatee sanctuaries and refuges that would include key feeding and resting areas, travel corridors, and thermal refuges. To identify an optimal network of sites, it recommended that the Service cooperate with the Florida Marine Research Institute on a project using the state's geographic information system to identify areas of special importance to manatees. The Commission also recommended that, as an initial set of sites, the Service consider designating five small manatee sanctuaries (perhaps a few tens of acres each) at five thermal refuges (Homosassa Springs, Warm Mineral Springs, and three power plant outfalls), and three larger manatee refuges along key travel corridors where greater protection was needed to prevent watercraft-related deaths (the Barge Canal and Sykes Creek near Cape Canaveral and a portion of the St. John's River in Jacksonville).

On 10 August 2001 the Service published proposed rules to designate 16 areas, including 4 manatee sanctuaries and 12 manatee refuges. Four of the 16 sites (i.e., warm-water refuges at Homosassa

Springs, the Bartow Power Plant, Sykes Creek, and the Barge Canal) were sites identified by the Commission. As of the end of 2001 final action had not been taken; however, it was the Commission's understanding that the Service planned to publish final rules early in 2002 to designate 2 of the 16 proposed sites and to defer action on the other sites for a year. The two sites to be designated were manatee refuges at Sykes Creek and the Barge Canal in Brevard County. Rules for these refuges would include speed restrictions on transiting boats to reduce high levels of watercraft-related manatee mortality, although an exception was being considered to allow a boat manufacturer located along the Barge Canal to test-drive boats at high speeds.

With regard to the Commission's recommendation that the Service and the Florida Marine Research Institute cooperate to identify essential manatee habitats, the Service's 7 November 2001 reply to the Commission advised that a habitat working group was assisting in the identification of needed habitat studies. If that group found such a study to be warranted, the Service advised that it would participate to the extent funding allowed.

Manatee Harassment at Crystal River

Kings Bay, at the head of the Crystal River, is a mile-long bay fed by numerous warm-water springs. It is now used as a winter refuge by more than 300 manatees. In the early 1980s the Fish and Wildlife Service purchased several small islands in the bay to prevent their development. They were subsequently designated as the Crystal River National Wildlife Refuge to protect manatees from harassment by the increasing number of divers attracted to the area by its clear, warm water and the presence of manatees. The chance to swim with wild manatees in Kings Bay has become a major attraction for the area and, although some manatees have become accustomed to human divers, others avoid them. Those that have become accustomed will sometimes let divers approach and pet them. Nearly 100,000 divers visit the bay every year.

Over the years, reports of manatee harassment have continued to increase. To address the situation, the Service established seven small sanctuaries in the bay where divers and boats are prohibited. Manatees have learned to use these sanctuaries to escape unwanted attention from divers. In addition, the Service has prepared brochures and a video for divers on manatees and the need to avoid harassing them. These are made available in cooperation with local dive shop owners and dive tour operators. However, with the increasing numbers of manatees and divers using Kings Bay, frequent reports of divers attempting to grab, ride, and chase manatees continue.

During its October 2000 review of the manatee program, the Commission considered efforts to address this situation. Service representatives noted that the refuge staff was not able to respond effectively to harassment complaints because there was less than the equivalent of one full-time enforcement officer for the Crystal River Refuge and several other area refuges combined. As related matters, the Commission was provided copies of the brochures and video prepared for visiting divers, and was advised that the Service is exploring an opportunity to purchase an undeveloped property that included a major spring used by overwintering manatees (Three Sisters Spring), which would be suitable for a land-based viewing platform.

In light of the information provided, the Commission included several recommendations to address manatee harassment problems in Kings Bay in its 1 December 2000 letter to the Service. It recommended that the Service assign an additional full-time enforcement officer to the Crystal River National Wildlife Refuge and that it pursue all possible opportunities to acquire the Three Sisters Spring property for use as a refuge education and visitor center. With regard to the educational materials, particularly the video, the Commission found that they presented a contradictory conservation message. Although the materials note that harassment of animals is illegal and manatees should not be chased, the video, in particular, advised that touching manatees was permissible and that divers should expect the opportunity to do so. The Commission noted that this message increased the likelihood that divers would approach manatees and, in effect, encouraged divers to chase manatees. The Commission also noted that allowing people to touch friendly manatees reinforced a manatee behavior that in other situations could expose them to potential injury. The Commission therefore recommended that the Service update its educational materials, particularly its video, to advise divers explicitly that they should avoid touching manatees and should back away from any animals approaching them to prevent animals from learning behaviors that could place them at risk.

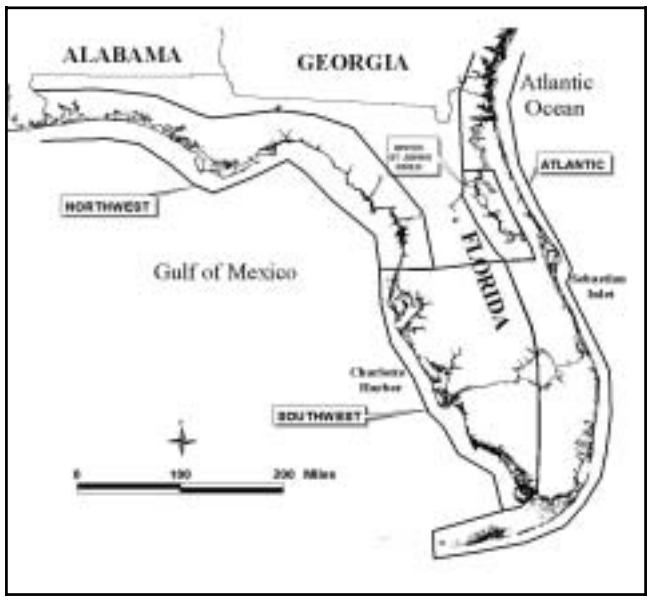

Figure 16. Regional boundaries of Florida manatee subpopulations (figure courtesy of Sirenia Project, U.S. Geological Survey).

Eleven months later, in its 7 November 2001 reply to the Commission, the Service advised that it had added an enforcement agent to the staff of the Crystal River National Wildlife Refuge. It also noted that the Three Sisters Spring property had been added to the Service's Land Acquisition Planning System and that preliminary contacts had been made with the owner to explore the possibility of purchasing the site. With regard to its educational material, the Service advised that it expected to replace its video with one that would caution divers against harassing manatees. The Service did not indicate, however, whether it planned to discourage divers from touching manatees as recommended by the Commission.

Updating the Manatee Recovery Plan

To identify and guide conservation activities to protect endangered and threatened species, section 4(f) of the Endangered Species Act directs the Fish and Wildlife Service to develop recovery plans for species under its jurisdiction. An initial plan for West Indian manatees was developed by the Service, with assistance from the Marine Mammal Commission, in 1980. To reflect new information and developments, that plan has been updated at roughly five-year intervals since 1989. The last update, adopted in January 1996, was developed by a subcommittee of the Manatee Recovery Team chaired by the Marine Mammal Commission's representative. The recovery team includes representatives of involved agencies and organizations convened by the Service to provide advice and recommendations on particular manatee recovery needs. In late 1999 the Service established a new recovery team, including a representative of the Marine Mammal Commission, to help prepare a third revision of the Florida Manatee Recovery Plan.

Preparation of a Draft Plan – The team met several times between 1999 and early 2001. During that time, team members drafted some sections of the plan and provided advice to Service staff, who drafted other sections. A matter of particular concern during this process was the development of recovery criteria to guide decisions on downlisting and delisting manatees from the list of endangered and threatened species. Although the Endangered Species Act was amended in the 1990s to require that recovery plans set forth objective, measurable criteria for removing species from that list, the previous plan deferred establishment of those criteria for Florida manatees pending further work to develop a scientifically sound means of assessing the size and trend of the Florida manatee population. To address this need, the plan called for the establishment of a manatee population status working group.

This working group was formed under the leadership of scientists with the Sirenia Project and also included manatee biologists with the Florida Marine Research Institute. Based on its deliberations, the group first considered the structure of the manatee population and concluded that, based on manatee movement data, Florida manatees should be divided into four relatively discrete management units or subpopulations, each of which represented a significant portion of the species' range (see Fig.16). Because a statistically reliable method did not exist to estimate manatee abundance or trends by direct counts, the group instead proposed three population benchmarks likely to indicate long-term trends. If met for each subpopulation, it believed that there would be a high degree of assurance that the Florida manatee population would not likely become endangered in the foreseeable future and thereby could be downlisted from endangered to threatened. The three benchmarks, to be

based on values averaged over a 20-year period, were

- a target adult survival rate of 94 percent, but with a lower bound of the 95 percent confidence interval no lower than 90 percent adult survival;
- an average of 40 percent of adult females being accompanied by first- or second-year calves and
- a target population growth rate of 4 percent, but with a 95 percent confidence interval no lower than zero (i.e., the population was not declining).

The first two criteria were to be based on photo-identification data for each region and the last criterion was to be based on population modeling. Ten years of data to apply these benchmarks already exist for all but the southwestern Florida region, which currently has about seven years of data. Based on these data, manatee subpopulations in two regions (the upper St. Johns River and northwestern Florida) now meet all of the above criteria. The Atlantic coastal region meets two of the three criteria; however, the lower bound of adult survival is slightly lower than 90 percent, suggesting that the abundance of this subpopulation could be decreasing slowly. The low level of adult survival is thought to be related to the high levels of boat-related deaths in the region. A preliminary analysis of available data for southwestern Florida suggests that it too may be slightly below the benchmark for adult survival.

Although most recovery team members supported the working group's recovery criteria, some team members expressed a preference for measuring population recovery against a set minimum number of manatees, which, if exceeded by statewide counts, would trigger consideration of action to reclassify the species. However, no objective means was identified for deriving such a number, and no attempt was made to reach agreement on what that number might be. The team therefore generally accepted the working group's recommended criteria. On other matters relating to specific research and management tasks, the team also was generally in agreement.

First Public Review Draft – After considering recovery team views and draft material, the Service completed a technical/agency review draft for the recovery plan and made it available for public review and comment on 30 November 2000. With regard to criteria for reclassifying Florida manatees as threatened, the Service concluded that the population status working group's criteria were inappropriate. Instead the Service proposed that criteria for reclassifying Florida manatees as threatened be based on the minimum count of 2,222 manatees obtained during a statewide survey on 27 January 2000, plus 4 percent annual population growth over a five-year period, which would result in a population size of 2,700. In this regard, the Service concluded that a population of 2,700 would be sufficient to ensure that Florida manatees could survive occasional stochastic events, such as red tides, hurricanes, and cold events, and would have sufficient genetic variability. The bases for these conclusions were not provided.

On 5 February 2001 the Commission, in consultation with its Committee of Scientific Advisors, responded to the Service's request for comments on the draft plan. In its comments the Commission noted that, although the plan stated that it was based on the advice of the recovery team, the Service's recovery criteria were contrary to the advice of most recovery team members and that the plan included no explanation as to why that advice was not followed. The Commission therefore recommended that the draft plan be revised to reflect the criteria developed by the population status working group or that it provide a sufficient explanation as to why those criteria were rejected.

In addition, the Commission noted that the recovery criteria should be expanded to reflect consideration of the five statutorily identified factors to be considered in listing decisions (i.e., present or threatened destruction, modification, or curtailment of habitat; overutilization for commercial, recreational, scientific, or educational purposes; disease or predation; inadequacy of existing regulatory mechanisms; and other natural or anthropogenic factors affecting its continued existence). With regard to threats to manatee habitat, the Commission noted that assurance of adequate protection for manatee habitat was particularly important, and it therefore recommended that the Service defer any consideration of reclassifying Florida manatees until habitat-related criteria are developed and justified scientifically for each of the four regional manatee subpopulations.

Second Public Review Draft – Based on the comments received on its initial draft revision, the Service determined that substantial revision of the plan was necessary and that another opportunity for public

review and comment was therefore required. Accordingly, on 10 July 2001 the Service made available a second technical/agency review draft for the revised Florida Manatee Recovery Plan. The document proposed a new set of recovery criteria that was similar to, but were less stringent than, the benchmarks recommended by the population status working group and which were to be used to trigger consideration of action to remove the Florida manatee from the endangered and threatened species list instead of downlisting their status to threatened.

The new proposal stated that the current population size of at least 3,276 would be sufficient to survive occasional stochastic mortality events and to consider delisting if each of the four subpopulations met the following benchmarks over a 10-year period: (1) an average annual adult survival of 90 percent or greater, (2) an annual average of 40 percent of adult females accompanied by first- or second-year calves, and (3) an average annual population growth equal to or greater than zero. The proposed benchmarks included no requirement for statistical confidence in estimates for adult survival or population growth. The revised draft also stated that the Service believed the manatee population working group's benchmarks set a standard higher than the statutory definition of a threatened species and that a minimum adult survival of 90 percent would more accurately reflect population demographics consistent with the Act's definition of a threatened species.

On 6 August 2001 the Commission, in consultation with its Committee of Scientific Advisors, provided comments to the Service on its revised draft plan. It noted that the plan provided little explanation and no data to support the Service's belief that the current minimum population estimate would be sufficient to delist manatees or why it believed the working group's recommended benchmarks were inconsistent with the statutory definition of a threatened species. The Commission agreed with the Service's statement that the current population was large enough to survive occasional mortality events, but noted that this was a vague and inappropriate standard for gauging the size at which a population would no longer be threatened.

It also noted that the 416 manatee deaths in 1996 exceeded 13 percent of the current maximum count of 3,276 and that even if all human-related mortality that year (71 animals) were eliminated, it would still exceed 10 percent of the maximum count. Noting that two or more years of such mortality would reduce a population of 3,276 to well below 3000, the Commission expressed its view that this would leave the population in danger of extinction. Although noting that a population size of 3,276 might be large enough to warrant downlisting manatees from endangered to threatened if there was evidence that their abundance was increasing, the Commission strongly disagreed that this level of abundance justified delisting manatees. The Commission therefore recommended that the plan delete all statements suggesting that the current population size as indicated by the maximum count of 3,276 is sufficient to delist Florida manatees.

The Commission also strongly disagreed with the proposed population benchmarks. Among other things, it noted that studies had shown that manatee population growth rates are very sensitive to changes in adult survival and that manatee abundance would likely decline if adult survival rates remained below 90 percent. Because the Service's proposal included no statistical confidence intervals for its adult survival or population growth benchmarks, it was therefore quite possible that the manatee population could actually be in a state of decline even though point estimates of 90 percent adult survival and zero percent population growth were achieved. The Commission therefore again recommended that the Service revise the population benchmarks to bring them in line with those recommended by the population status working group.

The Commission also recommended that the Service expand the draft plan to identify how the Service intends to determine whether mitigation measures for key threats, such as watercraft collisions, entrapment in flood gates, and potential loss of essential habitat, are being addressed successfully. With regard to identified recovery activities, the Commission noted that the actions identified in the plan appeared to be relatively complete. To address the exceptions, it recommended that the Service add tasks or expand the narrative to identify steps to (1) continue periodic meetings of the manatee recovery team, (2) convene an interagency team to review and coordinate enforcement activities, (3) convene and publish results of a manatee population biology workshop in 2002, and (4) develop standards or criteria for developing and approving county manatee protection plans.

Final Revised Florida Manatee Recovery Plan – On 30 October 2001 the Service adopted the third revision of the Florida Manatee Recovery Plan. Recovery benchmarks in the final plan were revised to bring them in line with those recommended by the manatee population working group. They call for considering reclassification of the Florida manatee as a threatened species when there is a 95 percent statistical confidence that, over a 10-year period, each of the four manatee subpopulations has an average annual adult survival of 90 percent or greater, 40 percent or more of adult females are accompanied by first- or second-year calves, and their average annual population growth is equal to or greater than zero. If future scientific studies indicate that other benchmarks are more appropriate, the Service noted that it would modify the benchmarks accordingly. In addition to the population benchmarks, the Service noted that reclassification would require progress toward reducing threats to manatee habitat from other natural and human factors by (1) identifying minimum flow rates at warm-water springs used by manatees, (2) protecting selected warm-water refuges, (3) identifying foraging habitats near warm-water refuges to be protected, (4) identifying other important areas for protection, and (5) reducing unauthorized human-related mortality and serious injury.

To meet its recovery objectives, the plan identified about 100 tasks listed under four principal objectives: (1) minimizing manatee disturbance, harassment, injury, and mortality, (2) determining and monitoring the status of the manatee population, (3) protecting, identifying, evaluating, and monitoring manatee habitats, and (4) facilitating recovery through public awareness and education.

Dugongs in Okinawa (*Dugong dugon*)

The dugong inhabits the tropical and subtropical coastal and island waters in the Indo-Pacific from East Africa to Vanuatu, between 26ºN and 26ºS latitudes. It is a member of the order Sirenia, which also includes three species of manatees (see the previous section) and is the only member of the family Dugongidae. Although the dugong is an herbivorous animal like the manatee, it is strictly marine. Dugong stocks thought to be relict populations are often separated by sometimes large distances, although the animal is known to be able to traverse vast expanses of ocean. Human exploitation has led to extinction of the species in several archipelagoes, including Mascarene, Laccadive, the Maldives, Barren, Narcondam, Cocos (Keeling), and Christmas Islands around the rim of the Indian Ocean, and the Lesser Sunda Islands in Indonesia east of Java.

One of the smallest known dugong populations is found in the waters off the eastern coast of Okinawa, Japan. This population is thought to comprise about 50 individuals, which feed on the few remaining sea grass beds in that area. Ten animals were spotted in deep water in the area in a systematic aerial survey in 1998, and six were seen during an opportunistic helicopter survey in 1999. Subsurface feeding trails were confirmed in shallow sea grass beds at about the same time. The Okinawa dugong, like all dugong populations, is included in Appendix 1 of the Convention on International Trade in Endangered Species of Fauna and Flora (CITES), and all international trade in dugong meat and products is therefore prohibited. In addition, all dugong populations are protected as endangered under the Endangered Species Act of 1973 and are listed by the World Conservation Union (IUCN) as vulnerable to extinction.

In August 2000 the Japanese Save the Dugong Foundation contacted the Marine Mammal Commission to inform it of plans by the government of Japan to relocate the U.S. Marine Corps Air Station Futenma to a new location on Okinawa because of problems with noise and the proximity of the current location to the human population. A primary location under consideration by the government of Japan was a site offshore from the city of Nago in eastern Okinawa where the dugongs and the seabeds they use for feeding and habitat are located. In its 26 August 2000 communication to the Commission, the Save the Dugong Foundation expressed concern that the planning, construction, and use of an air station in this area would adversely affect both dugongs and their habitat. In November 2000 a delegation from the foundation traveled to Washington, DC, to meet separately with Commission representatives and nongovernmental organizations.

In October 2000 at the IUCN World Conservation Congress in Amman, Jordan, the World Conservation

Union issued a resolution expressing its concern over the proposed relocation of the air station to the waters off eastern Okinawa and the effect the action might have on the resident dugong population. The resolution urged the government of Japan voluntarily to conduct an environmental impact assessment and to implement dugong conservation measures to stop further reduction of the population. It urged the United States to cooperate with the government of Japan on any such impact statement and to take the findings into account.

On 31 January 2001 the Commission wrote to the Departments of State and Defense addressing the proposed relocation. In its letter, the Commission noted that the dugong is listed as endangered under the Endangered Species Act, that the species is extremely susceptible to extirpation due to its low reproductive potential, that foraging areas for dugong are limited to only about 10 percent of the coastline, and that locating the new air station in the middle of this area would likely hasten habitat degradation. The Commission also noted that representatives of the U.S. government had gone on record at the IUCN World Conservation Congress as supporting the preparation of a "comprehensive and transparent" environmental impact statement on the proposal. The Commission suggested that, although the base is not located in U.S. territory, its operation would trigger U.S. environmental laws and that therefore an environmental impact statement should be prepared. The Commission urged the Department of Defense to coordinate with Japanese authorities on any such review being prepared.

In their 4 April 2001 response, the Departments of Defense and State informed the Commission that the government of Japan is overseeing all construction-related activities in accordance with relevant Japanese law and practice, including issues relating to the environment, and that the United States will operate the air station consistent with Japan's environmental governing standards with the basic idea of selecting the more protective standards from relevant U.S. and Japanese laws and regulations. The letter also stated that the government of Japan has already conducted environmental surveys in connection with the relocation of the air station and that environmental issues will remain important considerations as the project continues.

On 25 May 2001 the Pacific Environment Advocacy Center of Portland, Oregon, informed the Commission by E-mail that it was working on behalf of the Japanese Environmental Lawyers Federation to develop a legal case against the Department of Defense under the Endangered Species Act to protect the Okinawa dugong and the population's last remaining habitat from destruction. No case had been filed as of 31 December 2001.

On 27 December 2001 the government of Japan announced that agreement had been reached on a plan for the proposed construction of the facility on the reef off the coast of Nago. No additional information was available as of 31 December 2001.

Chapter IV

MARINE MAMMAL/FISHERIES INTERACTIONS

Fishing operations are known to disturb, harass, injure, or kill marine mammals either accidentally or deliberately during fishing operations. Conversely, marine mammals may take or damage bait and fish caught on lines, in traps, or in nets; damage or destroy fishing gear; or could potentially injure fishermen trying to remove them from fishing gear. Further, marine mammals and fishermen sometimes compete for the same fish and shellfish resources.

The Marine Mammal Protection Act was amended in 1994 to establish a new regime governing the take 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. Implementation of the 1994 fisheries regime is discussed in this chapter. Also discussed are amendments to the Marine Mammal Protection Act enacted in 1997 pertaining to the eastern tropical Pacific tuna fishery and actions being taken to implement those amendments. Fishery interactions affecting specific species, including Hawaiian monk seals, Steller sea lions, harbor porpoises, bottlenose dolphins, and right whales, are discussed under the individual species' sections in Chapter III.

Implementation of the 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 ruling in a lawsuit challenging 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, under then-existing provisions, such permits could continue to be issued to many other fisheries known to take marine mammals. In response, Congress passed a five-year interim exemption to govern taking incidental to commercial fishing operations, during which time a new long-term incidental-take regime was to be developed. Efforts to design the new regime, including development of recommended guidelines by the Commission, are discussed in past annual reports.

These efforts led to the amendment of the Marine Mammal Protection Act in 1994 to establish a new regime to govern the taking of marine mammals incidental to commercial fishing operations. Three new sections (sections 117, 118, and 120) 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. In part, the assessments are intended to identify strategic stocks for which take reduction plans must be prepared. Strategic stocks are those that (1) have a level of direct human-caused mortality exceeding the calculated potential biological removal level, (2) are designated as depleted under the Marine Mammal Protection Act, (3) are listed as endangered or threatened under the Endangered Species Act, or (4) are likely to be listed as endangered or threatened in the foreseeable future.

Section 118 sets forth the requirements of the 1994 incidental-take regime. It directs the National Marine Fisheries Service to publish a list of commercial fisheries classified into three categories according to the frequency with which they kill or seriously injure marine mammals. Certain require-ments (e.g., a registration requirement and a require-ment to carry observers) are applicable, depending on a fishery's classification. The amendments focus resources on the most pressing problems — those involving strategic stocks. A take reduction plan is to be developed for each strategic stock subject to fre-quent or occasional mortality or serious injury.

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 to lethally take 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 task force to examine problems involving pinnipeds and aquaculture projects in the Gulf of Maine.

The new regime includes a mechanism for authorizing a limited incidental take of marine mammals listed as endangered or threatened under the Endangered Species Act, something the original statute and the interim exemption did not provide. 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 and southern sea otters) 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 below and, as they relate to specific marine mammal stocks, in Chapter III. Implementation of the other requirements of section 118 and provisions applicable to endangered and threatened species and to deterrence of marine mammals from damaging fishing gear or catch are also discussed. Actions taken under section 120 are discussed under the topic of pinniped/fisheries interactions later in this chapter.

Stock Assessments

Section 117 of the Marine Mammal Protection Act requires the Secretaries of Commerce and the Interior to prepare and periodically update stock assessment reports for each marine mammal stock that occurs in U.S. waters. This provision also requires that three regional scientific review groups be established to assist in the development of these reports. These groups were established in 1994 for Alaska, the Pacific coast, including Hawaii, and the Atlantic coast, including the Gulf of Mexico. They include experts in marine mammal biology, commercial fishing technology and practices, and, in the case of Alaska, Native subsistence uses. Among other things, scientific review groups are 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) needed research with respect to possible modifications in fishing gear and practices to reduce the incidental mortality and serious injury of marine mammals, and (4) the potential impacts of habitat destruction on marine mammals and, for strategic stocks, conservation measures to reduce such impacts.

Based on the advice of the scientific review groups and public comment on draft stock assessments, the Secretaries are to publish a final assessment report for each stock. The Act directs 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 of the stock;
- 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 level 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 it to reach or

remain at its optimum sustainable population level. The potential biological removal level is calculated by multiplying three variables: the stock's minimum population estimate, one-half of its theoretical or estimated maximum net productivity rate at a small population size, and a recovery factor of between 0.1 and 1.0, depending on the status of the population.

National Marine Fisheries Service – As discussed in previous annual reports, the National Marine Fisheries Service published its original stock assessment reports in 1995. Forty-seven of the 145 stocks assessed were determined to be strategic stocks. The Service also designated as strategic 33 localized stocks of bottlenose dolphins that inhabit bays, sounds, and estuaries in the Gulf of Mexico after concluding that the minimum abundance estimates for these stocks were so low that the take of a single animal from most would exceed the calculated potential biological removal level.

Assessments are to be reviewed at least annually for strategic stocks and at least once every three years for other stocks. Revisions made to stock assessments by the National Marine Fisheries Service in 1998 and 1999 and revisions proposed in 2000 are discussed in previous annual reports. A notice of availability of the final stock assessments for 2000 was published by the Service in the *Federal Register* on 15 March 2001. All three of the assessments were adopted as proposed with only minor changes, most of which were for clarification purposes. The reports for the Alaska, Atlantic, and Pacific stocks may be accessed on the National Marine Fisheries Service's website as follows:

www.nmfs.noaa.gov/prot_res/readingrm/MMSARS/2000AlaskaSARs.pdf (for Alaska)
www.nmfs.noaa.gov/prot_res/readingrm/MMSARS/2000AtlanticSARs.pdf (for Atlantic)
www.nmfs.noaa.gov/prot_res/readingrm/MMSARS/2000PacSar.pdf (for Pacific)

The National Marine Fisheries Service announced the availability of draft revised stock assessment reports for 2001 in a *Federal Register* notice on 7 June 2001. The Service proposed revisions to 17 of the 60 assessment reports on Atlantic and Gulf of Mexico stocks. The proposed revisions applied to 12 strategic and 5 nonstrategic stocks and, for the most part, pertained to abundance and mortality estimates. Information on human interactions such as fisheries and ship strikes were reviewed and updated for right whale, humpback whale, fin whale, and minke whale stocks. The draft 2001 assessment for the Gulf of Mexico/Bay of Fundy harbor porpoise stock reflects the results of a 1999 abundance survey of this stock. Also, the draft assessment incorporates the estimated mortality and serious injury for harbor porpoises collected in 1999, the first year during which measures were taken to implement the Harbor Porpoise Take Reduction Plan. The estimated annual mortality in 1999 was 323 animals in U.S. fisheries, a significant reduction in mortality compared with 2,900 animals estimated to have been taken in U.S. fisheries in 1990. These data indicate that the annual mortality and serious injury of harbor porpoises from this stock has been reduced to less than the potential biological removal level calculated for the stock. Because the reported mortality and serious injury estimates since implementation of management actions only reflect data from one year, the Service will continue to classify this stock as strategic until additional corroborating data are obtained.

Assessments for 10 marine mammal stocks occurring in U.S. waters along the Pacific coast and Hawaii were revised for 2001. Six of these stocks are listed as strategic and four as non-strategic. None of the stocks changed status as a result of the revisions. Among the changes proposed by the Service was the addition of new information on modifications in the longline fishery in the Hawaii false killer whale assessment and the renaming of the California/Oregon/Washington/Mexico stock of humpback whales as the eastern North Pacific stock to reflect new knowledge concerning the stock's range.

Of the 32 marine mammal stocks that occur in Alaska waters, draft revisions to assessment reports for 15 were proposed based primarily on new estimates of abundance or human-related mortality. Of the 15 assessments proposed to be revised, 9 are for strategic stocks and 6 are for nonstrategic stocks. None of the proposed revisions resulted in a status change for any of these stocks. Notable revisions involved the Cook Inlet beluga whale stock and the eastern stock of Steller sea lions. Annual mortality from the subsistence take of Cook Inlet beluga whales was reduced to zero to reflect the fact that no such taking occurred in 1999 or 2000.

The Service proposed revising the assessment for the eastern stock of Steller sea lions to include a new estimate of annual fishing mortality of 2.7 sea lions.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the draft stock assessments for 2001 and provided comments to the Service by letter of 4 September 2001. The Commission generally praised the Service for its preparation of informative and useful reports, but believed that certain improvements were needed before the final assessments were published.

Among the overarching concerns expressed by the Commission was that human-caused mortality was not being fully factored into the reports. The Commission recommended that, in keeping with the requirements of section 117 (a)(3) of the Marine Mammal Protection Act, the Service expand the reports to discuss all human-related factors, direct and indirect, that could impede population growth or recovery. The Commission was also concerned about how the reports dealt with uncertainty when estimating mortality. Specifically, the Commission recommended that estimates of entanglement- or collision-related mortality for certain species of whales consider all available data and use analytical procedures intended to provide the best possible estimates of mortality, rather than minimum estimates. Further, the Commission recommended that the Service include in the stock assessment reports analyses to indicate the power with which existing observer programs can estimate mortality and serious injury levels equivalent to each stock's potential biological removal level.

The Commission also commented specifically on the draft assessments prepared on two species, the Hawaiian monk seal and the Cook Inlet beluga whale. The Commission believes that, because of the endangered status of the Hawaiian monk seal and the existing potential for fisheries to adversely affect the species, the potential biological removal level should remain at zero, as opposed to increasing it to five, as proposed in the draft report. The Commission was also concerned that the Service proposed to keep the recovery factor for Cook Inlet beluga whales at 0.3 rather than reduce it to 0.1 as previously recommended by the Alaska Regional Scientific Review Group and the Commission. The Commission recommended that the recovery factor either be set at 0.1 or that additional justification be provided for using 0.3 as the factor.

At the end of 2001, final 2001 stock assessment reports for the marine mammal stocks under the jurisdiction of the National Marine Fisheries Service had not been completed, but were expected to be available early in 2002.

Fish and Wildlife Service – The Fish and Wildlife Service published initial assessment reports for the eight stocks of marine mammals under its jurisdiction on 4 October 1995. 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.

As discussed in previous annual reports, the Fish and Wildlife Service issued draft revised stock assessments for southern sea otters in California, northern sea otters in Washington, and the Florida and Antillean stocks of West Indian manatees in April 1997. Although the draft revisions incorporated information not available when the original assessment reports were prepared, no changes in the status of these stocks were proposed. The final reports for these stocks were never published, and they have not been updated since that time.

In September 1998 the Fish and Wildlife Service published updated assessment reports for the stocks of polar bears and walruses that occur in Alaska. These stocks remained classified as nonstrategic. During 2001, the Service prepared revised draft assessment reports for these stocks. The Commission expects that these revised reports will be made available for review early in 2002.

Although the Service published a draft assessment for Alaska sea otters earlier in 1998, issuance of a final report on this stock was deferred. The draft report had proposed splitting Alaska sea otters, previously considered to be a single stock, into three separate stocks based on genetic studies and other information. In response, the Alaska Sea Otter and Steller Sea Lion Commission, which represents Alaska Natives who hunt sea otters and which opposed the proposed division of Alaska sea otters into three stocks, requested that the Service conduct a proceeding on the record before finalizing the report. Under section 117 of the Marine Mammal Protection Act, an Alaska Native subsistence hunter has a right to request such a hearing

before a final stock assessment can be published for any marine mammal stock taken in Alaska for subsistence or handicraft purposes.

As discussed in the sea otter section of Chapter III and in last year's annual report, the Fish and Wildlife Service initiated consultations with the Alaska Sea Otter and Steller Sea Lion Commission in an effort to resolve the issue of stock structure without convening a formal hearing. These consultations resulted in the development of a memorandum of agreement, under which the Native Commission withdrew its request for a hearing and the Service agreed to work with the Native group to obtain additional information on sea otter stock structure in Alaska and to make a final determination on the issue by 1 March 2000. In October 2001, draft revised stock assessments for sea otters in Alaska, based on new genetic studies, were sent to both the Alaska Scientific Review Group and the Native co-management organization, the Alaska Sea Otter and Steller Sea Lion Commission, for review. The Service received comments back from the Review Group in November 2001. The Service expects to have the final assessment available early in 2002.

On 6 September 2001 the Service published an announcement in the *Federal Register* that it had received a petition under section 115 of the Marine Mammal Protection Act for Alaska sea otters to be listed as depleted under the Endangered Species Act. The Service published its findings on the petition in the *Federal Register* on 2 November 2001. In its findings, the Service determined that the population of Alaska sea otters was larger than that listed in the petition and that the stock, as a whole, did not qualify for listing. Further information on the petition and the Service's response can be found in Chapter III.

The Incidental-Take Regime

Section 118 of the Marine Mammal Protection Act sets forth the regime governing the take of marine mammals incidental to most commercial fishing operations. It requires classification of all U.S. 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 reduction of incidental mortality and serious injury of marine mammals in commercial fisheries to insignificant levels approaching zero within seven years. The section also requires the preparation of a take reduction plan 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 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 greater detail in previous annual reports, the National Marine Fisheries Service published regulations implementing section 118 on 30 August 1995. Among other things, the regulations include procedures for vessel owners to register for an authorization certificate, observer and reporting requirements, and criteria for classifying fisheries. Minor changes to the regulations were published on 24 February 1999.

Although the original proposed rule published by the Service in 1994 included a proposed definition to be used to determine when the zero mortality and serious injury rate goal of the Act had been achieved, this element of the regulations has never been finalized. As such, this one issue remains unresolved.

The 1994 amendments to the Marine Mammal Protection Act require that commercial fisheries reduce incidental mortality and serious injury of marine mammals to insignificant levels approaching a zero mortality and serious injury rate by April 2001. More specifically, the provisions of section 118 pertaining to take reduction plans specify that such plans are to be designed to achieve the zero mortality and serious injury rate goal for the covered fisheries within five years of a plan's implementation. Toward this end, the amendments require the National Marine Fisheries Service to review the progress of commercial fisheries in meeting this goal and to report its findings to Congress. The report was to have been submitted by 30

April 1998. As of the end of 2001, however, the Service had yet to complete the report.

Several provisions of the incidental-take regime for commercial fisheries are aimed at reducing marine mammal mortalities and serious injuries to certain levels. As such, it is important that there be some mechanism for differentiating between serious and nonserious injuries. Regulations promulgated by the Service in 1995 define serious injury as any injury that will likely result in the mortality of a marine mammal. However, it is not always apparent at the time a marine mammal is released from fishing gear whether its injuries are life-threatening. To address this issue, the Service convened a workshop in April 1997 to consider ways to determine what injuries are to be considered serious. Representatives of the Marine Mammal Commission participated in the workshop.

The workshop report, published in January 1998, identified the different ways in which marine mammals may be injured by various types of fishing gear and assessed the likelihood that different types of marine mammals would survive such injuries. The report also recognized that some marine mammals may succumb from the physiological effects of stress associated with entanglement in fishing gear. In addition, it summarized the participants' views concerning the types of information that should be collected by observers to enable the Service to determine which injuries should be considered serious.

The workshop report included general guidelines for determining when injuries should be considered serious. For large whales, participants generally agreed that any entanglement that resulted in the animal trailing gear such that its mobility or ability to feed was impeded should be considered a serious injury. For small cetaceans, animals that ingest hooks, are trailing gear when released, or swim away abnormally after being released should be considered seriously injured. For pinnipeds, animals should be considered seriously injured if they are trailing gear or are hooked in the mouth. The Service has drawn on the report to develop internal guidelines for determining what constitutes a serious injury, but has yet to publish draft guidelines for public review and comment.

Take of Endangered and Threatened Species – As noted earlier, the incidental-take regime enacted in 1994 includes a provision for authorizing the incidental taking of species listed as endangered or threatened, provided certain findings are made. In 1996 three-year permits were issued to participants in Alaska fisheries, authorizing the incidental taking of North Pacific humpback whales and Steller sea lions from both the eastern and western stocks. Those authorizations were to expire on 31 December 1998. On 30 December 1998, however, the National Marine Fisheries Service published a *Federal Register* notice extending those permits through 30 June 1999. Rather than reissue the permits for a three-year period, the Service chose to extend them for six months while it reviewed its criteria for determining whether authorized taking would have a negligible impact on listed marine mammal stocks.

The National Marine Fisheries Service published a *Federal Register* notice on 27 May 1999 proposing to issue three-year permits authorizing the taking of five stocks of endangered and threatened marine mammals incidental to several fisheries, based on revised criteria for making negligible impact determinations. Under these criteria, the threshold for making a finding of negligible impact would remain at 10 percent of a stock's potential biological removal level. Under this standard, if the number of human-related serious injuries and mortalities was less than 10 percent of the calculated potential biological removal level, incidental taking in all fisheries would be permitted. If the number of serious injuries and mortalities from all human-related causes exceeded this level, incidental taking could still be authorized if fishery-related mortality was less than 10 percent of the stock's potential biological removal level, provided that management measures were being taken to address the other sources of serious injuries and mortalities. In situations where the number of fishery-related serious injuries and mortalities was between 10 and 100 percent of a stock's potential biological removal level, and the stock was stable or increasing, the Service would review information for individual fisheries and make determinations on a case-by-case basis. For stocks that were declining, incidental-take permits would be issued only if the level of human-related mortality and serious injury was less than 10 percent of the stock's potential biological removal level. No incidental-take permits would be issued for any stock for which the total number of fishery-related serious injuries and

mortalities exceeded the stock's potential biological removal level.

Using these criteria, the Service determined that no incidental taking could be authorized from the California/Oregon/Washington/Mexico stock of humpback whales, the western North Atlantic stock of right whales, the California/Oregon/Washington and North Pacific stocks of sperm whales, and the Hawaiian monk seal population. Stocks for which the issuance of incidental-take permits were proposed included the western North Atlantic stock of fin whales, the central North Pacific and North Atlantic stocks of humpback whales, and the eastern and western stocks of Steller sea lions. The Service determined that no taking authorization was needed for the 14 other marine mammal stocks listed as endangered or threatened because there had been no documented fishery-related serious injuries or mortalities from these stocks.

The Commission commented on the Service's 27 May notice by letter of 30 July 1999. The Commission noted that, because all endangered and threatened species are strategic stocks, one of the statutory requirements for issuing an incidental-take permit under section 101(a)(5)(E) is that a take reduction plan has been or is being developed for the species or stock. The Commission explained that, in its view, preparing such plans for all listed species was not a wise use of agency resources. The Commission therefore urged the Service to seek an amendment to the Marine Mammal Protection Act that would eliminate the requirement to prepare a take reduction plan for those strategic stocks for which fishery-related mortality and serious injury are determined to be inconsequential. As discussed in Chapter II, such an amendment was included in the proposed Marine Mammal Protection Act reauthorization bill transmitted to Congress by the Secretary of Commerce and the Secretary of the Interior on 16 August 2000. This issue is again under review as the administration formulates a new proposed reauthorization bill.

The Commission was generally supportive of the use of 10 percent of a stock's potential biological removal level as a threshold for determining when fishery-related mortalities and serious injuries from listed species should be considered negligible. However, the Commission cautioned that this might not be an appropriate standard for a stock that is declining, despite the fact that known human-caused injuries and mortalities are only a small fraction of its potential biological removal level. Authorizing incidental taking in such cases may serve to hasten the decline and may not be negligible. Related to this point, the Commission noted that the *Federal Register* notice did not explain how the Service intended to attribute and quantify indirect adverse effects of human activities, such as the possible localized depletion of prey species on the declining western stock of Steller sea lions. The Commission recommended that the Service discuss whether and how indirect human-related effects will be factored into negligible impact determinations.

The Commission also found the Service's criterion for making negligible impact determinations for declining stocks to be confusing and believed that clarification was needed. Further, the Commission questioned the appropriateness of using blanket numerical criteria to make findings for declining stocks.

The Commission generally agreed with the fisheries identified by the Service as meeting the criteria for obtaining incidental take permits under section 101(a)(5)(E). However, consistent with its general comments concerning declining stocks, the Commission questioned the inclusion of fisheries that take Steller sea lions from the western stock. Because this stock continues to decline for undetermined reasons, the Commission thought that additional discussion of the Service's rationale for believing existing levels of fisheries-related taking to be negligible was needed before any taking could be authorized.

On 30 October 2000 the Service published in the *Federal Register* a notice of issuance of a three-year permit to authorize the incidental take of fin whales (California/Oregon/Washington stock), humpback whales (California/Oregon/Washington/Mexico stock), Steller sea lions (eastern stock), and sperm whales (California/Oregon/Washington stock) in the California/Oregon drift gillnet fishery for thresher shark and swordfish. As of the end of 2001 the Service had yet to issue new permits authorizing the taking of endangered and threatened marine mammals incidental to commercial fishing operations in the Alaska region, the northeast region, or the southeast region (including the Gulf of Mexico).

List of Fisheries – A key feature of the incidental-take regime is annual publication of a list of fisheries

placing 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 animals from any marine mammal stock are 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 are between 1 and 50 percent of the stock's potential biological removal level, provided that the total number of mortalities and serious injuries from all fisheries combined is greater than 10 percent of the stock's potential biological removal level. All other fisheries (i.e., those that, combined with other fisheries, do not take more than 10 percent of a stock's potential biological removal level or that individually take less than 1 percent of any stock's potential biological removal level) are placed in category III. In the absence of reliable information concerning the frequency with which marine mammals are killed or seriously injured incidental to a fishery, the National Marine Fisheries Service assesses the proper placement of the fishery by evaluating factors such as fishing techniques and gear used, available deterrence methods, target species, seasons and areas fished, stranding data, the species and distribution of marine mammals in the area, and comparisons with similar fisheries.

The Service published its final list of fisheries for 2001 on 15 August 2001. The list included 6 category I fisheries, 33 category II fisheries, and 140 category III fisheries. The most significant change from the 2001 list was the movement of the Atlantic squid, mackerel, butterfish trawl fishery from category II to category I, based on data that indicated a serious injury/mortality rate of greater than 50 percent of the potential biological removal level for pilot whales and common dolphins. Fisheries elevated from category III to category II for 2001 include the Atlantic blue crab trap/pot fishery, the North Carolina inshore gillnet fishery, and the southeast Atlantic gillnet fishery. Many fisheries underwent name changes in 2001, mostly for clarification purposes. For example, the Gulf of Maine/U.S. mid-Atlantic lobster trap/pot fishery was renamed the northeast/mid-Atlantic American lobster trap/pot fishery. Several fisheries were incorporated into larger groups, and some were divided into two separate fisheries. Numerous new fisheries were added to the list, such as the Gulf of Mexico haul/beach seine fishery, among others. Of these new fisheries, most were listed under category III, but six were added to category II. These include the North Carolina long haul seine fishery, the northeast anchored float gillnet fishery, the northeast drift gillnet fishery, the northeast trap/pot fishery, the Virginia pound net fishery and the California longline fishery. Numerous other changes were incorporated to refine the description of certain fisheries and to update information on the numbers of vessels or persons participating in the fisheries and on the species taken.

Take Reduction Plans – As noted earlier, section 118 of the Marine Mammal Protection Act 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). It directs the Service to establish take reduction teams to assume 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 Native American 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 are to continue to meet to monitor the plan's implementation.

As discussed in the previous annual report, the National Marine Fisheries Service had established five take reduction teams as of 2000 — the Gulf of Maine Harbor Porpoise Take Reduction Team, the Pacific Offshore Cetacean Take Reduction Team, the Atlantic Offshore Cetacean Take Reduction Team, the Atlantic Large Whale Take Reduction Team, and the Mid-Atlantic Harbor Porpoise Take Reduction Team. In 2001 a new group, the Bottlenose Dolphin Take Reduction Team, was established. Also, as discussed below, the Atlantic offshore cetacean team was disbanded in 2001. Representatives of the Commission have participated as members of the harbor porpoise, Atlantic large whale, and bottlenose dolphin teams.

Activities of the Mid-Atlantic and Gulf of Maine Harbor Porpoise Take Reduction Teams are discussed in the harbor porpoise section of Chapter III. Activities of the bottlenose dolphin team are similarly discussed in the bottlenose dolphin section of Chapter III. Actions by the Service and the Atlantic Large Whale Take Reduction Team regarding the take reduction plan for endangered whales taken in gillnet and lobster pot fisheries along the Atlantic coast are discussed in the northern right whale section of Chapter III.

The Pacific Offshore Cetacean Take Reduction Team was constituted to address the incidental take of several species of beaked whales, short-finned pilot whales, pygmy sperm whales, sperm whales, and humpback whales in the category I drift gillnet fishery targeting thresher sharks and swordfish in waters off California and Oregon. As noted in previous reports, marine mammal mortalities have been generally reduced to below the potential biological removal levels of the affected stocks since the implementation of measures in 1998 requiring, among other things, that nets be set a minimum of 11 m (36 ft) below the water surface and that low-intensity acoustic deterrent devices (pingers) be used on nets. The estimated number of mortalities and serious injuries in 2001 did not exceed the potential biological removal level for any stock.

The Atlantic Offshore Cetacean Take Reduction Team was established in 1996 to address the take of several species of cetaceans, including right whales, humpback whales, sperm whales, beaked whales, long-finned and short-finned pilot whales, and common, spotted, and bottlenose dolphins, incidental to operation of the Atlantic pair trawl, longline, and drift gillnet fisheries for swordfish and other species. The team submitted a draft take reduction plan to the National Marine Fisheries Service in November 1996. It recommended seasonal closures, increased observer coverage, limits on expansion of the fishery, and allocation of catch limits over a longer season.

Before finalizing its take reduction plan, however, the Service published a proposed rule to prohibit permanently the use of driftnets in the Atlantic swordfish fishery. In making this proposal, the Service noted that measures recommended by the Atlantic Offshore Cetacean Take Reduction Team did not provide sufficient guarantees that marine mammal takes would be reduced to allowable levels and did not adequately address concerns about the bycatch of sea turtles. The Service also noted that the cost of implementing the take reduction team's recommendations would exceed the net value of swordfish landings. Final rules to implement the driftnet closure were issued on 27 January 1999. Inasmuch as the taking of marine mammals was reduced appreciably by this closure, the Service, in April 2001, disbanded the Atlantic Offshore Cetacean Take Reduction Team.

In fiscal years 2001 and 2002 the Service received funding of $3 million for East Coast observer programs. Fisheries included in the East Coast observer program in 2001 include the Atlantic longline, southeast shark driftnet, southeast flynet, southeast rock shrimp and calico scallop trawl, squid trawl, mid-Atlantic small mesh trawl, and mid-Atlantic large mesh trawl fisheries. Although the main emphasis on the observer programs for many of these fisheries will be in turtle bycatch, data will be collected on marine mammal bycatch as well. Observer coverage in these fisheries range from 5 to 100 percent depending on time of year and type of fishery. The Service proposes to use data collected by these observers to evaluate the incidental- take problems of the area over the next few years. A new Atlantic Offshore Cetacean Take Reduction Team may be convened after that evaluation is completed if it

appears that incidental take of cetaceans in the Atlantic is above acceptable levels.

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 may take marine mammals by nonlethal means to deter them from damaging gear, catch, or other property under certain circumstances. 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 for 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 nonlethally. The use of certain 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, preventive, and reactive measures that could be taken to deter marine mammals, setting forth four general principles regarding acceptable deterrence measures. In addition to the 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, the use of explosives more powerful than seal bombs to deter seals or sea lions, the 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 to deter listed species safely would be subject to a separate rulemaking. Commission comments on the proposed regulations are summarized in the 1995 annual report.

As of the end of 2001, final deterrence regulations had yet to be published by the National Marine Fisheries Service. The Fish and Wildlife Service had yet to publish any guidelines or proposed regulations with respect to deterrence of those species of marine mammals under its jurisdiction.

Pinniped/Fisheries Interactions – Since passage of the Marine Mammal Protection Act, a number of seal and sea lion populations in U.S. waters have increased substantially. At the same time, reports of seal and sea lion interactions with commercial fisheries, aquaculture projects, and protected stocks of salmon have also increased. Such interactions typically involve depredation of catch, damage to gear, and in the case of wild salmon stocks, predation of dwindling numbers of salmon as they attempt to negotiate migratory barriers, such as locks, dams, and waterfalls. Pinniped/fishery interactions have been a particular source of concern in California, Oregon, and Washington on the West Coast and in the Gulf of Maine on the East Coast.

To address these concerns, Congress added section 120 to the Marine Mammal Protection Act in 1994. To address predation on depleted salmon stocks, section 120 calls for the formation of pinniped/fishery interaction task forces to identify research and management needs and to make recommendations concerning requests for lethal taking authority. Where nonlethal management alternatives prove ineffective, lethal removal of individual seals or sea lions contributing to the problem may be authorized. To address other concerns, section 120 also directs that various analyses and reports be completed to help assess the need for, and to identify, possible responsive measures.

Authorizations to Remove Pinnipeds

To date, only the State of Washington has requested lethal removal authority for pinnipeds under section 120. As discussed below, however, it has not yet had to use lethal means to address the identified problems.

Ballard Locks – Winter-run steelhead salmon that reproduce in streams emptying into Lake Washing-ton and then into Puget Sound must pass through the Chittenden, or Ballard, Locks in Seattle. From the early 1980s to 2001 the number of steelhead returning to spawn declined from nearly 3,000 to just 42.

During that period, increasing numbers of California sea lions were observed congregating at the locks to prey on the steelhead. The State of Washington and the National Marine Fisheries Service attempted various nonlethal methods to reduce sea lion predation, but were initially unsuccessful. The Washington Department of Fish and Wildlife therefore sought authority from the Service to lethally take individually identified California sea lions known to prey on the steelhead. The Department's application prompted the Service to establish, in 1994, a pinniped/fishery interaction task force under section 120(c). Based on recommendations of the task force, the National Marine Fisheries Service authorized the Department to lethally remove individual sea lions provided that (1) the animals had been observed taking steelhead at the site, (2) nonlethal means had failed, and (3) the identified animals were present during the time of the steelhead run. The authorization was initially valid until 30 June 1997, but was extended through 30 June 2001. As discussed in past annual reports, the Commission provided comments to the Service at various steps in the authorization process.

No sea lions were killed during the 1994–1995 winter run, but three were captured, held in captivity until the end of the run, and then released in the Strait of Juan de Fuca. No sea lions were lethally removed during the 1995–1996 winter run, but three were captured and removed to permanent captivity at Sea World in Orlando, Florida. In addition, an acoustic array was installed around the locks to deter sea lions that might approach the locks to forage on steelhead and other salmon, and measures were taken to enhance the fish passageways. No sea lions have been observed foraging on steelhead at the locks since then. Pending new developments, review by the Ballard Locks Task Force has been suspended, and no further action is planned. The State of Washington and the National Marine Fisheries Service continue to monitor the situation. Steelhead escapement increased from 70 in 1994 to 126 in 1995, 234 in 1996, 620 in 1997, and 584 in 1998. In 1999, however, salmon escapement dipped to about 220 and in 2000 it fell to a low of 48, before reaching its current level of 42. Because no sea lion predation has been observed since 1998, the recent continuation of the decline appears to be due to factors other than sea lion predation at the locks.

On 19 October 2001 the Service gave notice in the *Federal Register* that the State of Washington was seeking to extend its letter of authorization for another five years, through 30 June 2006. No other changes were proposed to the authorization. In its request to the Service, the State of Washington cited the continuation of severely depressed returns of steelhead and the need to quickly remove any sea lion that meets with the criteria of the authorization. The state noted that there were no lethal removals planned as of 12 September 2001, but requested that the authorization be extended so that, as a last resort, it could respond in a timely manner to sea lion predation that could not be controlled by nonlethal means. The Commission expects that the extension will be granted early in 2002.

Other Pinniped/Fisheries Interactions

Information on investigations into whether California sea lions and Pacific harbor seals are having significant negative impacts on the recovery of endangered and threatened salmonid stocks or other components of coastal ecosystems in Washington, Oregon, and California is available in the Commission's previous annual reports. No action took place in these investigations in 2001. Similarly, information on the Gulf of Maine task force on aqua-culture/pinniped interactions is contained in the previous report.

The Tuna-Dolphin Issue

For reasons not fully understood, schools of large yellowfin tuna (those greater than 25 kg [55 lbs]) tend to associate with dolphin schools in the eastern tropical Pacific Ocean. This area covers more than 18.1 million km^2 (5 million mi^2) 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 fishermen to release the dolphins unharmed, some

animals become trapped in the nets and are killed or injured. Estimated dolphin mortality in the early years of the fishery was in the hundreds of thousands per year. 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 11, progress made by the United States to reduce dolphin mortality under the Marine Mammal Protection Act was offset by increased mortality from growing 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 with 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. Additional requirements also were placed on U.S. tuna fishermen.

The 1988 amendments and the resulting threat of tuna embargoes brought about a substantial reduction in dolphin mortality by foreign fleets. Another factor contributing to the drop in dolphin mortality was the La Jolla Agreement, an agreement entered into voluntarily by the tuna-fishing nations in 1992. Among other things, the agreement established vessel-specific mortality limits. The specific provisions of the La Jolla Agreement are discussed in past annual reports. Under the Marine Mammal Protection Act and the La Jolla Agreement, dolphin mortality declined by more than 95 percent between 1988 and 1993. Although part of this decline was attributable to fewer sets being made on dolphins, the primary factor in reducing incidental dolphin mortality was a marked reduction in the average number of dolphins killed per set.

Even though the international tuna fleet had been quite successful in reducing incidental dolphin mortality from unsustainably high levels in the 1980s, under the comparability requirements applicable under the 1988 and 1992 Marine Mammal Protection Act amendments, yellowfin tuna caught in the eastern tropical Pacific was excluded from the U.S. market if it was from countries whose vessels continued to set on dolphins. This prompted six parties to the La Jolla Agreement — Colombia, Costa Rica, Ecuador, Mexico, Panama, and Venezuela — to issue a statement in 1995 urging the United States to lift the embargoes then in effect. They contended that catching tuna in compliance with the International Dolphin Conser-vation Program, established under the La Jolla Agree-ment, was environmentally sound and that increased use of dolphin-safe fishing methods would harm biodiversity by increasing the discard of juvenile tuna and the bycatch of nontarget species other than dolphins. The six nations stated that the situation was endangering their continued participation in the program established under the La Jolla Agreement. In response, Congress in mid-1995 began to consider the need for changes to the Marine Mammal Protection Act's tuna-dolphin provisions, particularly those concerning the tuna embargoes.

Concerned that an opportunity to consolidate the gains in dolphin conservation made under the La Jolla Agreement was slipping away, five environmental groups initiated discussions with representatives of Mexico in September 1995 to explore the possibility of a multilateral agreement among tuna-fishing nations to formalize and strengthen the International Dolphin Conservation Program and lift U.S. tuna embargoes. These discussions led to a compromise supported by the tuna fishing nations, some environmental groups, and the U.S. Administration.

This compromise ultimately formed the basis for the Declaration of Panama, an agreement signed by representatives of the United States and 11 other nations on 4 October 1995. These nations declared

Table 11. Estimated incidental kill[1] of dolphins in the tuna purse seine fishery in the eastern tropical Pacific Ocean, 1972–2001

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	2,547
1997	0	3,005
1998	24	1,853
1999	0	1,348
2000	0	1,636
2001	0	<2,150[2]

[1] 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.
[2] Preliminary estimate.

their intention, contingent on the enactment of changes in U.S. law, to formalize the La Jolla Agreement as a binding international agreement and to incorporate additional dolphin protection measures. The envisioned changes to U.S. law included allowing access to the U.S. market for all tuna, whether caught by setting on dolphins or not, provided that it was caught in compliance with the agreement. The Declaration of Panama also called on the United States to redefine 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, rather than applying that term only to tuna caught on trips during which no dolphin sets were made. Among other things, the new international agreement was to establish annual stock-specific quotas on dolphin mortality based on minimum population estimates and to limit overall mortality to no more than 5,000 a year.

Since 1993 dolphin mortality incidental to the eastern tropical Pacific tuna fishery has been reduced further, to a record low of 1,348 observed dolphin deaths in 1999. However, based on preliminary data for 2001, it appears that dolphin mortality since then has increased for the second straight year. In part, this is attributable to an increase in the number of dolphin sets being made. In 1999, 8,648 dolphins sets were made. In 2000 the number increased to 9,235. Prelimi-nary data for 2001 indicate that more than 9,600 dolphin sets were made during the year. Some of the increase in dolphin mortality, however, is attributable to an increase in the number of dolphins being killed per set. During 1999 the dolphin mortality rate was about 0.15 dolphin per set. For 2001 it appears that the kill per set will be about 0.22. Despite the recent increases, dolphin mortality in 2001 continued to remain well below the annual mortality limit of 5,000 established under international agreement.

The International Dolphin Conservation Program Act

Efforts to amend U.S. law as called for by the Declaration of Panama culminated in enactment of the International Dolphin Conservation Program Act on 15 August 1997. The new law made several changes to the U.S. tuna-dolphin program. Amendments to section 304 of the Marine Mammal Protection Act directed the Secretary of Commerce, in consultation with the Marine Mammal Commission and the Inter-American Tropical Tuna Commission, to conduct a study of the effects of chase and encirclement on dolphins and dolphin stocks

taken in the course of purse seine fishing for yellowfin tuna in the eastern tropical Pacific. The study was to consist of abundance surveys and stress studies designed to determine whether chase and encirclement are having a "significant adverse impact on any depleted dolphin stock in the eastern tropical Pacific Ocean." Specifically, the amendments required the National Marine Fisheries Service to survey the abundance of depleted dolphin stocks during calendar years 1998, 1999, and 2000. The stress studies were to include (1) a review of relevant stress-related research and a three-year series of necropsy samples from dolphins killed in dolphin sets, (2) a one-year review of relevant historical demographic and biological data related to dolphins and dolphin stocks, and (3) an experiment involving the repeated chasing and capturing of dolphins by means of intentional encirclement.

The Service was directed to make an initial finding by March 1999, based on the preliminary results of the research program and any other relevant information, as to whether the intentional encirclement of dolphins was having a significant adverse effect on any depleted dolphin stock. A final finding is to be made between 1 July 2001 and 31 December 2002 and a report of that finding submitted to Congress. Unless the Service determines that chase and encirclement are having a significant adverse effect on a depleted dolphin stock, the definition of dolphin-safe tuna will be changed to include all tuna harvested in sets in which no dolphin mortality was observed.

The amendments also directed the National Marine Fisheries Service to engage in other research to further the goals of the International Dolphin Conservation Program. The Service, in consultation with the Marine Mammal Commission and with the cooperation of the nations participating in the International Dolphin Conservation Program and the Inter-American Tropical Tuna Commission, is to conduct such research, which may include projects to (1) devise cost-effective fishing methods and gear designed to reduce or eliminate incidental mortality and serious injury of dolphins; (2) develop cost-effective methods for catching mature yellowfin tuna that do not require setting on dolphins; (3) carry out assessments of dolphin stocks taken in the eastern tropical Pacific tuna fishery; and (4) determine the extent to which the incidental taking of nontarget species, including juvenile tuna, occurs in the eastern tropical Pacific tuna fishery and assess the impact of such taking.

Although still subject to the dolphin-safe labeling requirements, all tuna caught in the eastern tropical Pacific after the effective date of the amendments may be imported into the United States, provided it was caught in accordance with the requirements of the International Dolphin Conservation Program. The amendments further required that the total dolphin mortality limits and the per-stock limits for nations importing tuna to the United States not exceed the 1997 levels and be consistent with the objective of progressively reducing dolphin mortality to a level approaching zero. The amendments lifted the zero quota and stock-specific restrictions that have prevented U.S. fishermen from setting on dolphins. U.S. fishermen are now able to apply for a permit allowing them to take dolphins in accordance with the provisions of the International Dolphin Conservation Program. Unlike the multiyear, general permits issued to the American Tunaboat Association in the past, individual vessels are required to obtain annual permits.

The amendments took effect on 3 March 1999, the date that the Secretary of State certified to Congress that a binding international agreement establishing the International Dolphin Conservation Program had been adopted and was in force. The parties to that agreement, other than the United States, are Costa Rica, Ecuador, El Salvador, Honduras, Mexico, Nicaragua, Panama, Peru, Venezuela, and, as of 17 May 2001, Guatemala. In addition, Bolivia, Colombia, the European Union, and Vanuatu are applying the agreement provisionally.

Implementation of the 1997 Amendments

As noted earlier, the International Dolphin Conservation Program Act requires the National Marine Fisheries Service to consult with the Marine Mammal Commission regarding implementation of mandated research into the effects of chase and encirclement on depleted dolphin stocks. Other research in furtherance of the goals of the International Dolphin Conservation Program required under the Act is also to be conducted in consultation with the Commission. In addition, the Service is required to consult with the Commission in developing regulations to implement the new provisions

governing the taking of marine mammals in the eastern tropical Pacific tuna fishery.

Initial Finding – Under the terms of the International Dolphin Conservation Program Act, the National Marine Fisheries Service was to make an initial finding by the end of March 1999 as to whether the intentional encirclement of dolphins is having a significant adverse effect on any depleted dolphin stock in the eastern tropical Pacific. However, as discussed in the 1999 annual report, the Service decided to conduct an independent peer review of the scientific bases for making the finding, as requested by members of Congress, before publishing its results. To accommodate the review, publication of the initial finding was delayed by one month.

The Service made its initial finding on 29 April 1999 and published notice of that finding in the 7 May *Federal Register*. The rationale for the finding and a summary of the data on which it was based were presented in a report to Congress.

The Service noted that its population assessments indicated that the northeastern offshore stock of spotted dolphins and the eastern stock of spinner dolphins apparently are not increasing at the expected rate, despite the relatively low level of fishery-related mortalities reported from the tuna fishery since 1991. Available data did not enable the Service to assess whether the coastal stock of spotted dolphins had or had not increased at the expected rate. As recom-mended by a group of independent peer reviewers, the Service cautioned that its conclusions were not without some uncertainty because of biases in the way that abundance data had been collected by tuna vessel observers or a possible delay between the birth of dolphins and their attainment of sexual maturity following the years in which dolphin mortality was first reduced to low levels.

The report then considered the slower-than-expected growth of these populations, looking at two possible causes: changing environmental conditions and indirect or unobserved effects of tuna-fishing operations. The Service concluded that the environmental data examined to date showed no evidence of a recent ocean environmental shift or other long-term change that might have affected the growth rates of the depleted dolphin stocks. Turning to the tuna fishery as a possible cause of the apparently depressed growth rate, the Service indicated that its literature review had led to the conclusion that stress resulting from chase and encirclement could not be dismissed as a possible cause. The Service also identified two other possible fishery-related causes: separation of dolphin mothers and calves during chase and encirclement and under-reporting of direct mortality.

Although it believed that the rate of recovery has been lower than expected, the Service found that, based on the available data, there was insufficient evidence to conclude that chase and encirclement are having a significant adverse impact on any depleted dolphin stock in the eastern tropical Pacific. The Service apparently interpreted the statute as requiring that it make such a finding if it could not determine "with certainty" that depleted dolphin stocks were experiencing significant adverse effects due to chase and encirclement. In making this finding, the Service noted, however, that it could not rule out chase and encirclement as a possible cause. It indicated that efforts to resolve the uncertainties would continue and would be reflected in the final determination to be made by the end of 2002.

The Service explained that the initial finding would not become effective until the effective date of final regulations implementing the provisions of the International Dolphin Conservation Program Act. That is, the definition of dolphin-safe tuna would not change until a proposed rule had been published and finalized.

As discussed in the litigation section below, environmental groups successfully challenged the initial finding based largely on the Service's failure to collect and consider at least preliminary data from all of the studies mandated under the International Dolphin Conservation Program Act. Further, the appellate court that reviewed the case ruled that the Service, in making the findings under the Act, must determine whether or not chase and encirclement are having significant adverse effects on depleted dolphin stocks. The final finding is expected to be issued at the end of 2002.

Implementing Regulations – Section 303 of the Marine Mammal Protection Act, as amended by the International Dolphin Conservation Program Act in 1997, requires the National Marine Fisheries Service, in consultation with the Department of State, the Marine Mammal Commission, and the U.S. commis-sioners to the Inter-American Tropical Tuna Com-mission, to issue regulations to implement the Inter-national Dolphin Conservation Program. Proposed

implementing regulations were published by the Service on 14 June 1999. The Service proposed to amend the provisions applicable to dolphin-safe tuna to reflect the Service's initial finding on the effects of chase and encirclement. Once implemented, tuna caught in sets with no observed dolphin mortality or no serious injury to any dolphin could be labeled as dolphin-safe. The regulations also would allow entry into the United States of all yellowfin tuna caught in compliance with the International Dolphin Conser-vation Program Act, whether dolphin-safe or not. As required by statute, the regulations would also establish tracking and verification requirements to ensure that tuna products imported into the United States are accurately labeled.

Other aspects of the proposed rule would apply only to U.S. fishermen. These provisions would establish procedures for U.S. fishing vessels to obtain annual permits allowing them to participate in the eastern tropical Pacific tuna fishery on an equal footing with vessels from other nations.

Comments on the proposed rule were submitted by the Commission on 9 September 1999. The Commission believed that the proposed regulations generally tracked the applicable provisions of the International Dolphin Conservation Program Act and, except as noted in specific comments, recommended that they be adopted. Among other things, the Commission noted that the proposed rule needed to be updated to indicate that the International Dolphin Conservation Program Act had entered into force and to reflect the system for allocating stock-specific dolphin quotas, which was to have been adopted by the parties to the international agreement by 15 August 1999. In response to a specific request for comments as to whether affirmative findings of conformance with the requirements of the International Dolphin Conservation Program Act should be issued on a multiyear basis, the Commission expressed the view that findings should be made annually, at least with respect to determinations concerning whether countries are meeting their financial obligations to the Inter-American Tropical Tuna Commission and are complying with applicable dolphin mortality limits. Similarly, the Commission believed that determinations regarding imports from intermediary nations needed to be reviewed periodically.

The Service proposed to correct, through issuance of the regulations, an apparent drafting error in the 1997 amendments concerning the time relative to sunset by which sets must be completed. It appears that the applicable statutory provision erroneously established the point at which the backdown process is to be completed at 30 minutes *before*, rather than *after*, sundown. The Commission concurred that the statutory wording probably had resulted from an error, but noted that the legislative language was clear. The Commission therefore recommended that the problem be corrected by amending the Act rather than by regulation.

The Commission commented that the system of reporting and inspection requirements proposed by the Service to track and verify that tuna imported into the United States is properly labeled appears, at least in theory, to be adequate. The Commission expressed concern, however, that, although the Service will have the opportunity to observe offloading, deliveries, and other transfers, it was not clear what effort the Service intended to make in this regard. Without such information, the Commission was unable to comment on whether the proposed tracking and verification program would, in practice, provide the needed oversight. The Commission therefore recommended that the Service provide some sort of estimate of the effort that it expects to make to conduct spot checks under the tracking and verification program.

The Commission also noted that the proposed rule discussed efforts being made to negotiate an agreement among the nations that fish for tuna in the eastern tropical Pacific concerning a cooperative international tracking program, but did not indicate when such a program might be in place. The Commission thought it ill advised, and possibly contrary to the requirements of the International Dolphin Conservation Program Act, to adopt final regulations allowing tuna to be imported into the United States before the international tracking and verification program has been agreed to and is in place.

The National Marine Fisheries Service published a related proposed rule on 22 December 1999, seeking comments on the proposed design of the official mark required to be developed under the International Dolphin Conservation Program Act to be used to label dolphin-safe tuna. Final regulations adopting the mark were published by the Service on 30 May 2000.

The National Marine Fisheries Service published an interim final rule implementing the provisions of the

International Dolphin Conservation Program Act on 3 January 2000. Based on the Service's initial determination that there was insufficient information to determine that chase and encirclement of dolphins in the eastern tropical Pacific tuna fishery was having significant adverse effects on depleted dolphin stocks, the regulations specified that, beginning on 2 February 2000, the effective date of the regulations, tuna caught in dolphins sets during which no dolphin mortality was observed could be labeled as dolphin-safe. The regulations also set forth the evidence to be supplied and findings to be made before a fishing nation is authorized to import into the United States yellowfin tuna harvested by purse seine nets in the eastern tropical Pacific. As recommended by the Commission, the interim final rule specified that such findings would be reviewed on an annual basis, although harvesting nations need only request an affirmative finding every five years. Contrary to the Commission's recommendation that determinations for intermediary nations also be reviewed periodically, the Service indicated that such a review would be undertaken only when requested by the nation or when there is reason to believe that the nation, within the preceding six months, may have imported yellowfin tuna banned from direct importation into the United States.

To receive an affirmative finding, a nation must provide documentary evidence concerning its membership in the Inter-American Tropical Tuna Commission, compliance with the International Dolphin Conservation Program, adequacy of its tuna tracking and verification program, and compliance with national dolphin mortality limits and annual stock-specific mortality limits. Under the regulations, a nation could exceed its total dolphin mortality limit in a given year and still receive an affirmative finding, provided the limit was exceeded due to "extraordinary circumstances" beyond the control of the nation or the vessel captains and the nation took immediate action to require its vessels to cease fishing for tuna in association with dolphins for the remainder of the year. Similarly an affirmative finding could be made for a nation that exceeded the annual stock-specific limits during the preceding year if the limit was exceeded due to extraordinary circumstances, setting on dolphins was immediately stopped for the remainder of the year, and the nation was making good-faith efforts to ensure compliance with the requirements of the International Dolphin Conservation Program by all vessels operating under its flag.

As noted earlier, there exists some confusion as to whether all sets must be completed to backdown 30 minutes before or after sunset. The Commission and others who commented on this aspect of the proposed rule cautioned that the proposed rule was inconsistent with the statutory provision and that, if an error had been made in the International Dolphin Conservation Program Act, it should be corrected legislatively. Nevertheless, the Service opted to use the later time limit because previous legislation and regulations had used it and there had been no indication in the legislative history of the 1997 amendments that Congress intended to change this requirement.

The interim final regulations also set forth the specifics of the tracking and verification program. Generally, tuna caught in sets in which no dolphin mortality or serious injury occurred and that caught in sets with mortalities or serious injuries are to be stored in separate wells onboard the vessel. However, under the regulations, there are two, presumably rare, instances in which dolphin-safe and non-dolphin-safe tuna may be kept in a mixed well. First, if the observer originally designates a set as being dolphin-safe and subsequently discovers during the loading process that a dolphin mortality or serious injury has occurred, the dolphin-safe status of the well is changed. In such a situation, most of the previously loaded tuna would retain its dolphin-safe status. Under the regulations, 15 percent of the dolphin-safe tuna (by weight) would be redesignated as non-dolphin-safe to provide a buffer between the two types of tuna maintained in the well. The second exception would occur only at the end of a fishing trip, in those situations where the only storage space available is in a non-dolphin-safe well. In such an instance, dolphin-safe tuna may be loaded on top of the non-dolphin-safe tuna provided that it is segregated by a net or other barrier.

With respect to the Commission's comment that the adequacy of the tracking and verification program depends, in large part, on the resources directed at monitoring, the Service indicated that it plans to monitor all off-loading by U.S. purse seine vessels fishing in the eastern tropical Pacific. Further, the Service indicated that it has requested and received

funding to hire two inspectors to monitor such off-loading. As for the Commission's concern that the international tracking and verification program be in place before adoption of final regulations, the Service noted that such a program had been adopted by the parties to the International Dolphin Conservation Program.

The regulations also specify the requirements and procedures for U.S. fishermen to obtain operator and vessel permits, mirroring the statutory requirements. During 2000 the National Marine Fisheries Service issued six permits to U.S. tuna-fishing vessels. Despite securing such permits, no U.S. vessel engaged in setting on dolphins during 2000. Six permits were also issued to U.S. vessels during 2001. Again, no dolphin sets were made by any of these vessels during the year.

Environmental groups filed suit in the U.S. Court of International Trade challenging several aspects of the regulations shortly after they became effective. As discussed below, the court issued its ruling in December 2001, upholding the legality of the regula-tions. The court also found the affirmative finding for Mexico made under those regulations to be in accord-ance with law. It is expected that the ruling will be appealed.

Commission Consultations – Shortly after enactment of the International Dolphin Conservation Program Act, the Commission wrote to the National Marine Fisheries Service to establish a framework for carrying out the required consultations. Among other things, the Commission urged the Service to develop and circulate the criteria it would use to make the initial and final findings as to whether chase and encirclement of dolphins were having a significant adverse effect on any depleted dolphin stock. The Commission noted that these determinations were likely to be controversial and believed that the Service could best insulate itself from possible claims that it was not being objective by developing the criteria before collection and analysis of the data from the mandated studies.

As discussed in previous annual reports, the Service agreed and, in December 1998, convened a meeting to begin development of decisionmaking criteria. Participants at that meeting, which included representatives of the Commission, generally agreed that the criteria should be based on addressing two general questions. First, based on data concerning the abundance and trends of depleted dolphin stocks, have the populations failed to grow at expected rates? Second, if there has been such a failure, is it attributable -to fishery-related causes? A report pro-viding a detailed discussion of the framework developed at the 1998 meeting, which was used in making the initial finding, is available on the Service's website at http://swfsc.ucsd.edu/mmd/congress/ Good-man/Goodman.html.

A second meeting to refine the decision criteria was held in April 2000. Members of the Commission's staff also participated in that meeting. With respect to the issue of population growth, the participants focused on whether abundance estimates derived from observers placed onboard the tuna vessels should be pooled with line transect survey data to determine population trends. Because the Service would need to review the data before it could determine whether they were too biased to be useful, it was decided that a separate workshop should be convened to consider this issue. Although progress on the studies being planned or conducted to help attribute the cause of slower-than-expected growth was discussed, no explicit decision rules concerning attribution were developed. A complete summary of this consultation regarding the decision framework can be found in the Southwest Fisheries Science Center Administrative Report LJ-00-16, published in January 2001, which is available from the National Marine Fisheries Service.

Although the Service had informed the Commission that it planned to conduct further consultations regarding the decision framework and the underlying research projects in 2001, no consultations on the decision framework took place. Instead, the Director of the Service's Office of Science and Technology wrote to the Commission on 20 April 2001 to explain that the Service had recently held a workshop, including both agency scientists and top-level policy officials, to review the development of the decision process. One of the principal outcomes of that workshop was the recognition of "a clear distinction between scientific advice and the policy elements of the decision." Although the Service recognized its obligation to consult with the Commission about the research mandated by the International Dolphin Conservation Program Act, it apparently saw no need for ongoing consultation with respect to the development of the policy aspects of the decision criteria. Rather, the

Service indicated its intention to complete the development of a "draft decision process" internally and seek the advice of the Commission and others only after the draft was complete. It is expected that the draft decision process will be published for public comment early in 2002.

The Service met with representatives of the Commission and the Inter-American Tropical Tuna Commission on 1 August 2001 to consult further about the scientific research being conducted under the International Dolphin Conservation Program Act. The Service reviewed the research already completed, that under way, and that planned but yet to be undertaken, seeking advice on whether there were additional studies that it should be doing before making the final finding on the effects of chase and encirclement.

The Service noted that it had completed the three planned abundance surveys designed to estimate the abundance of coastal spotted, northeastern offshore spotted, and eastern spinner dolphins. The results of the 2000 survey had not undergone peer review and thus were not presented at the meeting. The Service indicated that it was using improved methods of analyzing the line-transect data using covariates such as school size, sea state, and the probability of detecting schools of dolphins. It was also in the process of re-analyzing its previous estimates using this approach. The Service had yet to determine whether and how it might use abundance data collected by observers on tuna vessels. Toward this end, the Service was in the process of examining recent analyses of the data conducted by the Inter-American Tropical Tuna Commission and had contracted for an independent evaluation of the biases in the data set. It is expected that a workshop to resolve issues related to these data will be held early in 2002.

The Service also described the various ecosystem studies that it was conducting to provide a context for interpreting the significance of the observed trends in dolphin abundance. Among other things, the Service was investigating oceanographic factors, plankton, nekton, flying fish, seabirds, and other top trophic-level predators.

The last group of studies reviewed at the meeting were related to the examination of stress in dolphins. The stress studies include (1) the necropsy sampling program, (2) photogrammetric analyses of spinner dolphin calves, (3) analyses of molecular stress indicators, (4) an investigation of cow/calf separation during chase and encirclement, (5) an investigation of dolphin swimming energetics, and (6) the chase-recapture experiment mandated by the International Dolphin Conservation Program Act.

With respect to the necropsy program, the Service reported that, as of August 2001, technicians onboard tuna vessels had collected samples from 35 dolphins. Although analyses of some samples had begun, no results were then available. It has been apparent for some time that the Service would fall far short of collecting and analyzing 450 samples or even 300 samples, the number the Service estimated it would need to provide sufficient statistical precision and power to address questions related to stress, as originally planned. This is largely due to difficulties encountered in securing the necessary authorizations to place the technicians onboard foreign tuna vessels, the only ones setting on dolphins. As of the end of 2001, it appeared that, at most, samples from 56 dolphins will have been analyzed in time to be factored into the final finding.

The Service also reviewed the results of its investigation of cow/calf separation during chase and encirclement. By analyzing a large number of tissue samples collected between 1973 and 1990, researchers determined that the number of dolphins killed incidental to tuna-fishing operations likely has been underreported because those figures do not account for the likelihood that nursing calves that become separated from their mothers during fishing operations also die. Inasmuch as more lactating females than calves were killed in about 25 percent of the sets examined, the researchers concluded that mortality may have been underestimated by between 6 and 15 percent. The researchers further surmised that the actual number of unobserved calf deaths likely is even higher because separation of mothers and calves could occur at several different points during chase and encirclement, with only a fraction of these being represented by the calf deficit detected at the end of the set.

As discussed in the Commission's previous annual report, the Service in 1999 began to question the appropriateness of the chase and recapture experiment mandated by section 304(a)(3)(C) of the Marine Mammal Protection Act and, if appropriate, whether it

should be done differently than originally planned. A meeting to evaluate the potential usefulness of the experiment in providing population-level results was convened in April 2000. Potential problems identified by participants at that meeting included difficulties associated with extrapolating the results from the expected small sample size to draw generally applicable conclusions, the lack of a control group of unstressed dolphins that could be sampled for comparison, the narrow focus of the anticipated study, which would look only at the effects on adult dolphins, and the difficulties with attributing any observed pathology to the chase and capture events. In light of these concerns, it was generally agreed that the study, as originally envisioned, was unlikely to provide quantitative results with sufficient statistical power to enable the Service to draw conclusions as to whether chase and encirclement are having significant adverse effects on depleted dolphin stocks.

The Service wrote to the Commission in August 2000, in part to follow up on some of the issues raised at the consultation meeting on the chase and recapture experiment. Although reservations had been expressed about the usefulness of the chase and recapture experiment, the Service noted that there had been a general consensus that, if the experiment must be conducted, it could be structured so as to produce some useful data that otherwise would not become available. The Service therefore indicated that it would conduct the experiment during 2001 and consider the results in making the final finding on the effects of chase and encirclement.

To prepare for the chase and recapture study, the Service, in January 2001, convened a workshop with an expert panel to solicit advice with respect to the blood parameters to be collected during the study for use in assessing stress in dolphins. The panel, which included a member of the Commission's Committee of Scientific Advisors, provided a series of recommendations as to what samples should be collected and how they should be obtained, archived, and analyzed. A copy of the workshop report and other information related to the chase and recapture experiment can be found at the Southwest Fisheries Science Center's web page (http://swfsc.nmfs.noaa.gov/prd/2001cruises/CHESSFront.htm).

The Service began a two-month-long research cruise in August 2001 to conduct the chase and recapture experiment, named the Chase Encirclement Stress Studies (CHESS) by the Service. By the end of the cruise, 27 dolphin sets had been made to tag animals and collect samples. Researchers collected 70 blood samples, including 17 from dolphins captured more than once. In addition, nearly 300 skin samples, to be used for both genetic and stress studies, were collected. It is expected that the results of these studies will be made available during 2002.

Litigation – As noted earlier, the National Marine Fisheries Service issued an initial finding on 29 April 1999 indicating that it was unable to determine whether chase and encirclement were having significant adverse effects on depleted dolphin stocks. On 18 August 1999 two individuals and ten environmental groups filed a lawsuit in U.S. district court challenging that finding (*Brower* v. *Daley*). The plaintiffs claimed that the best available scientific evidence supported a finding of significant adverse impact. They therefore alleged that the Service's finding was arbitrary and capricious and constituted an abuse of discretion in violation of the Administrative Procedure Act. Further in this regard, the plaintiffs contended that the evidentiary standard employed by the Service in making its finding (i.e., that the evidence show "with certainty" that chase and encirclement are having significant adverse effects on depleted dolphin stocks) is inconsistent with the applicable statutory provision.

The district court issued its ruling in this case on 11 April 2000. In the judge's view, Congress, in requiring that the initial finding be based, in part, on the research conducted by the National Marine Fisheries Service by 1 March 1999, "contemplated that the agency would consider at least preliminary data from the stress research projects in making the initial finding, given that this finding would determine any change in the dolphin safe label standard." Despite this expectation, the Service "did not consider preliminary data from *any* of the three mandated stress research projects prior to the time of the initial finding." Further, the judge found that the record of the agency's decision failed to demonstrate any compelling reason why the studies had not been pursued promptly as Congress had intended. The court therefore concluded that the Service's decision to trigger a change in the dolphin-

safe labeling standard on the grounds that it lacked sufficient evidence to make an informed finding failed to comport with both the spirit and the letter of the law, and could not withstand scrutiny under the Administrative Procedure Act. In line with these determinations, the court ordered that the Service's initial finding be set aside until the agency has had an opportunity to consider preliminary results from the mandated stress studies.

As to the challenge of the standard used to make the initial finding, the court disagreed with the plaintiffs that the Service had adopted a requirement that a finding of significant adverse impact be based on "conclusive evidence." Nevertheless, the court cautioned that the scientific evidence that was available to the decisionmakers (i.e., the abundance surveys of depleted dolphin stocks and the review of stress-related literature), although not conclusive, all pointed in the direction of there being a significant adverse impact.

The federal defendants filed a notice of appeal in this case on 18 May 2000. The appellants contended that the National Marine Fisheries Service had complied with the requirements of the International Dolphin Conservation Program Act by commencing the required study in October 1997 and completing the first year of the population abundance survey in 1998. They argued that, in contrast to those date-specific requirements, other provisions of the Act did not specify the year or years during the five-year study in which other research was to be conducted. Thus, in their view, the district court erred in finding that the Act mandated that the Service obtain results from the necropsy study and the chase and recapture experiment before March 1999.

The Ninth Circuit Court of Appeals heard the case (now *Brower* v. *Evans*) in December 2000 and issued its opinion 23 July 2001, affirming the district court ruling. As a threshold matter, the court disagreed with the appellants' contention that the new, "less-protective" labeling standard is the appropriate default when faced with inconclusive evidence that there is a significant adverse impact on dolphin stocks associated with chase and encirclement in the eastern tropical Pacific tuna fishery. Rather, the court found that "the Secretary must affirmatively find whether or not there is a significant adverse impact before the dolphin-safe labeling standards can be relaxed." The court further ruled that the National Marine Fisheries Service was required to conduct stress research as a prerequisite to its decisionmaking. "By failing to obtain and consider data from *any* of the mandated stress research projects before the Initial Finding," the court determined that the Service had "acted arbitrarily and capriciously and not in accordance with the law." The court also ruled that the Service had failed to adhere to the best available scientific evidence standard, as required by the Marine Mammal Protection Act. In this regard, the court noted that the information available at the time of the initial finding indicated that the fishery was having a significant adverse impact on dolphin stocks.

A second lawsuit against the National Marine Fisheries Service challenging certain aspects of the agency's tuna-dolphin program was filed in the U. S. Court of International Trade by environmental groups on 8 February 2000 (*Defenders of Wildlife* v. *Hogarth*). The plaintiffs contended that certain provisions of the interim final rule published by the Service on 3 January 2000 were inconsistent with the underlying statutory provisions. Among other things, the plaintiffs alleged that the regulations (1) did not accurately track the statutory provisions concerning stock-specific dolphin mortality limits, (2) provided unauthorized exceptions to the requirement that each nation's fleet not exceed its assigned annual dolphin mortality limit, (3) did not require affirmative findings to be made annually, (4) allowed backdown of purse seine nets to be completed up to 30 minutes after sundown, rather than no later than 30 minutes before sundown, (5) provided impermissible exceptions concerning tracking requirements and segregation of dolphin-safe and non-dolphin-safe tuna, and (6) failed to provide incentives for vessel captains to reduce dolphin mortality. The plaintiffs also alleged that the Service had violated the National Environmental Policy Act by not preparing an environmental impact statement and by omitting or misinterpreting crucial information in the environmental assessment the agency did prepare. Based on these alleged violations, the plaintiffs sought to have the court enjoin the importation into the United States of tuna taken from the eastern tropical Pacific under the new program. The plaintiffs filed an amended complaint on 7 April 2000 seeking to main-tain the then-existing ban on the importation of yellowfin tuna from Mexico, despite the likely affirmative finding to be made under the new regulations.

The court issued its decision on 7 December 2001, ruling in favor of the federal defendants on all claims. With respect to the provision pertaining to sundown sets, the court found that, although the regulation at issue conflicts with the wording of the statutory provision, it does not conflict with the intent of Congress, which is paramount in matters of interpretation. Citing numerous references to the completion of sets no later than 30 minutes after sundown, both in the preexisting provisions of the Act and in the international agreement, the court was not convinced that the use of the word "before" was a true expression of Congressional intent. The court also found that the regulatory provisions concerning tuna embargoes challenged by the plaintiffs were consistent with Congress' broad mandate to the Service to implement the Agreement on the International Dolphin Conservation Program and in accordance with applicable law.

The court also disagreed with the plaintiffs' claim that the regulations impermissibly allowed findings to be made less frequently than on an annual basis. Although the court concurred that evidence supporting an affirmative finding must be submitted annually, the Act did not require that such evidence be prepared and submitted only by the exporting nations themselves.

In finding that the regulations pertaining to the tracking of tuna were "rational, reasonable, and in accordance with law," the court noted that the Service might have provided additional guidance had it heeded the recommendation of the Marine Mammal Commission that some estimate of the effort to track tuna under the regulatory program be provided. Yet, that the Service chose not to do so is neither arbitrary nor capricious. The court also found that the Service's interpretation of the statute as not requiring specific regulations to provide incentives for reducing dolphin mortality was not arbitrary or capricious.

With respect to the plaintiffs' claims brought pursuant to the National Environmental Policy Act, the court ruled that the Service's Environmental Assessment was sufficient to meet that Act's requirements. The court further noted that, although the Act demands that accurate information be used in preparing the assessment, there was no requirement that the Service use the "best available scientific evidence," as plaintiffs had contended. Further in this regard, the court determined that the Service's failure to cite the information included in the 1999 report to Congress on the initial finding of the effects of chase and encirclement did not constitute violation of the Act.

The court also ruled that the Service's affirmative finding with respect to Mexico was appropriate. One of the crucial issues in this regard is whether the Marine Mammal Protection Act's provisions concerning dolphin mortality limits act as a "one-way ratchet." The plaintiffs argued that this is the case — that is, the 1997 limits can never be exceeded, nor can any subsequent allocation exceed the 1997 limit. The court found an alternative reading of the statute to be equally plausible — that the fishing nations are bound by their annual allocations and cannot exceed those limits in the corresponding year. Another issue under consideration was whether Mexico was meeting its financial obligations to the Inter-American Tropical Tuna Commission, inasmuch as the amount of its dues are not directly proportional to the amount of tuna it catches in the eastern tropical Pacific. Without ruling on the underlying question, the court found that the Service had acted reasonably by deciding to accept the Tuna Commission's confirmation that Mexico had met its obligations.

Another aspect of the claims against the legality of the affirmative finding for Mexico was the plaintiffs' allegation that Mexico was allowing unregulated vessels under 400 tons to impermissibly set on dolphins. In the court's view, however, neither the International Dolphin Conservation Program nor the International Dolphin Conservation Program Act governs actions by vessels under 400 tons The court therefore determined that neither the United States nor Mexico was obliged to monitor or restrict the actions of these smaller vessels. As such, the Service was not acting improperly by not considering Mexico's actions with respect to these smaller vessels.

Although they had yet to do so as of the end of 2001, it was expected that the plaintiffs would appeal the trade court's ruling.

Affirmative Findings and Embargoes – As noted earlier, the regulations implementing the International Dolphin Conservation Program Act set forth the procedures and criteria for making affirmative findings for tuna-harvesting nations. Only countries with such a finding are permitted to import yellowfin tuna and yellowfin tuna products into the United States.

During 2000 the National Marine Fisheries Service received applications for findings from Mexico, Ecuador, Panama, Spain, and Costa Rica. However, affirmative findings were issued only for Mexico and Ecuador. As indicated in *Federal Register* notices published on 3 October and 16 October 2000, yellowfin tuna harvested using purse seine vessels in the eastern tropical Pacific from Belize, Bolivia, Colombia, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Spain, Vanuatu, and Venezuela remains embargoed. No finding was needed for Costa Rica because it did not have any purse seine vessels with greater than 400 short tons of carrying capacity that fish in the eastern tropical Pacific Ocean. As reflected in notices pub-lished in the *Federal Register* on 27 April 2001, the affirmative findings for Ecuador and Mexico were renewed by the National Marine Fisheries Service for a one-year period extending through 31 March 2002.

Embargoes are also to be imposed against nations that import yellowfin tuna from harvesting countries embargoed from importing tuna directly to the United States. Such embargoes prevent nations from gaining access to the U.S. market for their tuna by shipping through a secondary nation. As noted in the previous annual report, intermediary nation embargoes of tuna from Costa Rica, Japan, and Italy were lifted in August 2000. Currently, no intermediary nation embargoes are in place.

Chapter V

INTERNATIONAL ASPECTS OF MARINE MAMMAL PROTECTION AND CONSERVATION

The Departments of Commerce, the Interior, and State, in consultation with the Marine Mammal Commission, are instructed by section 108 of the Marine Mammal Protection Act to take such actions as may be appropriate or necessary to protect and conserve marine mammals under existing international agreements, and to negotiate additional agreements as needed to achieve the purposes of the Act. Furthermore, section 202 of the Act requires 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.

The *Second Update* of the Commission's compendium of international treaties and agreements concerning the conservation of marine wildlife was completed in 2000 and published in 2001. Thereafter, the Commission immediately began gathering material to publish a *Third Update*. The Commission also continued to provide advice to the U.S. delegations to the International Whaling Commission, the Arctic Council, and 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

The Commission published the first edition of its reference source, *The Marine Mammal Commission Compendium of Selected Treaties, International Agreements, and Other Relevant Documents on Marine Resources, Wildlife, and the Environment* in 1994.

This first edition was published in three volumes of 3,500 pages as a compendium of international treaties and agreements concerned with the conservation of marine wildlife and contained the complete texts of more than 400 international agreements, multi- and bilateral treaties, agreements, accords, and memoranda of understanding, many of which were made publicly available for the first time. It included numerous amendments and protocols to these documents, several nonbinding international documents, and a number of significant documents to which the United States is not a party.

The Commission published the *First Update* to the *Compendium* in 1997 containing documents that were 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 contained more than 110 additional international legal documents.

In 2000 the Commission completed, and in 2001 published, the *Second Update* to the *Compendium*, adding material up to 31 December 1998. The *Second Update* includes over 100 international legal documents not listed in the original *Compendium* or the *First Update*. Like its predecessor volumes, the *Second Update* focuses on legal instruments that specifically address natural resource conservation, pollution, or protection of the marine environment.

The *Compendium* and its updates continue to serve the environmental, legal, and academic communities by providing easy access to documents that define and establish international legal commitments of the United States and other nations in the field of environmental protection.

International Whaling Commission

The International Whaling Commission (IWC) was established under the International Convention for the Regulation of Whaling, which was signed by the United States in 1946. The goal of the IWC is to manage commercial, scientific, and aboriginal subsistence whaling to conserve whale stocks. Nevertheless, commercial whaling before the 1970s reduced many whale stocks to levels approaching biological extinction. This, and other factors, led to passage of the Marine Mammal Protection Act. The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, as part of its responsibilities under the Act, provides advice to the Departments of Commerce and State on measures necessary to ensure that commercial and aboriginal subsistence whaling do not cause any whale stock to be reduced or maintained below its optimum sustainable level. Activities related to the 2001 annual meeting of the IWC are described below.

Preparations for the 2001 IWC Meeting

The National Oceanic and Atmospheric Administration (NOAA) acts as the lead agency representing the United States at IWC meetings. To prepare for the annual meeting in 2001, NOAA convened public/interagency committee meetings to help develop and review U.S. positions on major issues scheduled for discussion. A representative of the Marine Mammal Commission participated in these meetings.

The principal issues facing the IWC and its Scientific Committee at their 2001 meetings included the following:

- the application by Iceland to rejoin the IWC, but with a reservation regarding the moratorium on commercial whaling activities;
- further development of a Revised Management Scheme for commercial whaling;
- research whaling by Japan, which takes minke whales in the Southern Ocean Sanctuary and minke, Bryde's, and sperm whales in the North Pacific Ocean;
- a request by Japan seeking authorization for coastal, community-based whalers to catch up to 50 minke whales per year;
- the effects of climate change and environmental contaminants on cetaceans;
- the need to conserve highly endangered whale populations; and
- proposals to create whale sanctuaries in the South Atlantic and the South Pacific Oceans.

Intersessional Meeting on the Revised Management Scheme – Before adoption of a moratorium on commercial whaling in the mid-1980s, excessive catch quotas authorized by the IWC contributed to the overexploitation and depletion of some whale stocks. 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 a revised management procedure setting forth a new formula for calculating whaling quotas was accepted in principle at the 1994 IWC meeting as one part of the Revised Management Scheme being developed by the IWC to regulate any resumption of commercial whaling. However, the IWC recognized that determining catch limits that have a low probability of adversely affecting exploited stocks is only part of an effective management program. In this regard, work has continued to develop other essential components of the Revised Management Scheme, including mechanisms for compliance monitoring and enforcement and requirements for conducting whale surveys and data analyses.

The IWC's working group on the Revised Management Scheme met in February 2001 to propose a new supervision and control scheme to replace the current text contained in the IWC Schedule of Regulations. Although progress was made, no consensus on a new scheme was reached, and the working group did not submit a report to the Commission.

The 2001 Meetings of the IWC and Its Scientific Committee

The 53rd annual meeting of the IWC was held in London, United Kingdom, on 23–27 July 2001. It was preceded by working group meetings and the Scientific Committee meeting on 3–16 July 2001. Major issues considered at those meetings are discussed below.

Iceland's Application to Rejoin the IWC – The first major agenda item at the 2001 IWC meeting was an application from the government of Iceland to rejoin the IWC, but with a reservation to Paragraph 10(e) of the Schedule of the Convention, which establishes the moratorium on commercial whaling. Iceland, a former member of the IWC, withdrew as a member in 1992 over disagreements concerning the management of commercial whaling. The members of the IWC were strongly divided as to whether the body had competency to determine the legal status of Iceland's request, as well as on the issue of whether Iceland should be allowed to rejoin with a reservation that would free its whalers from being bound by the whaling moratorium. On the question of the IWC's competency to consider the reservation, the parties voted 19 for and 18 against, with one abstention. With respect to the issue of whether the IWC should reject the reservation, the parties voted 19 for and 0 against, with 3 abstentions and 16 refusals to participate. Based on the results of a third vote, the Icelandic delegation was subsequently allowed to participate in the meetings as an observer.

The Moratorium on Commercial Whaling – In 1982 the IWC added Paragraph 10(e) to the Schedule to the Convention, establishing a moratorium on commercial whaling. That measure entered into effect during the 1985 pelagic and 1986 coastal whaling seasons. Although several nations filed formal objections to the moratorium, only Norway and Russia continue to maintain their objections. Under 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 its provisions. As discussed below, the IWC is developing a Revised Management Scheme, which would provide a framework for the regulation of commercial whaling, should the moratorium be lifted.

Japan submitted a proposal at the IWC's 2001 annual meeting requesting a quota of 50 minke whales to allow four coastal communities to engage in "small-type" whaling operations. Japan has submitted similar proposals since 1988, contending that whaling at this level would have no adverse impact on the targeted minke whale stock and that the quota was needed to alleviate economic distress in these communities resulting from the moratorium on commercial whaling. As in previous years, opponents to the proposal pointed to the commercial aspects of Japan's request and contended that the integrity of the moratorium should be sustained unless and until the Revised Management Scheme is adopted and the moratorium lifted. The IWC rejected Japan's proposal as they have done each time previously. The IWC did, however, pass a resolution reaffirming its commitment to work to alleviate the distress caused to the four coastal communities by the cessation of whaling.

The Revised Management Scheme – At the 2001 annual meeting of the IWC, the parties decided to form an Experts Drafting Group to meet intersessionally to address continuing disagreement over the terms of the Revised Management Scheme. Among the areas of dispute that remain to be resolved are whether (1) every whaling operation must have an international observer, (2) the scheme should include DNA testing of whale meat to enable the IWC to track and verify that whale products sold commercially come from legally taken whales, (3) observer reports should be filed daily or at the end of a whaling trip, (4) an IWC committee should be established to address compliance issues, and (5) the costs of the scheme should be borne by the whaling nations or the IWC as a whole.

At its meeting, the IWC's Scientific Committee developed a new tuning value for its formula to calculate catch quotas based on an improved computer program. Issues concerning implementation trials to test population models for North Pacific minke, North Pacific Bryde's, and North Atlantic minke whales were discussed, and the Committee decided to hold an intersessional meeting and form a steering group to further these goals. These trials, to be carried out before using the formula to determine allowable catches, are to include test cases representing the full range of uncertainty in such matters as range occupied, stock structure, and possible mixing of multiple stocks in some areas. The Committee also considered methods of estimating bycatch and other human-induced mortality, including the incidental catch of whales in commercial fishing gear, that should be considered when calculating whaling catch quotas. For North Pacific minke whales, the major factors being considered relate to stock identity and levels of human-caused removals other than by direct whaling (e.g., bycatch in fishing gear).

Aboriginal Subsistence Whaling – In addition to catch limits for commercial whaling (currently set at zero under the moratorium), the IWC Schedule of Regulations includes catch limits for aboriginal subsistence whaling by various Native groups. In 1997 the IWC adopted five-year subsistence quotas allowing the take of bowhead whales from the Bering/Chukchi/Beaufort Seas stock and gray whales from the eastern North Pacific stock by Natives in the United States and Russia. The quota for bowhead whales was set at 280 whales over the five-year period covered (1998–2002), with an annual cap of no more than 67 whales taken in any year. However, a certain number of unused strikes from one year may be carried over to the subsequent year. The gray whale quota adopted in 1997 set the total allowable catch at 620 whales for the five-year period, with an annual cap of 140 whales. The United States and Russia share these quotas under a separate agreement signed annually by the two nations. Under the most recent agreement, signed in March 2001, Russia was allocated a quota of 7 bowhead whale strikes, with Alaskan Natives being allowed to strike up to 75 bowhead whales. In contrast, the gray whale limits are established by the number of whales landed rather than the number of strikes. For 2001 Russia was allotted 135 gray whale landings and the Makah Tribe of Washington was allotted 5.

The hunting of bowhead whales by Alaska Natives is managed under a cooperative agreement between the National Oceanic and Atmospheric Administration and the Alaska Eskimo Whaling Commission (a Native organization established to represent and oversee whaling by Alaska Native whalers). Under that agreement, catch levels consistent with the U.S.–Russia agreement governing the shared IWC quota are allocated by the Alaska Eskimo Whaling Commission among whaling villages in Alaska. Although the U.S. share of the gray whale quota has been set at five whales per year, only one whale has been taken by the Makah Tribe since 1998. An assessment of the status and condition of eastern North Pacific gray whale stocks hunted by Russia and the Makah Tribe will be conducted by the IWC in 2002.

The Caribbean nation of St. Vincent and the Grenadines currently has a quota, which expires in 2002, to take two humpback whales per year. To help prepare for reconsideration of that quota, the IWC's Scientific Committee began a comprehensive assessment of the North Atlantic humpback whale in 2001. During its 2001 meeting, the Committee identified information needs with respect to the management of this stock, including the need for better estimates of historical catch levels in several feeding areas in the Cape Verde Islands and the Caribbean. The Committee hopes to complete its assessment of this stock during the 2002 meeting.

Aboriginal subsistence catch limits for fin whales and minke whales taken by Natives in Greenland also extend through 2002. The five-year catch limit for North Atlantic minke whales is set at 175 whales per year, with up to 15 unused strikes in a given year being available in the subsequent year. The catch limit for North Atlantic fin whales is 19 whales per year.

Although Canada withdrew from the IWC in 1982, an observer from the government of Canada reported that one bowhead whale, probably from the Hudson Bay stock, was taken by a Native group in August 2000 under a permit issued by Canada. As discussed in previous annual reports, similar hunts authorized by Canada in other years led to certification of Canada by the Secretary of Commerce under the Pelly Amendment to the Fishermen's Protective Act and adoption of resolutions by the IWC calling on Canada to refrain from authorizing such whaling unless sanctioned by the IWC.

Finally, the Scientific Committee's standing working group on the development of a new aboriginal whaling management procedure agreed to meet in early 2002 in Seattle, Washington. The meeting will examine two possible procedures, chosen from an original list of 13 candidates, for managing the Bering/Chukchi/Beaufort Sea stock of bowhead whales.

Research Whaling – The International Convention for the Regulation of Whaling allows parties to issue permits to its citizens to take 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 1988, the government of Japan has issued permits to its citizens for research whaling and allowed meat from the killed whales to be sold commercially to help support the research operation. The value of this research has been much debated, and the IWC has adopted a series of nonbinding resolutions calling on

Japan to refrain from issuing permits authorizing lethal research.

At its 2001 meeting, the Scientific Committee reviewed proposals by Japan to continue its research whaling for minke whales in the Southern Ocean and minke, Bryde's, and sperm whales in the North Pacific Ocean. The stated goal of the research program is to obtain information to contribute to the conservation and sustainable use of the region's marine living resources. As happened last year, when Japan first introduced a proposal to expand its lethal whale research in the North Pacific to include more whales and additional species, there was considerable disagreement within the Committee over most aspects of the proposed program, including its objectives, methodology, likelihood of success, and effect on stocks. Japan's plan to take sperm whales was particularly controversial.

The IWC adopted two resolutions at the 2001 meeting concerning Japan's research whaling program They first noted that Japan's North Pacific research program did not address any priority research issues, had many methodological problems, and could be done just as well using nonlethal methods. The resolution therefore called on Japan to refrain from issuing the required research permit. The second resolution addressed Japan's Southern Hemisphere research program. In part, it pointed out that the killing of minke whales for research purposes was contrary to the spirit of the Southern Ocean Sanctuary, which prohibits commercial whaling in all waters around Antarctica. It also noted that, based on preliminary analyses of new data, the Scientific Committee had concluded that the size of the Southern Ocean minke whale population was appreciably smaller than previously estimated. The resolution therefore called on Japan not to issue any further permits for whaling in the Southern Ocean until the impact of Japan's lethal whaling of the population has been reported to the Commission by the Scientific Committee.

Environmental Effects – For more than a decade, the IWC has expressed concern about the potential effects of habitat degradation on whales. At its 1992 meeting, the IWC directed its Scientific Committee to review, on a regular basis, the impact of environmental changes on whale stocks. Since then, the IWC has sponsored several workshops to plan and examine studies to investigate the effects of chemical pollution, climate change, and other environmental changes on cetaceans.

Over a period of several years, the Scientific Committee has developed two multinational, multi-disciplinary research proposals. "Pollution 2000+" has two objectives: determining whether relationships exist between bio-markers of exposure to PCBs and levels of these pollutants in certain whale tissues; and validating/calibrating samples and analytic techniques. Bottlenose dolphins in waters off Sarasota, Florida, were sampled under this program in 2000 and 2001 to evaluate the relationship between bio-markers and PCBs in a population of known individual animals. Harbor porpoise carcasses were sampled in 2001 in the Bay of Fundy to examine the effects of decomposition on bio-markers. The feasibility of obtaining appropriate samples from bottlenose dolphins in the Mediterranean Sea and harbor porpoises in the North Atlantic was assessed.

The other program, "SOWER 2000," is examining variability in the physical and biological environment and its effects on the distribution, abundance, and migration of whales. During January and February 2000 the IWC and the Commission for the Conservation of Antarctic Marine Living Resources completed their first collaborative field program for the SOWER 2000 project. The work included a multi-vessel survey of whales and krill and their environment in the South Atlantic sector of the Southern Ocean. The Scientific Committee reviewed preliminary estimates of minke whale abundance from the SOWER program at the 2001 meeting and concluded that there had been a marked decrease in minke whale abundance in the area surveyed. The SOWER program will continue to survey remaining geographic areas in 2001–2002 and 2002–2003.

At its 2001 meeting, the IWC adopted a resolution concerning the Stockholm Convention on Persistent Organic Pollutants. That resolution encourages IWC member governments to sign or ratify the Convention, which entered into force earlier in 2001.

During its meeting, the Scientific Committee discussed the possible effects of seismic surveys planned off Sakhalin Island in Russia on the severely depleted western North Pacific gray whale. The Committee decided to conduct an assessment of this

population in parallel with its planned study of the species' eastern North Pacific stock next year.

Small Cetaceans – For several years there has been debate within the IWC as to whether the International Convention for the Regulation of Whaling confers jurisdiction over small cetaceans as well as large whales. As in past years, no consensus was reached on this issue. Despite the lack of consensus, it has been agreed that the Scientific Committee can study and provide nonbinding advice on small cetaceans.

At its 2001 meeting the Committee attempted to review the status of Dall's porpoise stocks taken in Japan's hand-harpoon fishery, but was unable to do so because Japan refused to cooperate. The Committee concluded that work on Dall's porpoises and other porpoises was not possible with the information available. In response, the Commission later passed Resolution IWC 2001-13 endorsing the Committee's work on small cetaceans and asking its members to cooperate.

Regarding other small cetacean stocks, Mexico announced its intention to work with the Scientific Committee on a review of the vaquita. The Committee further indicated its intention to devote priority attention to bottlenose dolphins in the Black Sea during 2003 and 2004.

Sanctuaries – Australia and New Zealand vigorously put forth a proposal for a new South Pacific Ocean sanctuary that would prohibit commercial whaling in that area. The proposal was strongly opposed by Japan, Norway, and some other countries. Brazil and Argentina proposed a similar sanctuary for whales in the South Atlantic Ocean. Both proposals failed to garner enough votes to pass.

The Arctic Council

In September 1989 representatives of the eight Arctic countries — Canada, Denmark (for Greenland), Finland, Iceland, Norway, the Soviet Union, Sweden, and the United States — met in Rovaniemi, Finland, to discuss cooperative measures to protect the Arctic environment. The principal impetus for this meeting was the Chernobyl nuclear accident and pollution from Russian mining activities near the Finnish border, both of which created a desire to help the Soviet Union address a number of environmental concerns. From this beginning, the Arctic Council was eventually established in 1996 and is today one of the highest-level venues where Arctic nations discuss the Arctic environment, including their concerns about the habitat and conservation of Arctic marine mammals. The Council is notable for being one of the first international forums that strives to accommodate the traditional subsistence and cultural needs and practices of indigenous people through their active participation as permanent members. Previous Commission reports give a more detailed account of the history and development of the Arctic Council.

Human activities in the Arctic, such as coastal and offshore oil and gas development, may have adverse effects on marine mammals and their habitats. In addition, human activities outside the Arctic may be adversely affecting the Arctic food web, including marine mammals and people who rely on fish and wildlife for subsistence. Recent studies indicate that a variety of persistent organic compounds and other pollutants originating from human activities in the middle latitudes are being carried by air and water currents to the Arctic, where they can accumulate in the tissues of species throughout the food chain, including humans.

The Arctic Council has developed five principal working groups to deal with these issues. The first of these is the Arctic Monitoring and Assessment Program (AMAP), which evaluates and monitors the health (human and wildlife) and ecological risks associated with contamination from radioactive waste, heavy metals, persistent organic pollutants and other pollutants. The program for the Conservation of Arctic Flora and Fauna (CAFF) is concerned with the adequacy of habitat protection and finding ways to strengthen wildlife protection through a regional network of protected areas and effective conservation practices. The Emergency Prevention, Preparedness, and Response (EPPR) working group reviews emergency notification systems, recommends clean-up and response measures and has developed an environmental disaster "risk assessment" for the Arctic. The group for the Protection of the Arctic Marine Environment (PAME) conducts an on-going evaluation of the legal instruments associated with protection of the Arctic ecosystem, including the development of regional guidelines for offshore oil and gas operations in the Arctic. Finally, the Sustainable Development

Working Group (SDWG) was established to protect and enhance the economies, culture, and health of the inhabitants of the Arctic. Efforts of these groups in 2001 are discussed further below.

Arctic Council Activities in 2001

Chairmanship of the Council for 2000–2002 is held by Finland. In 2001 two meetings of the senior Arctic officials were held, one in Rovaniemi, Finland, in June, and one in Espoo, Finland, in November. The Marine Mammal Commission worked with the Department of State, other federal agencies, Alaska Native organizations, and the Alaska Governor's office to develop U.S. positions for these meetings. The United States continues to uphold the view that it is inappropriate for the Arctic Council to be involved in issues relating to the take of marine mammals and other living resources and trade in products made from them. This policy was developed as a direct order from President Clinton in 1997 in reaction to an attempt by Canada to address takings of marine mammals in the Council. The position was reconfirmed by President Bush in August 2001.

The Arctic Monitoring and Assessment Program – The Working Group for the Arctic Monitoring and Assessment Program (AMAP) is charged with reporting on levels, effects, and sources of environmental pollutants in the Arctic. The National Oceanic and Atmospheric Administration has lead responsibility for U.S. participation in the working group.

In 1997 the working group delivered a report, entitled *Arctic Pollution Issues*, to the ministers of the Arctic Environmental Protection Strategy. The report was a nontechnical description of what is currently known about a wide range of pollutants and their effects on the environment and on human health in the Arctic. The full scientific report was delivered to the Arctic Council in September 1998. This report, *The AMAP Assessment Report*, is a comprehensive summary of pollution issues in the Arctic through 1997.

Since the issuance of that report, AMAP has been developing updates and addressing emerging topics, such as the use of the antifouling paint additive tributyltin, or brominated flame retardants that were not covered in the initial assessments. Several important meetings were held by AMAP in 2001 including workshops on emissions and particle transportation, and experts group meetings on radioactivity. An initiative was developed in 2001 for an oil and gas development workshop to be held by AMAP in 2003. Separate updated technical reports on persistent organic pollutants, heavy metals, radioactivity, and human health are to be completed in 2002, accompanied by a nontechnical summary report on all four topics. AMAP will hold a symposium in Rovaniemi, Finland, to deliver its findings immediately before the Arctic Council meeting in October 2002.

Activities of the Arctic Monitoring and Assessment Program are of interest to the Commission because pollutant levels in several marine mammal species found in the Arctic appear higher than expected and may be affecting the health and well-being of both the animals themselves and the Alaska Natives who rely on them for subsistence.

Conservation of Arctic Flora and Fauna – The Working Group on the Conservation of Arctic Flora and Fauna (CAFF) provides a distinct forum for scientists, indigenous people, and conservation managers to exchange data and information on issues of mutual interest and concern regarding the biology, ecology, and utilization of fish, wildlife, forests, and other living resources in the Arctic. The Alaska Office of the U.S. Fish and Wildlife Service has lead responsibility for U.S. participation in the working group.

The most important achievement of CAFF in 2001 was the publication of a book entitled *Arctic Flora and Fauna: Status and Conservation.* The book is intended for use as a reference tool for nonspecialists and is the product of 10 years of CAFF-sponsored projects. CAFF members hope to use the book as a marker from which to measure progress in conservation and as a way to bring Arctic conservation issues to a wider audience.

Other achievements in 2001 included the revitalization of the Circumpolar Protected Areas Network under the joint leadership of the United States and Canada. This subgroup plans to meet in February 2002 to discuss marine protected areas, which may include areas of importance for marine mammal habitat. In addition, CAFF is developing a monitoring network for nine species, or species groups, one of which is ringed seals.

The Sustainable Development Program – The Sustainable Development Working Group was

established by the Council in 1998. The working group is composed of senior Arctic officials designated by the eight Arctic nations and is responsible for (1) facilitating preparation of development-related proposals for consideration by the Council, (2) recommending to the Council projects that appear to merit consideration, and (3) overseeing implementation of projects approved by the Council.

During 2000 negotiations concerning a framework statement for the Sustainable Development Program were concluded and the language was adopted. Two issues were contentious. First, several countries, led by Denmark, favored an extensive and prescriptive document that would define the program and outline specific activities to be undertaken, as well as emphasizing certain philosophical points of view, particularly concerning the appropriateness of using marine mammals. The United States favored a brief document, summarizing the general intent of the program without specific details or opinions. In the end, the U.S. approach was taken.

Arctic Climate Impact Assessment – Another topic of great concern to the Commission is climate change and its possible effects on the Arctic environment. Alaska Natives have expressed concerns about observed changes in sea ice and the condition of marine mammals in the Arctic. The Commission worked with representatives of Alaska Native communities to convene a workshop in 2000 to evaluate information on the nature and causes of sea ice change and how it may affect Native communities in Alaska and elsewhere that depend on marine resources. The final report from the workshop provides a series of recommendations that identify possible avenues for addressing issues associated with environmental change in the Arctic.

The Arctic Council has directed the AMAP working group to work with the CAFF working group to assess the effects of climate change on Arctic ecosystems. The working groups, in cooperation with the International Arctic Science Committee, developed a proposal for an Arctic climate impact assessment, which the Arctic Council approved at its October 2000 meeting. The assessment will address climate change, ozone depletion, and ultraviolet radiation and their impacts on the Arctic environment, human health, and human activities. The assessment is scheduled to be presented to the Council in 2004. A representative of the Commission is participating in the preparation of the assessment.

Coordinating U.S. Involvement in Arctic Activities

In the United States, the Department of State has lead responsibility for developing and overseeing implementation of U.S. policy regarding the Arctic. To help meet this responsibility, U.S. positions regarding policy-related matters are developed through an interagency Arctic Policy Group chaired by the Department of State. This group includes representatives of the Marine Mammal Commission, the Arctic Research Commission, the Environmental Protection Agency, the National Science Foundation, and the Departments of Commerce, Defense, Energy, the Interior, and Transportation. Representatives of the State of Alaska, Alaska Native organizations, industry, and public interest groups are consulted to assist in developing policies regarding issues that affect them.

Federal agency interest and contributions to the work of the Arctic Council are increasing, due in part to growing recognition of both the global and regional importance of the issues. The Commission will continue to take part in domestic discussions of Arctic Council issues, to send representatives to working group and other meetings bearing on marine mammals under the aegis of the Arctic Council, and to make recommendations as appropriate concerning the organization and content of work of the Arctic Council.

Convention on International Trade in Endangered Species of Wild Fauna and Flora

One of the international frameworks for regulating trade in animals and plants that are or may become threatened with extinction is the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The Convention entered into force in 1975 and at the beginning of 2001, 152 countries had become parties. The Republic of Moldova, Qatar, and Sâo Tome and Principe became signatories to the Convention in 2001, bringing the number of CITES members to 155. Within the United States, the Fish and Wildlife Service is the lead agency for federal actions under the Convention. The National

Marine Fisheries Service, the Marine Mammal Commission, the U.S. Customs Service, the Animal and Plant Health Inspection Service, and other agencies provide technical expertise and participate in CITES meetings, including conferences and technical meetings, such as the Animals and Plants Committees.

Under CITES, species are categorized in three appendices, depending on their conservation status, and trade in them is correspondingly restricted. 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 or their products in trade 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 in the range of the species.

The most recent Conference of Parties was the 11th annual meeting and was held 10–20 April 2000 at the United Nations Environment Programme headquarters in Gigiri (Nairobi), Kenya. The Conference meets approximately every 2.5 years. The next meeting is scheduled to take place in Santiago, Chile, in November 2002.

Biological Listing Criteria

In 2001 the Criteria Working Group of CITES, which is made up of members of the CITES Animals and Plants Committees and invited experts, continued to review the listing criteria for amending CITES appendices. At the meeting in 2000 the group was tasked with addressing questions including (1) whether the current criteria, definitions, and notes involved in the process are scientifically valid for all groups of plants and animals; (2) whether the current guidelines are useful when making proposals for amendments; and (3) whether the format involved in putting forth an amendment requires the proposing member to adequately assess the proposal against the criteria.

Question 3 had previously been successfully addressed in August 2000, but the group did not review items 1 or 2. The U.S. Fish and Wildlife Service in its March 2001 *CITES Update* solicited comments, particularly from the scientific community, on all aspects of questions 1 and 2 and asked that comments be submitted as quickly as possible to allow for review before the next meeting of the Criteria Working Group in May 2001. Although progress has been made, no consensus has been reached on these questions by the end of 2001.

Proposed Changes to the Appendices

Members of CITES may propose adding or deleting species to the appendices or transferring species from one appendix to another before any Conference of the Parties. Before the 2000 meeting in Nairobi, Japan submitted proposals, as they had in 1997, to downlist the eastern Pacific stock of gray whales (*Eschrichtius robustus*) and the Okhotsk Sea/western Pacific and Southern Hemisphere stocks of minke whales (*Balaenoptera acutorostrata*). Likewise, Norway resubmitted proposals to downlist the northeastern and central North Atlantic stocks of minke whales from Appendix I to Appendix II. Japan did not resubmit its proposal to downlist Bryde's whales.

At both the 1997 and 2000 CITES meetings, the United States strongly opposed the downlisting of any species or population of whales subject to the International Whaling Commission's (IWC) moratorium on commercial whaling. In the opinion of the United States and several other CITES parties, it is inappropriate to consider downlisting any whale species or population until the IWC has completed the Revised Management Scheme.

The United States and Georgia jointly submitted a proposal to transfer the Black Sea bottlenose dolphin (*Tursiops truncatus ponticus*) from Appendix II to Appendix I at 2000 meeting. This subspecies, which is isolated from other populations of bottlenose dolphins, is found only in the Black Sea, and its population has declined greatly due to its overexploitation, diminished food resources, pollution, and other factors affecting the Black Sea ecosystem. The size of the current population is unknown, and no estimates exist of sustainable levels of take. The United States and Georgia considered that any take for purposes of exhibit or export are potentially detrimental to the population.

In addition, Australia proposed transferring the Australian population of dugongs (*Dugong dugon*) from Appendix II to Appendix I to eliminate potential enforcement problems caused by the current split listing. Dugongs, once widely distributed in the tropical and subtropical coastal areas of the Indian Ocean and southwestern Pacific, have been exterminated or are now extremely rare in much of their former range. With the exception of the Australian population, the species was listed on Appendix I before the 2000 meeting. Although the Australian population is estimated to total 85,000 animals or more and is not considered to be endangered, its transfer to Appendix I would place all dugong populations on the same appendix, eliminating the possibility of permits being issued based on falsified applications. Permit applicants would not be able to claim that an animal was from an Appendix II (Australian) population when it was actually from an Appendix I population.

Actions Taken at the 2000 Meeting

Consideration of the Japanese and Norwegian proposals to downlist various stocks of gray and minke whales resulted in protracted deliberations during the Nairobi meeting. CITES parties first considered and rejected Japan's proposal to downlist the eastern Pacific stock of gray whales. Subsequently, Japan amended its proposals to downlist two stocks of minke whales to include a provision, similar to the one included in the Norwegian proposals, to establish a forensic DNA inventory system for use in identifying meat or other parts from legally taken whales. After extended deliberations, the measures eventually were defeated. CITES parties then considered Norway's proposals to downlist two other stocks of minke whales. The measures were initially defeated; however, under CITES procedures, Norway was able to reopen consideration of its proposals in plenary session on the following day, and a second vote was taken. Although the measures did not receive the required two-thirds majority vote, they did receive a simple majority, thus bringing Norway one step closer to getting the appendices amended to allow for commercial trade in whale meat or other parts. The Commission anticipates that Norway and Japan will again propose the downlisting of these species at the 2002 meeting.

The joint U.S.–Georgia proposal to transfer the Black Sea bottlenose dolphin from Appendix II to Appendix I was withdrawn by the United States pending collection and evaluation of additional information. (Georgia was unable to attend the meeting for logistical reasons.) To this end, the CITES Secretariat requested in 2001 that the range states for the subspecies provide information on the number of dolphins taken from the wild each year (including age, sex, capture methods, and capture mortality), the number of dolphins exported each year, the population status (if available), any nondetriment findings issued for this species under its Appendix II status, and, if available, the number of dolphins killed incidental to fishing operations. Such information was to be provided to the CITES Animals Committee, which was directed to review the issues pertaining to the conservation and trade of the species, evaluate the information received, and request that the range states cooperate with experts to examine the genetics of this population and evaluate its distinctiveness through the collection and analysis of tissue samples. The Animals Committee was asked to submit recommendations to the next CITES meeting. However, the affected range states have been slow to submit the requested information and it is unclear whether an analysis can be performed in time for the Animals Committee to present their findings at the November 2002 meeting.

Australia's proposal to transfer the Australian population of dugongs from Appendix II to Appendix I was adopted by the CITES parties by show of hands. The United States supported this proposal.

CITES' Relationship to the IWC

In recent years there has been an ongoing debate among various CITES parties concerning the relationship between CITES and the IWC. In 1982 the IWC imposed a moratorium on the commercial take of large whales pending development of a Revised Management Scheme that would ensure adequate protection for affected whale stocks, and it requested that the CITES parties assist the IWC by including in CITES Appendix I those whale species subject to the moratorium. Many CITES parties, including the United States, have stated support for the IWC request and opposition to any proposals to revise appendix designations for whales before the IWC has adopted a Revised Management Scheme for commercial whaling. Other parties believe that there is a need for independent action under CITES using the Convention's own criteria when listing

species on the appendices, without taking into consideration the views or actions of the IWC.

At the 10th meeting in 1997 Japan introduced a proposed resolution to repeal a long-standing CITES resolution that recommends that parties not issue permits for harvest or trade for primarily commercial purposes of any species or stock protected from commercial whaling by the IWC. Although the resolution was defeated, the discussion resulted in a clarification from the CITES Secretariat stating that, although consultation was essential under CITES and other conventions, this did not mean that it was obligatory for there to be strict adherence in one convention to decisions made within another.

The CITES Convention stipulates, however, that when a proposal for a marine species is received for consideration by the CITES parties, the CITES Secretariat must consult "intergovernmental bodies having a function in relation to those species" for their comments. In anticipation of such a request, the IWC, at its May 1999 annual meeting in Grenada, overwhelmingly adopted a resolution directing its Secretariat to advise CITES parties that the IWC had not yet completed work on its Revised Management Scheme and that catch limits of zero for commercial whaling remain in force.

Two relevant proposed resolutions were submitted for consideration at the 2000 CITES meeting: one from the United States and one submitted jointly by Japan and Norway. The U.S. proposal was put forth as a means to reaffirm and strengthen the cooperation and synergy between CITES and the IWC. It called on the CITES parties to acknowledge the directives and provisions of the IWC's May 1999 resolution, endorsed cooperation between CITES and the IWC on matters related to whales, and urged all CITES parties to make every effort to ensure that this cooperation continues.

Expressing the view that the IWC's moratorium was a political decision not supported by scientific information, Japan and Norway called on CITES parties to decide on amendments to the CITES appendices on the basis of CITES' own criteria, taking into account scientific information from the IWC and other sources.

CITES parties considered and defeated the Japanese-Norwegian proposal to break the link between CITES and the IWC at the 2000 meeting. As a result of this affirmation of the continued cooperation and coordination between the two conventions, the United States withdrew its proposed resolution.

Illegal Trade in Whale Meat

Since 1979 CITES parties have cooperated with the IWC to prevent trade in whale meat from any species or stock protected from commercial whaling by the IWC. Despite the cooperation that has resulted from resolutions adopted by both CITES parties and the IWC, illegal trade in meat from whale species listed under Appendix I remains a significant concern. At the June 1997 CITES meeting, a consensus was reached to encourage CITES parties to inventory frozen whale products possessed in commercial quantities and to collect samples for DNA identification from all inventoried stocks, including baleen whales taken incidentally in fisheries and from aboriginal and incidental takes. It further invites all concerned countries to cooperate in determining sources of whale meat in cases of smuggling, or unknown identity, and to make the information available to the CITES Secretariat for dissemination to interested parties.

In conjunction with Japan's research activities described earlier, whale meat is sold on the Japanese market to help defray the costs of the program. During 2000 the Tokyo-based Institute of Cetacean Research tested samples of whale meat available for purchase in Japan and purported to be from minke whales taken under the research program. According to reports, DNA tests showed that just over 50 percent of the meat sampled could be identified as coming from minke whales. Other samples were identified as being from protected whale species, including blue, fin, humpback, and sperm whales, or from smaller cetacean species not protected by the IWC.

On 16 November 2000 the Humane Society of the United States petitioned the Department of the Interior to certify Japan under the Pelly Amendment to the Fishermen's Protective Act. The petition alleges that Japan is diminishing the effectiveness of CITES by engaging in trade in whale meat from species listed on CITES Appendix I. This certification would be in addition to that issued by the Secretary of Commerce on 13 September 2000, which found that Japan had acted in a manner that diminished the effectiveness of the IWC (see previous section). At the end of 2001 the Department of the Interior was still in consultation on the issue.

Chapter VI

MARINE MAMMAL MORTALITY EVENTS

Unusual mortality events involving marine mammals appear to have increased in frequency and scale over the past several decades. In addition to unexplained population declines (such as sea otters in Alaska), a greater number of dead and dying marine mammals have been washing ashore in stranding events in some coastal areas. In the southeastern United States, for example, the number of dead marine mammals found on beaches has doubled since the mid-1980s. Several factors may be contributing to these observations, including actual increases in the number of deaths, more extensive observation, better reporting, or some combination of these.

Unusual mortality events have been documented around the world for a wide range of species. More than 17,000 harbor seals died in the North Sea in 1988; more than 1,000 striped dolphins died in the Mediterranean Sea in 1990–1991; as many as 200 Mediterranean monk seals died along the northwestern coast of Africa in 1997; more than 1,600 New Zealand (Hooker's) sea lions died on the Auckland Islands, south of New Zealand, in January–February 1998; and more than 10,000 Caspian seals died along the Kazakhstan coast in April and May 2000. Similar events have occurred in the United States over the past 25 years involving Hawaiian monk seals in the Northwestern Hawaiian Islands; harbor seals, humpback whales, white-sided dolphins, and harbor porpoises in New England; harbor seals, California sea lions, and gray whales on the Pacific coast; bottlenose dolphins along the east and Gulf of Mexico coasts; and manatees in Florida. These events can have devastating impacts on marine mammal populations, particularly those that are threatened or endangered.

Mortality events may be triggered by a variety of factors, both natural and human-related. Several recent events were caused by naturally occurring toxins. In 1996 manatees along the southwestern coast of Florida died after exposure to brevetoxin, a biotoxin produced by *Karinia breve*, the organism that causes red tides. In 1998 the death of California sea lions off the central California coast was linked to domoic acid, a neurotoxin produced by the alga *Pseudonitzchia australis*. The unusually high mortality of bottlenose dolphins along the coast of northwestern Florida in 1999 and 2000 also appears to have been caused by one or more blooms of toxic algae, suspected to be brevetoxin. Toxic algal blooms are occurring more frequently in many parts of the world, perhaps triggered by pollution or other environmental changes.

Several other recent mortality events (e.g., those involving Mediterranean monk seals, harbor seals, bottlenose dolphins, and striped dolphins) are believed to have been caused by morbilliviruses, congeners of which cause distemper in dogs, measles in humans, and rinderpest in hoofed mammals. Cetaceans and pinnipeds succumbing to these viruses may have been exposed to them only recently, thus having no acquired immunity to them, or more virulent forms of the viruses may be evolving. Animals in the affected populations also may have been stressed in ways that compromised their immune systems, thereby making them more susceptible to these and other diseases.

High levels of several environmental contaminants were found in the blubber, livers, and other tissues of some of the bottlenose and striped dolphins that died during the events noted above. Available information is insufficient to determine how, at what levels, or in what combinations contaminants may have contributed to the animals' susceptibility to disease. As noted in its 1999 annual report, the Commission, in cooperation with the National Marine Fisheries Service, the U.S. Geological Survey, the Environmental Protection Agency, and the National Fish and Wildlife Foundation, held a workshop in October 1998 to better document and determine how to resolve the most

critical uncertainties concerning contaminant effects. The Commission provided the workshop report to scientists and organizations with related interests and responsibilities worldwide and recommended that the National Oceanic and Atmospheric Administration establish an interagency working group to promote and coordinate efforts needed to resolve the uncertainties.

Unusual Mortality Events in 2001

Relatively few events involving high levels of marine mammal mortality occurred during 2001 as compared with 1999 and 2000. Events were recorded for Hawaiian monk seals in the Northwestern Hawaiian Islands and bottlenose dolphins in the Indian River lagoon system in Florida. The gray whale event from 1999 and 2000 was deemed ended in December 2001.

Gray Whales

In 1999 and 2000 the number of gray whale (*Eschrichtius robustus*) strandings from Mexico to Alaska increased to seven times the mean annual strandings between 1995 and 1998. Two hundred and eighty-four whale carcasses were reported in 1999 and 377 in 2000. Of those for which gender could be determined, the majority were female in 1999 and male in 2000. Previously, the highest recorded level of strandings was 89 animals in the 1980s. By December 2001 known strandings had decreased again to a total of 20 whales. The majority of the dead whales occurred in the breeding lagoons in Baja California, Mexico, but dead whales were also found in California, Oregon, Washington, Canada, and Alaska. In Alaska, most strandings were north of the Aleutian Islands in 1999 and in the Gulf of Alaska in 2000. Only limited data on stranded animals are available because carcasses were often either inaccessible or in advanced stages of decomposition.

In 1999 and 2000 adult and subadult animals were the most common age class to strand, whereas in previous years, calves were the most common age class stranded. Blubber thickness in animals examined ranged from 4.6 to 17 cm. The mean blubber thickness in apparently healthy whales harvested in Chukchi coastal waters in 1977–1981 was 12 cm. The range of blubber thicknesses observed in stranded whales is large, with some being thinner than expected, and others being greater than expected for the season. Blubber thickness is probably a poor measure of condition in gray whales, which may be better indicated by lipid quantity and quality. Only three animals that stranded in the United States received complete post-mortem examinations. These three animals stranded alive in California and were euthanized due to their poor condition, prolonged stranding, and resulting poor prognosis. All three were young animals, of which one had severe intestinal parasitism with a granulomatous enteritis; one had histological changes in the cerebrum suggestive of viral encephalitis; and one had the biotoxin domoic acid in blood, urine, and feces suggesting possible biotoxication, as well as transmural abscesses in the gut-associated lymphoid tissue. All three animals were emaciated, with blubber thickness over the sternum between 7 and 10 cm. Among the other whales involved in unusual mortality incidents in California, one was found dead in San Francisco Bay with propeller wounds along its dorsum. A second whale was reported to have been hit by a tugboat, but the carcass was not recovered.

Concentrations of PCBs and DDT found in the blubber of the animals sampled were highly variable, ranging from 47 to 2,100 ng/g lipid for total PCBs and 15 to 770 ng/g for DDT and its derivatives. These ranges are similar to those observed in previously examined gray whales that stranded between 1985 and 1995. Contaminant measurements are expressed as a percentage of lipid content of blubber and so are influenced by factors such as body condition and carcass freshness.

Some live animals photographed offshore during the fall southward migration in 1999 and 2000 appeared to be emaciated, and some stranded animals were severely so. There were numerous sightings of "skinny" whales in the breeding lagoons during 1999 and 2000 as well. Calf production, estimated from observations of cow/calf pairs migrating north in spring, decreased in 1999, 2000, and 2001. In 2000 only 96 calves were sighted on the northward migration, the lowest number since counts began in 1994. Based on the sightings data and a correction factor for cow/calf pairs not seen, the total number of calves in 2000 was estimated at 279 – only 1.1 percent of the total population.

Because many of the gray whale carcasses were emaciated, and calf production was reduced markedly in 2000 and 2001, it is likely that malnutrition played an important role in the mortalities. The ultimate cause of the malnutrition has not been explained. One hypothesis is that the growing gray whale population may be reaching the limit of available food resources, precipitating an increase in density-dependent mortality. The principal gray whale feeding grounds are the shallow shelf waters of the eastern Bering Sea, and amphipods are the primary prey. At the same time, environmental changes in the Bering Sea and North Pacific may have reduced available food supplies and lowered the carrying capacity, perhaps exacerbating density-dependent responses.

However, as pointed out in a 20 April 2000 letter from the Working Group on Marine Mammal Unusual Mortality Events (see later in this chapter) to the National Oceanic and Atmospheric Administration, many of the stranded whales were not emaciated or in poor nutritional condition. Other potential causes could be masked by the presumption that these deaths are simply a function of the environmental carrying capacity.

To facilitate work on these and related questions, the working group's letter described the need for greater access to carcasses and for more detailed necropsy of carcasses. The working group recommended that (1) the National Marine Fisheries Service increase efforts to locate carcasses and conduct detailed necropsies; (2) the National Oceanic and Atmospheric Administration secure areas for necropsies and provide for disposal of carcasses after the necropsies; (3) managers of the National Ocean Service's national marine sanctuaries on the Pacific coast, the Department of the Interior's coastal national parks and wildlife refuges, and the Environmental Protection Agency's national estuarine sanctuaries all be informed of the need to cooperate with stranding response teams to facilitate necropsies; and (4) the National Marine Fisheries Service Southwest Region continue to provide full support to investigations of this unusual mortality event. Although the gray whale unusual mortality event was deemed concluded in December 2001, these recommendations remain pertinent because mortality and strandings of gray whales or other large cetaceans may increase in the future and will require suitable levels of investigation.

Hawaiian Monk Seals

In the late winter and spring of 2001 an increased number of immature Hawaiian monk seals were found dead in the Northwestern Hawaiian Islands. In January, a yearling was found dead at French Frigate Shoals; in March a 3-year-old seal was found dead at French Frigate Shoals, a yearling was found dead at Midway Atoll, and four seals were found dead at Lisianski Island (three of which had been dead for some time); and in April four juveniles died within a nine-day period at Laysan Island. Only 11 juvenile strandings had been recorded on Laysan Island over the previous 19 years, and eight of those were due to mobbing behavior by adult male seals. The carcasses found on Laysan Island in April 2001 revealed no evidence of trauma. Finally, several seals at Midway Atoll appeared to be exhibiting behavior similar to the moribund animals at Laysan Island.

Based on this information and the fact that Hawaiian monk seals are an endangered species, the Working Group on Marine Mammal Unusual Mortality Events declared this to be an unusual mortality event. An investigation team was sent to the Northwestern Hawaiian Islands to conduct population surveys, behavioral observations, and live biomedical sampling. Necropsies were performed on two neonates, five yearlings, three 2-year-olds, and an adult. Loss of body condition and emaciation were the only common findings in juvenile seal necropsies associated with the event. Field studies conducted that year at the main reproductive sites revealed that survival of pups weaned in the previous year was particularly poor at all sites except Pearl and Hermes Reef, and survival of yearlings of the previous year was poor at all sites except Pearl and Hermes Reef and Laysan Island. For example, at Kure Atoll only 2 of 13 pups weaned in 2000 were known to have survived to age one. The circumstances of this event were still being analyzed at the end of 2001, and a final report is expected in summer 2002.

Bottlenose Dolphins

From July to September 2001 at least 35 bottlenose dolphins stranded in a localized part of the Indian River lagoon system in Florida. Dolphins in this area are considered to be a small permanent resident population, and migrations in and out of the area are uncommon. Dolphins branded 20 years ago in the Indian River Lagoon are still observed today in the same vicinity. Inlets into the system are small, so the car-

casses observed are not likely those of dolphins that died at sea and were washed into the lagoon. Several of the animals were severely emaciated, but no definitive cause of the event has yet been identified. During the height of the event, several large fish, crab, and seabird kills occurred in the lagoon and were attributed to low levels of dissolved oxygen.

Caspian Seals

In late April 2000 high numbers of dying Caspian seals were reported near the mouth of the Ural River in Kazakhstan at the northern end of the Caspian Sea. The die-off then spread south to Azerbaijan and Turkmenistan. More than 10,000 seals are estimated to have died along the Kazakhstan coast alone. Clinical signs were primarily related to respiratory function. Microscopic findings included pneumonia and lymphoid depletion. Viral DNA identical to that of canine distemper virus detected from a Caspian seal in 1997 was identified in nine seals in 2000. Although the origin of the virus is unclear, inoculation from a terrestrial source is possible. Caspian seals, believed to number several hundred thousand animals, also are affected by chemical pollution, oil and gas development, and continued harvest. In 2001 the Commission awarded a contract for a risk assessment of Caspian seals (see Chapter VIII of this report).

Bahamas Mortality Event

On 15 and 16 March 2000 at least 17 cetaceans, including 14 beaked whales, 2 minke whales, and 1 spotted dolphin, stranded on beaches in the northern Bahama Islands (Abaco, Grand Bahama, and Eleuthera Islands). Most of the animals were alive when they stranded. Both minke whales and six of the beaked whales were returned to the sea; their fate is unknown. As discussed in greater detail in Chapter VII of this report, these strandings occurred near and at about the time that seven U.S. Navy surface ships and three submarines were operating their sonar systems in the New Providence Channel. Investigations conducted cooperatively by the Navy and the National Marine Fisheries Service suggest that the sonar transmissions were a factor in the strandings due to the environmental conditions in the channel at the time of the exercises. An interim report on this event was released in December 2001 and is described in Chapter VII.

Alaska Sea Otters

Aerial surveys of the Aleutian Islands sea otter population in April 2000 revealed a 70 percent decline in the population since 1992. The primary hypothesis for the decline is predation by killer whales. No additional causes have been identified, but other factors (e.g., food availability and contaminants) are still being evaluated (see also the sea otter section in Chapter III). In 2001 the Fish and Wildlife Service developed a new stock assessment report in which they recognized southwest, southcentral, and southeast stocks based on recent research conducted by the Service. The decline in sea otter numbers from 1992 to 2000 occurred in the southwest stock, which is being considered for listing under the Endangered Species Act.

Working Group on Marine Mammal 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 to the Marine Mammal Health and Stranding Response Act of 1992 (Title IV of the Marine Mammal Protection Act). Among other things, the Act 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 sick and injured marine mammals have recovered and can be returned to the wild; (5) continue development of the National Marine Mammal Tissue Bank; and (6) establish and maintain a central database for tracking and accessing data concerning marine mammal strandings.

The Secretary delegated responsibility for these activities to the National Marine Fisheries Service. In response, the Service, in consultation with the Marine Mammal Commission and the Fish and Wildlife Service, established the Working Group on Marine Mammal Unusual Mortality Events composed of marine mammal experts from around the country. The working group consists of 12 voting members, each appointed for a three-year term, plus one representative

each from the National Marine Fisheries Service, the Fish and Wildlife Service, the Environmental Protection Agency, and the Marine Mammal Commission. In addition, Canada and Mexico are each represented by a non-voting member. The group held its first meeting in April 1993 and has met annually since then. Service staff members have been designated to consult the group whenever increases in stranding rates or other factors suggest that an unusual mortality event may be occurring.

The working group has developed criteria to help decide when unusual mortality events are occurring. The criteria are (1) a marked increase in the number of strandings compared with historic records; (2) strandings of animals at an unusual time of year; (3) an increase in strandings in a localized area (possibly suggesting a localized problem), over a growing area, or throughout the geographic range of a species or population; (4) a difference in the species, age, or sex composition of the stranded animals compared with that which normally occurs in the area or time of year; (5) the appearance of similar or unusual pathologic findings in the stranding animals or differences in the general condition (e.g., blubber thickness) of stranded animals compared with what is seen normally; (6) abnormal behavior in living animals in the area where mortality is occurring; and (7) the stranding of critically endangered species. The working group assisted in the preparation of the National Contingency Plan for Response to Unusual Marine Mammal Mortality Events, published by the National Marine Fisheries Service in September 1996, and the Contingency Plan for Catastrophic Manatee Rescue and Mortality Events, published by the Fish and Wildlife Service in 1998. An updated version of the former plan is expected to be completed in 2002.

The working group met in Silver Spring, Maryland, on 14–15 March 2001 for its annual meeting. At its meeting the group discussed, among other items, the Marine Mammal Health and Stranding Response Program, mortalities in 2000 (gray whales, bottlenose dolphins, Caspian seals, harbor seals, and beaked whales in the Bahamas) and recent sea otter trends in Alaska and the Aleutian Islands.

Marine Mammal Rescue Assistance Act of 2000

In December 2000 Congress passed the Marine Mammal Rescue Assistance Act of 2000. The Act amends Title IV of the Marine Mammal Protection Act of 1972 by inserting a new section, section 408. It instructs the Secretaries of Commerce and the Interior to conduct, subject to the availability of appropriations, a grant program to be known as the John H. Prescott Marine Mammal Rescue Assistance Grant Program. The purpose of the program is to provide financial assistance for marine mammal stranding network participants to carry out several critical activities including (1) recovery or treatment of stranded marine mammals; (2) collection of data from living and dead stranded marine mammals; and (3) payment for operation costs that are directly related to the aforementioned activities. Awards will be granted for up to three years with a cumulative total of $100,000 per eligible participant.

The grant program will be administered by the National Marine Fisheries Service and the Fish and Wildlife Service. A total of $5 million was authorized for each of fiscal years 2001 through 2003, to remain available until expended. Of this amount, $4 million is available to the Secretary of Commerce and $1 million to the Secretary of the Interior. The Secretaries are to ensure that the funds are distributed equitably among the stranding networks, taking into account episodic mortality events in the preceding year, average annual strandings and mortality events, and the size of marine mammal populations inhabiting a geographic area within a region. Preference will be given to facilities with established records for rescuing and rehabilitating sick and stranded marine mammals.

On 7 June 2001 the National Marine Fisheries Service issued a first call for constituent review of a draft implementation plan for the program. The Service's plan lists funding priorities under the three critical activities listed above. These priorities are listed in no particular order and cover national and regional goals. Among many other items, priorities include enhanced response to stranding events, care and treatment of live animals, investigations into the causes of strandings and monitoring of overall health trends among species vulnerable to stranding events.

The Commission, in consultation with its Committee of Scientific Advisors, commented to the Service on 29 June 2001. In its letter, the Commission commended the Service for its thorough and well- written plan for the program. The Commission recommended that state and local governments be allowed to apply for support related to pinniped strandings, as well as cetacean strandings as written in the Service's draft. The Commission also recommended that the Service make allowances for applications from inexperienced applicants to allow for new ideas and the inclusion of participants in stranding programs. Furthermore, the Commission recommended that the Service implement the program jointly with the Fish and Wildlife Service under a single integrated set priorities, criteria, and procedures so that plans for manatees, sea otters, and other species were coordinated. The Commission anticipates that a solicitation for applications will be announced early in 2002.

The Marine Mammal Rescue Assistance Act also instructs the Secretary of Commerce to initiate a study of the environmental and biological factors responsible for the significant increase in mortality of the eastern gray whale population and other potential factors that may affect the population. The Secretary is directed to ensure, to the extent feasible, that information from current and future studies of the western gray whale population is also considered to better understand the dynamics of both populations. Funds in the amounts of $290,000 for 2001 and $500,000 for each of fiscal years 2002 through 2004 were authorized for gray whale studies.

Chapter VII

EFFECTS OF SOUND ON MARINE MAMMALS

Underwater sounds of both human and natural origin may affect the behavior and, in some circumstances, the survival and productivity of individual marine mammals and the populations they compose. The nature and significance of the effects depend on a number of factors. They include the intensity, frequency, and duration of the sound; the location of the sound source relative to the potentially affected animals and key features of their habitat; whether the sound source is moving or stationary; the species, age, sex, reproductive status, activity, and hearing ability of the animals exposed to the sounds; whether the animals use similar sounds for communication, locating and capturing prey, sensing their environment, etc.; and whether and how frequently the animals have been exposed previously to the sounds. For example, exposure to high-intensity sounds with rapid onset, such as those produced by underwater volcanic explosions and detonation of large explosive charges, can cause serious organ damage and kill animals nearby, but exposure to sounds of the same frequency and duration at greater distances may cause nothing more than a temporary startle response. Similarly, some animals exposed frequently to a particular sound may grow accustomed to the sound and stop responding to it, but others may become sensitized to the sound and respond to it more and more intensely over time. Also, some animals may respond differently to particular sounds if they are in deep, offshore waters versus shallow, coastal waters, in murky versus clear water, and in embayments versus the open ocean.

When the Marine Mammal Protection Act was enacted in 1972, there were no indications that underwater sounds of human origin could adversely affect marine mammals, either directly or indirectly through effects on other ecosystem components. However, studies done in Alaska and Canada in the late 1970s and early 1980s found that the distribution and behavior patterns of ringed seals, bowhead whales, and beluga whales sometimes were affected by sounds produced by ships, aircraft, ice breaking, and operation of air guns and other equipment used in offshore oil and gas exploration and development. Subsequent studies done in California and elsewhere found that gray whales and other marine mammals also can be affected in a variety of ways by sounds of human origin. The findings of these and other studies conducted through the mid-1990s are reviewed in the book *Marine Mammals and Noise,* by W. John Richardson, Charles R. Greene Jr., Charles I. Malme, and Denis H. Thomson Richardson (1995, Academic Press). Additional information, including information on the effects of low-frequency sounds on fish and human divers, is contained in the report of a workshop held by the Office of Naval Research in February 1998 (Gisiner, Robert, C. 1999. *Proceedings* [of a] *Workshop on the Effects of Anthropogenic Noise in the Marine Environment, 10–12 February 1998*. Office of Naval Research) and in two reports by the National Research Council (NRC. 1994. *Low-Frequency Sound and Marine Mammals: Current Knowledge and Research Needs*; and NRC. 2000. *Marine Mammals and Low-Frequency Sound: Progress Since 1994*).

The Marine Mammal Protection Act established a moratorium on the taking of marine mammals. It exempted from the moratorium taking by Alaska Natives for subsistence and handicraft purposes, and provided that permits could be issued to take marine mammals incidental to commercial fisheries and for purposes of scientific research and public display when certain conditions were met. It also provided that the moratorium could be waived to allow taking for other purposes when certain conditions were met. However, the waiver procedure is complicated and time-consuming, even when the taking is likely to have little or no effect on the health or welfare of the affected individuals or populations. Therefore, as noted in previous annual reports, the Act was amended in 1981,

and again in 1986 and 1994, to provide more streamlined means for obtaining authorizations to take small numbers of marine mammals incidental to activities, such as offshore oil and gas exploration and development, when the taking will have negligible effects.

Although much has been learned about the effects of sounds of human origin on marine mammals, available information often is insufficient to accurately assess how existing sources may be affecting, or to predict how new sources may affect, marine mammals or other marine organisms (e.g., fish, fish eggs and larvae, sea turtles, diving birds, etc.). For example, commercial shipping appears to be the greatest single human source of sound in the world's oceans, yet it is not known whether marine mammals and other marine organisms have become used to and are not being affected adversely by ship-generated sounds, whether certain sounds have caused some species or age/sex groups to avoid shipping channels or otherwise alter their behavior or habitat-use patterns in certain areas, what if any alterations in behavior or habitat-use patterns affect survival or productivity, or whether repeated exposures to certain sounds cause stress and have adverse effects on growth, reproduction, disease resistance, etc.

The Commission, in consultation with its Committee of Scientific Advisors, works with the National Marine Fisheries Service, the Fish and Wildlife Service, the Minerals Management Service, the Office of Naval Research, the U.S. Geological Survey, and other agencies and organizations with related responsibilities and interests to identify and determine how best to resolve the uncertainties while at the same time avoiding unnecessary restrictions on sound-producing activities. The Commission's actions with regard to requests for small-take authorizations relating to offshore oil and gas development and other sound-producing activities are described in Chapter IX. Background information and the Commission's actions regarding three particularly controversial issues are described below. These issues are the Navy's proposed operational deployment of the SURTASS LFA sonar, the ongoing investigation to determine the cause of the unusual cetacean strandings in the Bahamas on 15–16 March 2000, and the Navy's Littoral Warfare Advanced Development (LWAD) Program.

Proposed Operational Deployment of the SURTASS LFA Sonar

During the Cold War both the United States and the former Soviet Union developed and used passive listening systems to detect and track the movements of submarines. Both countries also worked to develop quieter submarines that cannot be detected and tracked with passive listening systems and to develop alternative systems for detecting and tracking those submarines, including low-frequency active sonar. In the last decade, additional nations have developed the technology.

In July 1996 the Department of the Navy published a *Federal Register* notice announcing its intent to prepare an environmental impact statement on planned operational deployment of a low-frequency active sonar designed to enhance its antisubmarine warfare capability. In July 1999 the Department made available for public comment its Draft Overseas Environmental Impact Statement and Environmental Impact Statement for [its] Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar. In August 1999 the Navy submitted to the National Marine Fisheries Service a request for authorization, in accordance with section 101(a)(5)(A) of the Marine Mammal Protection Act, to take small numbers of marine mammals incidental to the planned operational deployment of the SURTASS LFA sonar. In October 1999 the Service published in the *Federal Register* an advance notice of proposed rulemaking concerning the Navy's request. These actions and the Commission's responses to them are described in previous annual reports.

The final environmental impact statement concerning the planned deployment of the SURTASS LFA sonar was published in January 2001. On 19 March 2001 the National Marine Fisheries Service published in the *Federal Register* proposed regulations to authorize and govern the taking of marine mammals incidental to operational use of the sonar. The proposed regulations incorporated by reference the risk analysis and other information included in the final impact statement. Based on that information and the mitigation measures proposed by the Navy, the Service preliminarily concluded that use of the SURTASS LFA sonar as described in the impact statement would result in the incidental taking of only small percentages of the

affected marine mammal species and populations and that the effects on the distributions, sizes, and productivity of those species and populations would be negligible. Recognizing that certain aspects of the proposed regulations were likely to be controversial, the Service held public hearings in Los Angeles, Honolulu, and at its headquarters in Silver Spring, Maryland, to receive comments on the proposed regulations from the public and interest groups. A *Federal Register* notice announcing the hearings and an extension of the deadline for commenting on the proposed regulations was published by the Service on 13 April 2001.

Commission representatives attended the public hearing held at the Service's headquarters on 3 May 2001. Most of the members of the public and representatives of interest groups who spoke at the hearing expressed concern about the adequacy of the Navy's environmental impact statement and the measures proposed by the Navy and the National Marine Fisheries Service to avoid or mitigate possible harmful effects on marine mammals. The Commission understands that similar concerns were expressed at the hearings held in Los Angeles on 26 April and in Honolulu on 28 April 2001.

On 5 June 2001 the Commission, in consultation with its Committee of Scientific Advisors, forwarded comments on the proposed regulations to the Service. Among other things, the Commission noted that the data and analyses provided in the environmental impact statement and referenced in the *Federal Register* notice were insufficient to be confident that the proposed action would affect only small numbers of marine mammals and have only negligible effects on the affected species and stocks. The Commission also pointed out that the "negligible effects" determination was based on a number of assumptions and that the monitoring and mitigation programs proposed by the Navy and tentatively endorsed by the Service appeared insufficient to confirm the validity of the assumptions. The assumptions included the following:

- although the studies done to assess the effects of LFA sonar transmissions on marine mammals were limited to four cetacean species thought likely to be particularly sensitive to low-frequency sounds and no animals were exposed in the course of the studies to received levels above 155 dB, the impact statement concluded that "[f]or injury, an animal would have to be within the 180-dB sound field at the onset of a transmission, the likelihood of which is similar to that of a ship collision with the animal. The probability of either of these events occurring is nearly zero because of the visual and acoustic monitoring that would be utilized whenever the SURTASS-LFA sonar is transmitting";
- possible harmful effects on the hearing and behavior of marine mammals can be avoided by not operating the LFA sonar in areas where received sound levels will exceed 180 dB within 12 nmi (22.2 m) of any coastline or within four proposed "biologically important areas" and when marine mammals are known to be within 1 km of the transmitters;
- it will be possible to detect 70 to 90 percent of marine mammals within 1 km of the LFA sonar transmitters during both day and night operations using a combination of visual and passive acoustic monitoring and an active high-frequency marine mammal monitoring (HFM3) sonar;
- because the HFM3 sonar is similar to "fish-finder" sonars used by many commercial fishermen, its use is unlikely to result in the death, injury, or disruption of a biologically important behavior of any species or age-sex class of marine mammal; and
- uncertainties concerning the possible cumulative effects of operational use of the LFA sonar will be addressed satisfactorily by a long-term research program being planned by the Navy but is not described in either the environmental impact statement or the *Federal Register* notice.

The Commission pointed out that the validity of most if not all of these assumptions could be confirmed by expanding the required monitoring and reporting programs and by asking the Navy to specify the research it anticipates conducting to resolve the uncertainties concerning the significance of possible cumulative long-term behavioral effects and the effectiveness of the HFM3 sonar. The Commission recommended that these and a number of related matters be addressed in any final regulations issued by the Service.

As noted earlier, the effect of human-origin sounds on marine mammals was one of the topics addressed at a Marine Mammal Protection Act over-

sight hearing on 11 October 2001. The hearing, held by the House of Representatives Subcommittee on Fisheries Conservation, Wildlife and Oceans, was structured to receive comments from certain government agencies, the scientific community, and organizations with special interests in the Act and related issues. The Navy's views regarding the SURTASS LFA sonar and related issues were presented in a statement by the Deputy Chief of Naval Operations for Warfare Requirements and Programs. Among other things, the statement indicated that there is an immediate and critical national security need for the operational deployment of the SURTASS LFA sonar; the impact statement prepared to assess the possible environmental effects of the LFA sonar was the most comprehensive and exhaustive, scientifically based impact assessment ever undertaken by the Navy for a major seagoing combat system; extensive peer-reviewed research and risk analyses were done in the process of developing the impact statement and support the conclusion that operational use of the LFA sonar will have negligible effects on marine mammals; and following issuance of a small-take authorization by the National Marine Fisheries Service, "the Navy will provide a detailed Long Term Monitoring Plan, which will include —

- Navy and independent scientific analyses of the effectiveness of the proposed mitigation measures, including verification of the high-frequency monitoring sonar performance;
- Careful measurement and modeling of the LFA sound field at various depths and ranges prior to and during operations to ensure compliance with the 180 dB geographic restriction and the 145 dB diver criterion;
- Additional research conducted in collaboration with other Navy oceanographic research laboratories and U. S. academia, such as Woods Hole Oceanographic Institution and the Scripps Institution of Oceanography..to help address the outstanding critical issues on the direct and indirect effects of man-made low-frequency sound on marine mammal stocks."

At the end of 2001 the National Marine Fisheries Service had not made a final determination on whether the requested small-take authorization was in compliance with the Marine Mammal Protection Act and could be issued.

The Bahamas Cetacean Strandings

As noted in the Commission's previous annual report, at least 17 cetaceans, including 14 beaked whales, 2 minke whales, and 1 spotted dolphin, stranded on beaches in the northern Bahama Islands (Abaca, Grand Bahama, and Eleuthra) on 15 and 16 March 2000. Most of the animals were alive when they stranded and six of the beaked whales and both of the minke whales were pushed off the beaches and swam away. They have not been seen since then and may or may not have survived.

On 22 March 2000 the *Washington Post* published an article indicating that the strandings and two earlier ones had coincided with U.S. Navy activities. On the same day the Commission received a copy of a letter sent to the Navy the previous day by the Natural Resources Defense Council and the Humane Society of the United States expressing concern that the strandings could have been caused by acoustic devices being tested as part of the Navy's test in the Bahamas of the Littoral Warfare Advanced Development (LWAD) Program. The letter urged that all such testing be suspended pending completion of the investigation to determine the cause of the strandings. (See the following section of this report for additional information concerning the LWAD program.)

The National Marine Fisheries Service was asked by the Bahamian Government to assist the investigation of the strandings. Both the Navy and the Service subsequently provided funding and personnel to facilitate the investigation. It soon was determined that the LWAD tests had been conducted at times and in places where there was little possibility that they could have affected the animals that stranded. However, it also was determined that an antisubmarine warfare training exercise involving use of standard, mid-frequency range tactical sonars had been under way near the areas and at about the same time that the strandings occurred. Although similar exercises have been carried out routinely with no apparent adverse effects in many parts of the world's oceans, the focus of the investigation was shifted to determine if the strandings may have been the product of unusual oceanographic conditions or concentrations of beaked whales particularly sensitive to the transmissions from the tactical sonars.

As noted in the Commission's previous report, representatives of the Animal Welfare Institute, the Humane Society of the United States, the Ocean Mammal Institute, and the Natural Resources Defense Council held a press conference on 10 May 2000 in which they alleged that the Bahamas strandings had been precipitated by the LWAD tests and called on the Navy to halt both the LWAD program and the planned operational deployment of the SURTASS LFA sonar described earlier. Later that day, the Navy issued a press release indicating that the strandings had begun more than four hours before and occurred more than 35 mi (65 km) from the area where the LWAD tests had been conducted and that the tests therefore could not have caused the strandings. The Navy also indicated that it was continuing to work with the National Marine Fisheries Service to assess possible causes of the strandings and, as part of the investigation, was conducting a review to determine if other naval activities might have caused or contributed to the strandings.

In light of the preceding, the Commission advised the Navy by letter of 19 May 2000 that it was not clear whether all appropriate steps were being taken to determine the cause of the strandings and, if Navy activities are implicated, steps that reasonably might be taken to avoid such occurrences in the future. The Commission pointed out that, unless the uncertainties were resolved satisfactorily, efforts to stop the development and use of high-energy sound sources for national defense and other purposes were likely to intensify. The Commission recommended that the Navy and the National Marine Fisheries Service hold a workshop to review what was being done, and to identify what more might reasonably be done, to determine the cause of the strandings and, if Navy activities are implicated, steps that might reasonably be taken to avoid such situations in the future. The Commission also pointed out that it would be inadvisable to proceed with further at-sea tests associated with the LWAD program before the investigation of the Bahamas strandings was completed and the results made public.

On 5 June 2000 representatives of the Navy, the National Marine Fisheries Service, and the Commission met to review the preliminary results of the stranding investigation. The results of that review were summarized in a letter sent from the Navy to the Service on 9 June 2000. Among other things, the Navy indicated that it was conducting a complete reconstruction of the sound field in the area where the anti-submarine training exercises had been conducted and that the preliminary results of that assessment suggested that oceanographic conditions may have allowed the sonar transmissions to travel farther than normal without significant attenuation. The Navy also indicated its concurrence that the necropsies supported the hypothesis that the whales had sustained pressure-related or auditory trauma before stranding.

On 20 December 2001 the Navy and the National Marine Fisheries Service issued a "Joint Interim Report [on the] Bahamas Marine Mammal Stranding Event of 14–16 March 2000." The report notes that most, but not all, parts of the investigation have been completed and states that:

> Based on the way in which the strandings coincided with ongoing naval activity involving tactical mid-frequency range sonar use in terms of both time and geography, the nature of the physiological effects experienced by the dead animals, and the absence of any other acoustic sources, the investigation team concludes that tactical mid-range frequency sonars aboard U.S. Navy ships that were in use during the sonar exercise in question were the most plausible source of this acoustic or impulse trauma.

It also indicates that a combination of factors appear to have led to the deaths. These include the presence of a strong surface duct that allowed sonar transmissions to propagate over greater distances than normal, unusual underwater bathymetry, intensive use of multiple active sonars over an extended period of time, a constricted channel with limited egress, and the presence of beaked whales that appear to be particularly sensitive to sounds produced by the sonars. It recommends that future research focus on identifying such problematic conditions so that they can be avoided and briefly describes the range of studies meriting consideration. It indicates that "[t]o the maximum extent practical, the Navy will adopt measures in its future peacetime training, including those involving the use of tactical mid-range sonars, to avoid the taking of marine mammals."

The Marine Mammal Commission believes that the conclusions are well supported and that the recommended research and proposed mitigation measures are appropriate.

The Littoral Warfare Advanced Development (LWAD) Program

As noted earlier, the day the *Washington Post* carried the article on the cetacean strandings in the Bahamas, the Commission received a copy of a letter to the Navy by the Natural Resources Defense Council and the Humane Society of the United States expressing concern that the strandings may have been due to sea tests related to the Navy's Littoral Warfare Advanced Development (LWAD) program. The letter urged that the LWAD program and planned operational deployment of the SURTASS LFA sonar be suspended pending completion of the investigation, which, as described earlier, had been initiated cooperatively by the Navy and the National Marine Fisheries Service to try to determine the cause of the strandings.

The Commission had no prior knowledge of the LWAD program and, as indicated in the previous annual report, it contacted the Navy to determine the basis of the concerns expressed by the Council and the Humane Society. The Commission learned that the purpose of the LWAD program was to develop and test techniques and technology, including several operational and new experimental active sonars to detect and track submarines in shallow coastal waters where the SURTASS LFA sonar would be ineffective. The Commission also learned that further tests were scheduled off New Jersey between 22 May and 7 June 2000 and that, before both the previous and planned tests, the Navy had prepared environmental assessments and initiated informal Endangered Species Act consultations with the regional offices of the National Marine Fisheries Service to assure that the tests would not jeopardize or adversely affect critical habitat of any species listed as endangered or threatened under the Act. The Commission also learned that the Service's Northeast Region had questioned the Navy's determination that tests off New Jersey would not adversely affect any listed species and had pointed out that a small-take authorization under the Marine Mammal Protection Act would be required if the tests were likely to incidentally take marine mammals. Subsequently, the Commission learned that the Navy cancelled those parts of the May–June 2000 LWAD tests involving high-energy sound sources, that the Service sent representatives to observe the tests, and that, by letter of 23 August 2000, the Service advised the Navy that formal consultations under the Endangered Species Act and small-take authorizations pursuant to section 101(a)(5) of the Marine Mammal Protection Act are required if species protected under either of these Acts are likely to be affected by testing or related activities.

It is the Commission's understanding that the Navy and the Service have continued to consult to ensure that the LWAD program meets all relevant statutory requirements. Despite this effort, the Natural Resources Defense Council, Defenders of Wildlife, the Humane Society of the United States, and Santa Monica Baykeeper filed suit in September 2001 in the U.S. District Court, Central District of California to enjoin the conduct of any active sonar test or operations pursuant to the LWAD program until the Navy conducts environmental studies required by the National Environmental Policy Act, obtains permits required by the Marine Mammal Protection Act, and undertakes consultations required by the Magnuson-Stevens Fishery Conservation and Management Act and the Endangered Species Act. The suit claims that the Navy has continued to test high-intensity and often experimental active sonar systems in coastal waters throughout the world despite evidence that high-intensity sound transmissions can harm marine mammals and other marine life. It claims further that the Navy has failed to prepare an environmental assessment for the LWAD program as a whole, which the plaintiffs argue is required by the National Environmental Policy Act. It also claims that the Navy failed to obtain authorization under the Marine Mammal Protection Act to take marine mammals incidental to past testing and is not seeking authorization to take marine mammals incidental to a sea test, which the plaintiffs believe is to be conducted in the Gulf of Mexico in March 2002. It also claims that the Navy has failed to meet certain requirements of the Endangered Species and Fishery Conservation and Management Acts, and will do so again if it proceeds with the sea test expected to be conducted in the Gulf of Mexico in March 2002.

By the end of the year the suit had not been settled.

Chapter VIII

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 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 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 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 marine mammal and related research being conducted, supported, and planned by these departments and agencies.

For the 2000 survey, the Commission requested information from the following federal agencies, departments, and offices: the Department of Agriculture; the Department of the Air Force; the Department of Commerce's National Ocean Service, National Marine Fisheries Service, Office of Oceanic and Atmospheric Research, and National Sea Grant College Program; the Department of the Interior's Fish and Wildlife Service, Minerals Management Service, Biological Resources Division of the U.S. Geological Survey, and National Park Service; the Department of the Navy; the Department of State; the Department of Transportation's U.S. Coast Guard; 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.

The information obtained is being summarized for publication in the Commission-sponsored report "Survey of Federally Funded Marine Mammal Research and Studies FY94–FY00." This will be available early in 2002 from the National Technical Information Service (see Appendix B, Waring 1981 through 2000, for previous surveys).

Workshops and Planning Meetings

In 2001 the Marine Mammal Commission provided comments and recommendations to other federal agencies on a broad range of issues affecting the conservation and protection of marine mammals and marine mammal habitats. The issues included protection and recovery of endangered, threatened, and depleted species; interactions between marine mammals and fisheries; the possible direct and indirect effects of coastal and offshore development on marine mammals; people swimming with and otherwise directly interacting with cetaceans; response to marine mammal strandings and unusual mortality events; public display of marine mammals; applications for scientific research permits; and requests for authorization to take small numbers of marine mammals incidental to a variety of industrial, military, and scientific activities.

Members of the Commission, its Committee of Scientific Advisors, and its staff also helped organize or participated in meetings and workshops to:

- review and recommend actions to update or implement recovery plans for Hawaiian monk seals, Florida manatees, North Atlantic right whales, humpback whales, and the California population of sea otters;
- review and further develop take reduction plans for the East Coast gillnet fishery and other fisheries that incidentally kill and seriously injure harbor porpoises, right whales, and bottlenose dolphins;
- facilitate implementation of the Marine Mammal Health and Stranding Response Program;
- prepare for the 2001 meetings of the International Whaling Commission and Scientific Committee;
- oversee U.S. participation in the Arctic Council and its working groups established to give effect to the Arctic Environmental Protection Strategy;
- identify and coordinate federal agency efforts to resolve uncertainties concerning the possible effects of anthropogenic noise on marine mammals;
- review the National Marine Fisheries Service's research program to determine whether dolphin populations that have been depleted due to mortality associated with the tuna purse seine fishery in the eastern tropical Pacific Ocean are recovering and, if not, whether the failure to recover is due to chase and capture by tuna purse seiners;
- review co-management needs for Cook Inlet beluga whales, and prepare for and participate in the hearing before an administrative law judge on Cook Inlet beluga whale co-management;
- identify management alternatives necessary to prevent collisions between ships and North Atlantic right whales;
- review and identify management actions necessary to implement the Northwest Hawaiian Islands Coral Reef Ecosystem Reserve; and
- participate in reviews of unusual mortality events involving Hawaiian monk seals, gray whales, and bottlenose dolphins and investigations of those events.

Commission-Sponsored Research and Study Projects

As funding permits, the Marine Mammal Commission supports research to further the purposes and policies of the Marine Mammal Protection Act. In particular, it convenes workshops and contracts for research and studies to help identify and determine how best to minimize threats to marine mammals and their habitats. Since it was established in 1972, the Commission has contracted for more than 1,000 projects ranging in amounts from several hundred dollars to $150,000.

Research and studies supported by the Commission in 2001 are described below. Final reports of most Commission-sponsored studies are available from the National Technical Information Service (NTIS) or directly from the Commission. These are listed in Appendix B. Papers and reports resulting entirely or in part from Commission-sponsored activities and published elsewhere are listed in Appendix C.

WORKSHOPS, REVIEWS, AND ANALYSES

Review and Synthesis of Risk Factors Affecting the Caspian Seal, *Phoca caspica* (Barbara E. Curry, Ph.D., Escondido, California)

Caspian seals are endemic to the Caspian Sea and are categorized as vulnerable by the IUCN (World Conservation Union). The original population size is thought to have consisted of about one million seals. There are no current estimates of population size, although about 10 years ago the population was estimated at about 360,000 to 400,000 seals. The Caspian seal is increasingly at risk as the result of a number of critical factors including disease-related mass mortality, commercial hunting and poaching, effects of contaminants, and plans for large-scale oil development, including a major offshore oil and gas project planned for the northern Caspian Sea. The entire Caspian region is reported to be environmentally stressed as the result of through the widespread use of agricultural compounds and potential contaminants

originating from unregulated or loosely monitored industrial activities and nuclear facilities. The number of breed-ing female seals on northern ice floes dropped from an estimated 90,000 animals in 1966 to about 47,000 in 1989. In addition, pregnancy rates dropped from an anticipated 80 percent during the mid-1980s and early 1990s to 31 percent in 1993 and to 20 percent in 1997 and 1998. Major seal die-offs were reported in 1997 and again in 2000. Canine distemper virus was thought to be the possible cause of these die-offs although other potential factors include the bacterial infection, pasteurellosis; pollution; poaching; and pesticide-related toxins.

To better understand the situation, the contractor is preparing a risk assessment for Caspian seals. The report will include background information on the Caspian seal and the Caspian Sea; information on the mass mortalities; the risk of contaminants to these seals; other mortality factors such as poaching, disease, and prey depletion; an assessment of the future risks to the population; and recommendations for the management of this population. Lessons learned from studies of the Caspian seal may be applicable to other pinniped populations facing similar environmental issues.

West Indian Manatee Habitat Requirements and Reproduction (James A. Powell, Ph.D., Aquatic Programs Wildlife Trust, St. Petersburg, Florida)

The contractor is undertaking a research program on manatee biology in Southern Lagoon, Belize. One aspect of the study is to obtain accurate locations of feeding sites and information on activity patterns using satellite telemetry and global positioning system technology. The tracking data will be compared with the ongoing collection of environmental and sea grass data. Along with monitoring manatee reproductive status and general health these data will provide insight into manatee/habitat interactions in an enclosed lagoon system that is little disturbed by human activities. The results of this study will be provided to the Fish and Wildlife Service for comparison with manatee/habitat interactions in Florida, where most manatee habitat has been modified by human interactions.

Safety Guidelines for Blasting Projects in Florida Waters (Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida)

Over the past two decades, there has been a considerable increase in the number of projects involving underwater blasting in Florida waters. The state's review of permits involving blasting projects in manatee habitat increased from 1 for the period from 1986 to 1989 to 5 from 1990 to 1993, 12 from 1994 to 1997, and 20 from 1998 to 2001. Blasting projects can pose a significant risk to marine mammals, ranging from mild disturbance to physical injury and death. The degree of risk depends on a number of factors including distance from the blast, explosive power, bottom topography, and hydrology. To ensure that protection of marine mammals is based on the best available model for estimating the effects of underwater blasting, the Marine Mammal Commission contracted with Florida's Bureau of Protected Species Management to review existing impact models pertaining to marine effects of blasting and develop accurate and defensible conservation measures for blasting projects.

Analysis of Mortality Trends in Florida Manatees (Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute, St. Petersburg, Florida)

The Fish and Wildlife Service and the University of Florida began a manatee carcass salvage program in the mid-1970s to recover and examine all dead manatees found in Florida. In 1985 the program was transferred to the state and is currently administrated by the Florida Marine Research Institute, Florida Fish and Wildlife Conservation Commission. The program provides information important for determining and mitigating human-related causes of manatee death and for assessing the status and trends of manatee populations in Florida. In the mid-1990s an analysis of manatee mortality data was undertaken to review mortality patterns and trends based on records of 2,074 manatee carcasses collected under this program. Since 1992 more than 2,000 additional carcasses have been

collected. The contractor will summarize and describe data collected from the recovered manatee carcasses, including number of deaths, causes of death, reproductive status, and age. These data will be incorporated into a population model of the Florida manatee that will include an assessment of past trends and a possible model of future population trends. These results will be used by state and federal agencies responsible for manatee recovery.

Development of a Remotely Operated Photographic System to Monitor Vessel Traffic on Waterways Used by Manatees (Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute, St. Petersburg, Florida)

Watercraft mortality is the largest single cause of human-related manatee mortality. To reduce this source of manatee mortality, the State of Florida began in 1989 to establish site-specific boat speed regulatory zones in 13 key counties with important manatee habitat. To date, these zones do not appear to have significantly reduced vessel-related manatee mortality. Poor boater compliance is thought to be a factor. To collect data on boater compliance, the Florida Marine Research Institute has supported a series of studies involving the placement of observers along selected regulated waterways to record data on the number and types of transiting watercraft by time of day, week ,and year, and rates of compliance by different types and sizes of vessels.

Gathering these data using observers is both time-consuming and expensive. The purpose of this project is to develop and assess the usefulness of a remotely operated portable photographic system to monitor vessel traffic on regulated waterways in Florida. The system is intended to record information on the amount of traffic and the speed and identity of passing vessels to determine overall compliance by vessel type, size, time of day, and time of year. If the system is accurate and cost-effective, it may be deployed on a regular basis to determine boater compliance with posted speed regulations.

Release of Harbor Porpoises from Herring Weirs (Andrew J. Read, Ph.D., Grand Manan Whale & Seabird Research Station, Grand Manan, Canada)

Harbor porpoises are vulnerable to entrapment in fishing gear throughout their range. In the Bay of Fundy, porpoises often become entrapped in herring weirs, which are large, fixed impoundments that trap juvenile herring close to shore. Porpoises risk entrapment if they feed at night and follow herring into weirs. The porpoises can breath, swim, and feed while inside the weirs, but many animals die when the herring are harvested. These porpoises are part of the Bay of Fundy/Gulf of Maine population that moves back and forth across the U.S.–Canadian border. Individuals are taken as bycatch in gillnet fisheries in both the United States and Canada and, as a result, the population has been listed as a strategic stock in the United States and as a threatened stock in Canada. Since 1991 the Grand Manan Whale & Seabird Research Station has cooperated with fishermen in the Bay of Fundy to assist in the release of harbor porpoises caught in herring weirs. Important scientific data are collected on the porpoises during the release operations. In 2001 the number of porpoises caught in weirs increased to a record level of about 250. The porpoise release program was unable to continue without additional resources. This contract enabled the con-tractor to continue the porpoise release program throughout the time when entrapment could occur (July-August), as well as to collect body condition data and blood samples for health assessment from trapped porpoises before their release.

Use of Fatty Acid Signature Analysis to Assess Foraging and Trophic Dynamics in Bottlenose Dolphins (Dana L. Wetzel, Ph.D., Mote Marine Laboratory, Sarasota, Florida)

The investigation of foraging ecology based on fatty acid analysis is relatively new in marine mammal science. The theory behind fatty acid analysis is that each prey species contains a combination of fatty acids that compose the prey's unique fatty acid "signature."

When prey are consumed, those fatty acids are deposited in the fat reserves of the predator. Because these fatty acids are resistant to digestive modification, they retain their essential identifying signature. By removing fat samples from a predator and comparing the component fatty acids found with those from potential prey species, the dominant prey species may be determined. The use of fatty acid analysis has important advantages over other methods of investigating marine mammal foraging ecology. Little fatty tissue from the predator is required. Also, the fatty acids of predators represent a long-term sample of their feeding habits because fatty acids may be deposited and remain intact for relatively long periods of time. Although fatty acid analysis is receiving considerable attention, few laboratories have developed the capacity to conduct such analyses. This contract helped enable the contractor to develop a reference library of fatty acid signatures for potential bottlenose dolphin prey species, assess fatty acid sample consistency among different fat stores in individual bottlenose dolphins, match dolphin and prey fatty acids to identify important prey species, and develop more sensitive analyses of fatty acids by applying specialized derivatization techniques not currently used in fatty acid signature work.

Photo-Identification and Health Monitoring of Western Gray Whales off Northeastern Sakhalin Island, Russia (Bernd Würsig, Ph.D., Texas A&M University, Galveston, Texas)

The western population of gray whales in the North Pacific may number fewer than 100 individuals, only a portion of which are mature and reproducing. Winter distribution of the population is largely unknown, and the only known summer feeding area is off the northeastern coast of Sakhalin Island, Russia. In 1995 a U.S.–Russian cooperative research effort was initiated to study this population and provide important background information for management. The study is based primarily on photo-identification of individual animals and has provided information on abundance, composition, survival, reproduction, site fidelity, health status of individuals, threats to the population, and means of mitigating those threats. The most apparent potential threat is an active oil and gas exploration and development project within tens of kilometers of the main feeding area. A range of other human activities also may impede the recovery of this population, including incidental catch in fisheries, ship strikes, exposure to oil spills and other chemical pollutants, and noise disturbance. The contractor will continue photo-identification surveys to determine annual return, survival rates, population abundance, and patterns of site fidelity for known individuals; document the health status of whales determined to be unusually thin in 1999–2000 by visually observing and videotaping them throughout the feeding season to evaluate potential fattening or further wasting; record calf production; and determine habitat use and locations of primary feeding areas.

Potential Transmission of Disease between Marine Mammals and Humans (Jonna A. K. Mazet, DVM, MPVM, Ph.D., University of California, Davis, California)

Direct contact with marine mammals or marine mammal tissue poses a risk to veterinarians, research scientists, husbandry personnel, participants in stranding networks, and volunteers associated with a variety of activities involving these animals. Although there is considerable anecdotal evidence of resulting injury and disease, occurrences generally are not well documented in the scientific literature. The risks of disease transmission are poorly understood with regard to both the probability and consequences of transmission. The risks may be greatest for those performing necropsies on diseased animals, but other activities also pose some undetermined level of risk. Among other things, the risk may vary with the nature and extent of contact between humans and an infected marine mammal, the health of the marine mammal as well as exposed humans, the disease that may be transferred, the location and remoteness of the study site, availability of medical care, and the familiarity of medical personnel with diseases that can be transmitted by marine mammals. In this study, the contractor will assess the current knowledge about transmission of disease between humans and marine mammals to determine the probability of disease transmission and the nature and severity of the consequences, recommend methods to minimize the possibility of disease transmission, identify methods of treatment, and produce fact sheets for those who work with marine mammals.

Impacts of Hydrological Restoration on Manatees in Three Estuarine Communities of the Southwest Coast (Lynn W. Lefebvre, Ph.D., U.S. Geological Survey, Gainesville, Florida)

Restoration activities have been initiated for the greater Everglades ecosystem in south Florida with the intent to return the ecosystem to a more natural condition by restoring water flow and water quality. Within the United States, manatees primarily are found in coastal freshwater, brackish, and marine waters of Florida. Major changes in freshwater flows in the Everglades may alter existing habitat and its suitability for manatees, both through potential changes in water quality as well as secondary changes in aquatic flora upon which manatees forage. The aim of this study is to characterize current manatee habitat-use patterns in the regions to be affected by restoration efforts in order to provide baseline information for use when assessing any effects of the restoration on manatees and their habitat. The Commission's contribution to the greater study was for an assessment of distribution, movements, home range, and habitat use of individual manatees through the use of satellite-linked telemetry and global positioning system technology.

Habitat Use by the Vaquita (Lorenzo Rojas-Bracho, Ph.D., National Institute of Ecology, Ensenada, Mexico)

The vaquita is a small cetacean found only in the Gulf of California. It is thought that fewer than 600 individuals remain. In 1996 the International Union for the Conservation of Nature (now the World Conservation Union) concluded that the extinction of the vaquita is likely unless conservation efforts are substantially increased. The primary conservation problem appears to be incidental mortality in gillnets used in fisheries in the northern gulf. The aim of this study is to provide information on the distribution and habitat-use patterns of the vaquita to help determine the extent to which these animals may be vulnerable to entanglement in gillnet fisheries. Visual sightings of vaquita during research studies do not coincide with the locations where vaquita are incidentally caught in fisheries. Due to the difficulty of sighting these small animals, it was decided to use acoustic techniques to investigate distribution and habitat use. Using techniques that have proved to be successful when studying similar species, the study will describe the acoustic signals emitted by vaquita in different seasons, regions, and time of day, and obtain seasonal acoustic density indices for regions within the northern Gulf of California with reference to known fishing effort. These data will be used to identify measures to reduce or eliminate the incidental take of vaquita in gillnets.

GENERAL

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. Information concerning marine mammal research conducted or supported by other federal agencies in fiscal year 2000 was forwarded to the contractor. At the end of 2001, the contractor was preparing a draft report synthesizing the information. The draft will be sent to the responding agencies to verify the accuracy of the information. As with previous reports, the final report will be reviewed by the Commission, in consultation with its Committee of Scientific Advisors, to identify possible duplicative research and means to avoid duplication. The series of reports is available through the National Technical Information Service.

Assessment of the Activities of the Arctic Council and Its Subsidiary Working Groups (Henry P. Huntington, Ph.D., Huntington Consulting, Eagle River, Alaska)

In 1991 the eight Arctic nations (Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, and the United States) adopted the Arctic Environmental Protection Strategy, through which they address issues of pollution and conservation on a circumarctic basis. In 1996 the Arctic Council was established by the eight Arctic nations as a high-level forum to build upon the Arctic Environmental Protection Strategy so as to better address issues of common concern, in particular issues of environmental protection and sustainable development. The Council has subsumed the four programs and working groups established to help implement the Arctic Environmental

Protection Strategy. They are the Arctic Monitoring and Assessment Program; Conservation of Arctic Flora and Fauna; Emergency Prevention, Preparedness, and Response; and Protection of the Arctic Marine Environment. The Council also has established a Sustainable Development Working Group. Persons designated by each nation as senior Arctic officials act as liaisons and provide coordination of activities between the biennial meetings of the Council. The contractor represented the Commission at the meeting of the senior Arctic officials and at meetings of the Arctic Monitoring and Assessment Program Working Group and the Working Group on Conservation of Arctic Flora and Fauna, as discussed in Chapter V.

Assessment of Collisions between Ships and Whales

As noted in Chapter III, ship strikes are a major factor impeding the recovery of what may be the world's most endangered species of large whale — the North Atlantic right whale. They also are a growing concern for other species in some areas, such as humpback whales in southeastern Alaska. Despite these concerns, little has been done to assess the nature and extent of ship collisions with whales or factors that may contribute to their occurrence. Recognizing the importance of such information for identifying and evaluating possible management needs and options, the Marine Mammal Commission initiated a study in 1998 to compile and evaluate available information on collisions between motorized vessels and large whales. The review examined data from four sources: historical collision records before 1950, recent stranding records, recent anecdotal accounts involving vessels known to have hit whales, and data on the number and speed of ships over time. Results of that review were published in early 2001 (see Appendix B, Laist et al., 2001).

With regard to historical collision records, a search of scientific and popular literature suggests that ship collisions before 1950 were rare compared with more recent decades. Only 15 documented records involving motorized ships were found before 1950, with the first one occurring in 1885. It is interesting that many of the early records involved some of the fastest ships of the day, particularly passenger vessels and military ships able to sustain speeds of about 15 knots or faster.

The scarcity of collision records up to 1950 appears to reflect a genuine rarity of collision events during the period. This conclusion appears to be supported by historical data on whale strandings. Although few compilations of such records exist before the 1950s, those that were reviewed for the northeastern United States and the British Isles included few or no references to whales with massive injuries typical of ship-strike victims found in recent decades, even though they referenced other types of injuries or human interactions. In addition, whereas whale collision records are now often documented when whales become caught on the bows of large ships, such records were extremely rare before 1950. In one case involving a whale brought into Baltimore harbor in 1940, the event attracted thousands of curious bystanders and was publicized widely in newspapers. Given the attention such events aroused, it seems likely that they would have been referenced more prominently in writings by scientists of the day.

Table 12. Proportion of recorded large whale deaths resulting or possibly resulting from ship collisions

U.S. East Coast (1975–1996)		
Fin Whale	34%	2 (31 of 92)
Northern Right Whale	33%	(10 of 30)
Humpback Whale	8%	(10 of 123)
Minke Whale	5%	(5 of 105)
Sei Whale	66%	(2 of 3)
Sperm Whale	—	(0 of 48)
Bryde's Whale	—	(0 of 6)
France (1972–1998)		
Fin Whale	22%	(16 of 72)
Sperm Whale	—	(0 of 30)
Minke Whale	—	(0 of 17)
Humpback Whale	—	(0 of 6)
Sei Whale	—	(0 of 2)
Italy (1986–1997)		
Fin Whale	20%	(8 of 39)
Sperm Whale	6%	(4 of 71)
Minke Whale	33%	(1 of 3)

Marine mammal stranding programs organized in several parts of the world in the 1970s and 1980s provided an improved basis for documenting collisions between whales and ships. As part of the review, stranding records were examined for computerized marine mammal stranding databases in the eastern United States, France, and Italy (see Table 12). The records reveal that ship collisions are responsible for a surprisingly high number of dead stranded whales, including a third or more of some species in some areas. In general, stranding data suggest that fin whales are by far the species most frequently hit and killed, but that collisions with right whales, humpback whales, sperm whales, and gray whales may be com-mon in some areas.

Stranding records also suggest that, for at least some species, calves and juveniles are far more likely to be hit and killed than older animals. For example, of those animals for which ages could be estimated, 75 percent of all right whales (6 of 8) and 80 percent of all humpback whales (8 of 10) found dead due to ship strikes along the U.S. East Coast were calves or juveniles. Calving and nursing habitats and juvenile feeding grounds may therefore be areas where risks of ship strikes are greatest. The records also show that the long, sleek rorqual whales, such as fin, blue, sei, and minke whales, are prone to being caught on the bows of large ships, whereas stockier species, such as right whales and humpback whales, are not. Along the U.S. East Coast, 40 percent (13 of 31) of the whales killed by ships were found on the bows of vessels or floating in harbors; however, no right whales or humpback whales were caught on bows or found in harbors. The massive nature of ship collision injuries (e.g., large deep propeller slashes, severed tail stocks, and crushed skulls) on dead whales also indicates that lethal collisions usually are caused by large ships, such as tankers and freighters.

First-hand accounts by crew members of vessels that hit whales or witnesses in nearby boats were documented for 58 collisions. These accounts reveal that, although whales may be hit by all sizes and types of motorized vessels — from small outboards to aircraft carriers — the vast majority of collisions causing lethal and serious injuries are caused by ships more than 80 m (262 ft) long. Among those accounts with information on whether or not whales were seen beforehand, 93 percent (40 of 43) involved collisions in which whales were not seen before they were hit or were seen only at the last moment when it was too late to alter course. About 25 percent of the accounts involved whales caught on the bow of large ships (120 m or longer), and many of these went unnoticed until the ship entered port and the whale was found. This suggests that vessel operators, particularly those of large ships with limited maneuverability, are not likely to be able to detect and steer around whales. Thus, where steps are needed to reduce ship collisions, advance planning to alter vessel operating procedures (e.g., ship speed and routing) will likely be necessary.

In this regard, the accounts indicate that vessel speed is a factor in collisions causing serious or lethal injuries. Such injuries were absent below 10 knots, infrequent between 10 and 13 knots, and most common at 14 knots and faster (see Fig. 17). At less than 10 knots, collisions also tended to cause minor injuries or have no apparent effect on whales. The low proportion of serious injuries at speeds below 14 knots may be due to a last-second startle response by whales. Although some, or even many, whales may move away from moving vessels at distances of hundreds of meters or more, some whales appear to be oblivious to ap-

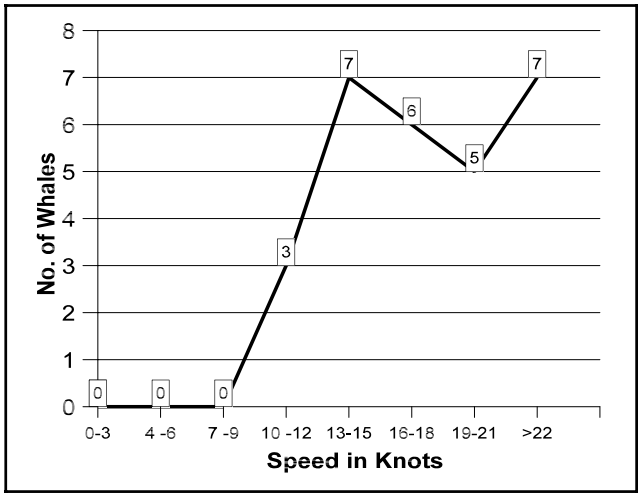

Figure 17. Number of severe and lethal large whale injuries by vessel speed.

proaching vessels. For seemingly oblivious whales, a last-moment startle response could still allow whales to successfully avoid ships.

Although most struck whales were not seen beforehand, a few accounts suggest that whales dived or made other sudden movements when ships approached to within about 100 yards (91.5 m) or closer. The slight reduction in response time for whales in front of ships traveling at 14 knots or faster compared to ships traveling under 14 knots could be an important factor in determining the ability of startled whales to avoid ships. Thus, in areas where ship strikes pose a particular management concern, study findings suggest that limiting vessel speeds to between 10 to 13 knots may significantly reduce the risk of hitting and killing whales.

Historical data examined during the study suggested a similar correlation between ship speed and collision frequencies. As noted above, the first collision records began to appear in the 1880s and 1890s when the fastest vessels could attain sustained speeds of about 14 to 15 knots or faster. Although the maximum speed of all ships involved in early collision records could not be found, several involved passenger ships and military vessels that were able to reach these speeds. Most motorized ships, however, were not able to reach speeds of 14 to 15 knots until the 1960s and 1970s. During that period, the frequency of collisions appears to have increased dramatically based on stranding records.

This study provides the most thorough compilation and analysis of information on collisions between ships and whales currently available. During 2001 the Commission provided these findings to the National Marine Fisheries Service. To help evaluate means of reducing ship strikes with North Atlantic right whales (see Chapter III), a Commission representative also presented results of the study at meetings of the recovery program's northeast and southeast implementation teams during 2001.

Chapter IX

PERMITS AND AUTHORIZATIONS TO TAKE MARINE MAMMALS

The Marine Mammal Protection Act places a moratorium, subject to certain exceptions, on the taking and importing of marine mammals and marine mammal products. The Act defines taking to mean "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal." One such exception provides for the issuance of permits by either the National Marine Fisheries Service or the Fish and Wildlife Service, 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. Amendments enacted in 1994 provide for the issuance of permits to authorize the taking of marine mammals in the course of educational or commercial photography and for importing polar bear trophies from certain populations in Canada. Permit-related activities involving polar bear trophies and the export of marine mammals to foreign facilities are discussed in Chapters III and X, respectively. Other permit-related activities are discussed here. With the exception of those for the importation of polar bear trophies, the Marine Mammal Commission is to review all permit applications.

Other provisions of the Marine Mammal Protection Act allow the National Marine Fisheries Service and the Fish and Wildlife Service to authorize the take of small numbers of marine mammals incidental to activities other than commercial fishing, provided the taking will have only a negligible impact on the affected stocks. Small-take authorizations incidental to several such activities are summarized in this chapter.

This chapter also summarizes steps taken to address interactions between wild marine mammals and members of the public who seek to approach, swim with, photograph, or feed them. In some instances, such interactions constitute harassment as defined under the Marine Mammal Protection Act and its implementing regulations. In other instances, the responsible agencies must determine on a case-by-case basis whether marine mammals have been harassed.

Permit-Related Regulations

As discussed in previous annual reports, the 1994 amendments to the Marine Mammal Protection Act affected many aspects of the Act's permit provisions. Among other things, the amendments added authority for the issuance of permits for commercial and educational photography, and established a "general authorization" procedure for 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). As part of the process, initiated in 1999, to reauthorize the Marine Mammal Protection Act, the Subcommittee on Fisheries Conservation, Wildlife, and Oceans of the House Resources Committee held an oversight hearing on 11 October 2001 at which the Commission and the other federal agencies with primary responsibilities under the Act testified on implementation of the 1994 amendments and identified problems that may warrant additional legislation. The Commission's testimony, which includes a discussion of permit-related issues, is provided in Appendix D.

In its statement to the subcommittee, the Commission noted that, as required by the 1994 amendments, the National Marine Fisheries Service had published an interim final rule in October 1994 implementing the general authorization. Although the Service apparently intends to replace the interim regulations with a permanent rule, it has yet to do so. The Commission also noted that the Service published proposed revisions to its public display regulations in July 2001 and apparently intends to issue specific regulations concerning permits for educational and commercial photography to supplement its existing general regulations. The Commission indicated that the Fish and Wildlife Service has

yet to revise its permit regulations to reflect the 1994 amendments to the permit provisions of the Act, including the general authorization for scientific research, for which the adoption of new regulations was specifically required.

At year's end, the National Marine Fisheries Service was reviewing the comments received on the proposed revisions to its public display regulations. Pending new regulations, the National Marine Fisheries Service is continuing to process applications for public display and photography permits using existing regulations, interim guidelines, and the applicable statutory provisions. The Fish and Wildlife Service intends to propose its own regulations after the National Marine Fisheries Service has finished updating its permit regulations, drawing on the National Marine Fisheries Service's regulations as appropriate.

The 1994 amendments also added a new provision to section 101(a)(5) of the Marine Mammal Protection Act, which allows for U.S. citizens to obtain authorization to unintentionally take small numbers of marine mammals incidental to activities other than commercial fishing when certain conditions are met. The new provision, section 101(a)(5)(D), allows the National Marine Fisheries Service and the Fish and Wildlife Service to use streamlined procedures to authorize the incidental taking of small numbers of marine mammals when only taking by harassment is involved. The Commission noted in its 2001 testimony to the Subcommittee that the National Marine Fisheries Service has revised its small-take regulations to reflect the new provisions. However, the Fish and Wildlife Service has yet to update its regulations to incorporate this statutory change.

Permit Application Review

Permits for scientific research, public display, species enhancement, and photography all involve the same four-stage review process: (1) receipt and initial review of the application by either the National Marine Fisheries Service or the Fish and Wildlife Service; (2) publication in the *Federal Register* of a notice of receipt 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 Service; and (4) final action by the Service after consideration of comments and recommendations by the Commission and the public. If captive maintenance of animals is involved, the views of the Animal and Plant Health Inspection Service on the adequacy of the facility and its husbandry and transportation arrangements are also sought (see also Chapter X).

Once issued, a permit can be amended by the responsible agency, provided the proposed change meets statutory and regulatory requirements. Depending on the extent of the proposed change, an amendment may be subject to the same notice, review, and comment procedures as the original permit application. Major amendments, such as requests to extend an authorization for more than 12 months, to take additional animals, or to take animals in ways not originally authorized, are subject to review by the Commission.

The total review time for a permit (from initial receipt of an application by either agency to final action) 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 agencies. During 2001 the Commission, in consultation with its Committee of Scientific Advisors, provided recommendations on 29 permit applications submitted to the National Marine Fisheries Service and 14 applications submitted to the Fish and Wildlife Service. Of these, 8 awaited final action by the Department of Commerce and 3 awaited final action by the Department of the Interior at the end of 2001. The Commission's average review time — from the point at which the application was considered complete to the submission of the Commission's final letter of recommendation — for the 40 applications on which it commented in 2001 was 28 days (range: 10–55 days). These calculations do not include the time required for review of an unusually complex application received from the Department of the Interior in 2000 but on which comments were not provided until 2001. The Commission also made recommendations on 13 requests to amend permits in 2001. The average time for Commission review of these requests was 30 days.

The National Marine Fisheries Service issued 22 permits during 2001, including permits for 13 applications received in 2000. The average processing time, from the date the application was received by the Service until final action was taken, was 185 days (range: 52–392 days). The average processing time from the date the application was received and consid-

ered complete by the Service until final action was taken was 146 days (range 46–392 days). The applications that required consultation under the Endangered Species Act required an average of 154 days (range 52–392 days) to complete.

The Fish and Wildlife Service issued eight permits during 2001. Its average processing time from the date the application was received at the Service until final action was taken was 136 days (range: 28–284 days). The average processing time from the date the application was received and considered complete at the Service until final action was taken was 98 days (range 22–182 days). These calculations do not include the time required for processing one complex application that presented several novel issues. Processing of that application was delayed for 10 months during which time the Commission formulated its recommendation to the Service.

The average processing times, calculated from the date considered complete to final action, for the National Marine Fisheries Service and the Fish and Wildlife Service in 2000 were 139 and 163 days, respectively.

Letters of Confirmation under the General Authorization

As noted above, the 1994 amendments to the Marine Mammal Protection Act added a general authorization under which research that involves the taking by harassment only of marine mammals not listed as endangered or threatened under the Endangered Species Act may be conducted without obtaining a permit. Before undertaking such research, however, the researcher must provide certain information to the National Marine Fisheries Service or the Fish and Wildlife Service and obtain a letter confirming that the general authorization applies. Between 6 and 16 researchers a year have obtained letters confirming that their activities may appropriately be conducted under the general authorization since its enactment in 1994. During 2001 eleven general authorizations were issued by the National Marine Fisheries Service. As noted in the Commission's 2000 annual report, it appears that, for certain types of research, this streamlined process has alleviated delays associated with issuing permits. One drawback with the general authorization is its inapplicability to activities that may take endangered or threatened marine mammals. In its testimony before the House Resources Committee's Subcommittee on Fisheries Conservation, Wildlife, and Oceans in June 1999, the Commission recommended that the general authorization be expanded to apply to such marine mammals. However, such a proposal was not included in a Marine Mammal Protection Act draft reauthorization bill submitted to Congress on 16 August 2000 by the Secretary of Commerce and the Secretary of the Interior, because it was thought that an amendment to the Endangered Species Act would be a more appropriate vehicle for implementing such a change.

Small-Take Authorizations

As noted earlier, under sections 101(a)(5)(A) and (D) of the Marine Mammal Protection Act, U.S. citizens may be authorized to unintentionally take small numbers of marine mammals incidental to activities other than commercial fishing when certain conditions are met. Such authorization is to be granted by the Secretaries of the Interior and Commerce. This section was added to the Act in 1981 to provide a streamlined alternative to the otherwise applicable requirement to obtain a waiver of the Act's moratorium on taking marine mammals when the number of animals likely to be affected is small and the impacts on the size and productivity of the affected species or populations are likely to be negligible. The section was amended in 1986 to include the taking of small numbers of depleted species and populations, as well as those listed under the Endangered Species Act. All forms of incidental taking, including lethal taking, may be authorized under section 101(a)(5)(A). A new subparagraph, section 101(a)(5)(D), was added to the Act in 1994 to streamline small-take authorizations further if the taking will be by harassment only.

Authorizations under section 101(a)(5)(A) require the promulgation of regulations setting forth permissible methods of taking and requirements for monitoring and reporting, as well as a finding that the incidental taking will have negligible effects on the size and productivity of the affected species or stocks. Authorization of taking by incidental harassment under section 101(a)(5)(D) does not require that regulations be promulgated. Rather, within 45 days of receiving an application that makes the required showings, the Secretary is to publish a proposed authorization and notice of availability of the application for public

review and comment in the *Federal Register* and in newspapers and by appropriate electronic media in communities in the area where the taking would occur. After a 30-day comment period, the Secretary has 45 days to make a final determination on the application. Authorizations under section 101(a)(5)(A) may be issued for periods of up to five years. Authorizations under section 101(a)(5)(D) may be issued for periods of up to one year. Both types of authorizations may be renewed.

Authorizations under Section 101(a)(5)(A)

Requests for small-take authorizations considered by the Commission during 2001 are described below.

Shock Testing the USS *Winston S. Churchill*– In December 1999 the Department of the Navy completed a draft environmental impact statement for conducting shock trials of the USS *Winston S. Churchill* (DDG-81) to evaluate the reliability of that vessel's structural components and electronic systems under combat situations. Following publication of the draft environmental impact statement, the Navy applied to the National Marine Fisheries Service on 12 January 2000 for a letter of authorization to take small numbers of marine mammals incidental to the shock trials to be conducted in the offshore waters of the Atlantic Ocean off either Mayport, Florida, or Norfolk, Virginia, or in the Gulf of Mexico off Pascagoula, Mississippi. On 12 December 2000 the Service published a notice of the application and request for comments in the *Federal Register*.

The Commission, in consultation with its Committee of Scientific Advisors, provided comments to the Service on the application by letter of 26 January 2001. The letter referred the Service to a previous Commission letter dated 30 March 2000, commenting on the Department of the Navy's December 1999 draft environmental impact statement, asking that those comments be incorporated by reference.

The Commission concurred with the Service that the proposed mitigation program would minimize injury and mortality to marine mammals incidental to the shock testing and that the anticipated disruption of behavior is unlikely to have biologically significant effects. The Commission pointed out, however, that the assessment of potential harassment provided in the DEIS and the proposed rule fails to appropriately reflect the definition of "harassment" set forth in section 3 of the Marine Mammal Protection Act.

Specifically, the Commission agreed that temporary threshold shift (TTS) is definable as Level B harassment provided it does not make the affected animals vulnerable to predation or otherwise affect their survival or productivity. The Commission questioned the reasoning used by the Navy and the Service as to whether the available data adequately supported the conclusion that TTS would not lead to increased mortality by increasing vulnerability to natural predation or ship strike. In addition, the Commission did not concur with the Service's proposal to measure Level B acoustic harassment from explosive detonation events exclusively in terms of TTS and stated that this was tantamount to determining that behavioral changes not related to TTS do not constitute harassment as defined in the Marine Mammal Protection Act. Furthermore, the Commission did not agree with the rationale for using a 50 percent probability of eardrum rupture as a criterion for nonlethal injury, especially as it appeared to be based on data obtained from terrestrial animals.

The Commission concluded by recommending that the Navy expand its application to include all marine mammal species that might possibly be taken, because it is unlikely that observers will be able to detect and identify all marine mammals that occur in the vicinity of the site.

On 4 May 2001 the Service published final regulations governing the shock trials of the USS *Winston Churchill* in the *Federal Register*. In response to the concerns raised by the Commission, the Service clarified that the proposed criterion for limiting Level B harassment to behavioral responses that are possible as a result of receiving an impairment to hearing (TTS) is limited to single-event explosions as opposed to multiple explosive events spaced over a short period of time in the same vicinity, such as live-fire exercises. Regarding the Commission's concerns over the use of a 50 percent probability of eardrum rupture as a criterion for nonlethal injury, the Service cited controlled trials done underwater on terrestrial animals (dogs and sheep) and indicated that it had made assumptions concerning the potential auditory effects on small marine mammals based on those assumptions. The Service further explained that the criterion in a "standard, statistically meaningful measure that has been estimated in a variety of mammals" provides an indirect way to estimate the likelihood of a permanent threshold shift occurring.

North Pacific Acoustic Laboratory (NPAL) – In May 2000 the Office of Naval Research completed

a draft environmental impact statement for continued operation of the former Acoustic Thermometry of Ocean Climate (ATOC) low-frequency source off the north coast of Kauai, Hawaii. In conjunction with publication of the draft environmental impact statement, Scripps Institution of Oceanography applied to the National Marine Fisheries Service on 21 May 2000 for a letter of authorization to take small numbers of marine mammals incidental to operation of the NPAL source. On 24 August 2000 the Service published an advance notice of proposed rulemaking in the *Federal Register*, followed by the publication of a proposed rule on 22 December 2000.

The Commission, in consultation with its Committee of Scientific Advisors, provided comments to the Service in a letter of 7 February 2001 asking that the Commission's previous comments of 24 July 2000 and 22 September 2000 be incorporated by reference. In its letter, the Commission agreed that continued operation of the former ATOC sound source off the north shore of Kauai is unlikely to have immediate or short-term biologically significant effects on the potentially affected marine mammal stocks. The Com-mission noted, however, that such sound transmissions are expected to take marine mammals, albeit unintentionally, and that the taking could have biologically significant long-term effects. For that reason, the Commission stated that it considers it essential that Scripps' monitoring program be designed to detect possible long-term effects. Specifically, the Commission recommended that, if the Service issues the requested authorization, then (1) the Service and Scripps consult with scientists familiar with the demography and behavior of potentially affected marine mammals to identify needed baseline information and monitoring methods necessary to detect long-term effects, and (2) the Service provide a description of the required monitoring program in sufficient detail to enable reviewers to judge the likelihood that it will detect biologically significant long-term effects in time to stop and reverse them.

The Commission also noted that Scripps had not responded to its recommendation of 22 September 2000 that (1) scientists with broad knowledge of the form and function of cetacean vocalizations be consulted to determine if monitoring and comparison of vocalizations before, during, and after NPAL transmissions could help to resolve the uncertainties concerning masking and possible related behavioral disruptions; and (2) if the consultations indicate that such monitoring would be possible and useful, an appropriate vocalization monitoring program be designed and included as part of the proposed action. The Service published the final rule regulating the operation of the NPAL source and commented on the Commission's concerns in a *Federal Register* notice dated 17 August 2001.

Surveillance Towed Array Sensor System Low Frequency Active Sonar (SURTASS LFA) – In August 1999 the Department of the Navy submitted a request for a letter of authorization for the incidental take of marine mammals associated with the employment of Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar. The Navy completed a Final Overseas Environmental Impact Statement and Environmental Impact Statement for the project in January 2001. On 19 March 2001 the National Marine Fisheries Service published a proposed rule in the *Federal Register* in response to the request. The Service extended the deadline for the submission of comments and gave notice of public hearings in a notice published on 4 April 2001. The Service again extended the deadline for comments in a 15 May 2001 notice. A summary of the SURTASS LFA project and the Commission's comments on the draft environmental impact statement and the Service's *Federal Register* notices is provided in Chapter VII.

Development of Production Facilities at the Northstar and Liberty Sites in the Beaufort Sea – On 25 November 1998 BP Exploration (Alaska), Inc., (BPXA) requested that the National Marine Fisheries Service promulgate regulations to authorize the taking of small numbers of bowhead whales, gray whales, beluga whales, ringed seals, bearded seals, and spotted seals incidental to the construction and operation of oil and gas production facilities at the Northstar and Liberty sites off the north coast of Alaska. A notice of the application and request for comments were published in the *Federal Register* on 1 March 1999.

The Commission provided comments to the Service on the application by letter of 31 March 1999. These comments are discussed in detail in the 1999 annual report. The Commission recommended that the Service initiate the requested rulemaking, provided that it was satisfied that the planned monitoring programs would be adequate to verify how and over

what distances marine mammals would be taken, and that cumulative impacts on the affected species and stocks would be negligible.

On 22 October 1999 the National Marine Fisheries Service published proposed regulations to govern the taking of bowhead whales, ringed seals, and other marine mammals under its jurisdiction incidental to construction and operation of the Northstar site. On 21 December 1999 the Commission, in consultation with its Committee on Scientific Advisors, provided further comments to the Service.

The Commission concurred with the Service's preliminary determination that construction and operation of production facilities at the Northstar site would likely have a negligible impact on marine mammals and no unmitigable adverse impact on the availability of marine mammals for taking by Alaska Natives for subsistence purposes. The Commission noted, however, that available information was insufficient to provide confidence that there would not be significant adverse effects on either marine mammals or their availability to Alaska Natives, particularly over the 15 to 20 years during which production and related activities are expected to occur. In this regard, the Commission noted that it was not clear whether the ongoing and proposed research and monitoring programs would be sufficient to detect any nonnegligible effects in time to take remedial action to ensure that they would not lead to long-term or irreversible population-level effects. The Commission also pointed out that it was not clear whether (1) the estimate of the number of bowhead whales that might be affected considered the year-to-year variability of the paths taken by migrating bowhead whales in the fall; (2) the proposed acoustic monitoring of the fall bowhead whale migration would be able to detect changes in behavior or movement patterns that could affect the survival or productivity of the whales or their availability to Alaska Natives for subsistence; (3) the Service had considered the various ways in which the planned construction activities could affect polar bears through effects on ringed seals; (4) the proposed surveys for ringed seal breathing holes and pupping lairs would be sufficient to detect any changes in ringed seal distribution, densities, or behavior due to activities such as road and pipeline construction; and (5) required polar bear monitoring programs would be coordinated with the ringed seal monitoring program to be established by the National Marine Fisheries Service in such a way that uncertainties concerning the effects of the proposed activities on marine mammals will be resolved.

The Commission therefore recommended that, if it had not already done so, the National Marine Fisheries Service (1) review data from past bowhead whale surveys conducted by the Minerals Management Service to determine whether such surveys would be likely to provide sufficient information to assess the efficacy of the proposed acoustic monitoring of the fall bowhead migration; and (2) if the Minerals Management Service's surveys are judged unlikely to provide sufficient data, require that additional aerial surveys be done during the Northstar construction phase to document the efficacy of the acoustic monitoring program. In addition, the Commission recommended that the Service, if it had not already done so, consult with the Fish and Wildlife Service to ensure that the monitoring program proposed by BPXA is sufficient to verify that any changes in the distribution, densities, or behavior of ringed seals and polar bears caused by construction and operation of production facilities at the Northstar site are negligible and, if not, that the Service take steps necessary to correct the identified deficiencies in the program.

The Commission also noted that the Service's *Federal Register* notice made no mention of the oil spill contingency plan developed by the applicant and approved by the Alaska Department of Environmental Conservation, the Coast Guard, and the Minerals Management Service. The Commission recommended that the National Marine Fisheries Service (1) review the contingency plan and related information to ensure that the risk of oil spills had been estimated appropriately and that planned measures for containing and cleaning up oil spills in open-ocean and ice-covered areas are likely to be effective; (2) require that the contingency plan be modified if everything feasible had not been done to minimize oil spill risks to marine mammals; and (3) provide for periodic site inspections, as part of the long-term monitoring program, to ensure that the contingency plan could be implemented if necessary. The Commission further recommended that an assessment of the contingency plan and related monitoring programs be included in any *Federal*

Register notice published to promulgate final regulations authorizing the taking of marine mammals incidental to construction and operation of production facilities and related activities at the Northstar site.

On 25 May 2000 the Service published final regulations governing authorization of the unintentional take of small numbers of marine mammals during the course of oil and gas exploration, development, and production activities in the Beaufort Sea and adjacent northern coast of Alaska. These regulations are to remain in effect through 25 May 2005. In response to the Commission's comments and recommendations, the Service noted, among other things, that basing a negligible impact determination on a worst-case scenario would not provide a realistic estimate of harassment take levels, and that calculations based on the best scientific data available indicate that a maximum of 717 bowhead whales annually, or approximately 9 percent of the estimated population, would be harassed by noise associated with the construction and operation of the Northstar facilities during the five-year authorization period. The Service believed that estimates of take levels over the 15- to 20-year lifetime of the Northstar project were unnecessary, in its view, because the Marine Mammal Protection Act requires that take levels be considered only for each authorization period (i.e., five years or less). Concerning possible impacts on Native subsistence hunting, the Service accepted the information submitted by the applicant, in conjunction with that provided by the Alaska Eskimo Whaling Commission, the North Slope Borough, and the U.S. Army Corps of Engineers' final environmental impact statement as the best information available to date on the potential effects on the availability of marine mammals for subsistence uses in the Beaufort Sea area. Based upon that information, the Service deter-mined that harassment by noise at the Northstar site would have no more than a negligible impact on bowhead whales.

The Service also noted that it was unaware of any evidence to indicate that increased interactions between polar bears and ringed seals are likely to occur as a result of the authorized activities, but that, to the extent practicable, on-ice monitoring of ringed seals and polar bears has been and would continue to be coordinated. Further, the Service indicated that the Commission's concerns with respect to the monitoring of polar bears and ringed seals would be considered at the next on-ice peer review workshop. Regarding the potential for an offshore oil spill, the Service determined that the probability of such a spill is less than 10 percent over a 20- to 30-year period and that the potential for oil from such a spill intercepting whales or seals is only about 1.2 percent. In light of this low potential and the seasonality of occurrence of bowhead whales, the Service determined that the taking of marine mammals incidental to construction and operation of the Northstar oil production facility is unlikely to have more than a negligible impact on this species, and that, because an oil spill response program and other mitigation measures will be in effect, there would not be an unmitigable adverse impact on subsistence uses.

On 17 August 2001 the Service published notice in the *Federal Register* that it had received a request to renew BP Exploration's letter of authorization, which is issued on an annual basis. The Commission, in consultation with its Committee of Scientific Advisors, provided comments to the Service in a letter dated 22 October 2001. Although the Commission concurred that the proposed activities would have negligible impacts on marine mammals, the letter highlighted several issues that remain to be resolved concerning the long-term impact that may occur and referred the Service to the Commission's letter of 21 December 1999. The letter went on to recommend that the Service review and comment on the updated oil spill contingency plan from BPXA expected in August 2001 and provide for periodic site inspections to assure that the contingency plan can be implemented when necessary.

On 21 December 2001 the Service published notice in the *Federal Register* of its issuance of a letter of authorization to BPXA. The Service responded to the Commission's comments, stating, among other things, that it did not agree that it should make a negligible impact assessment over the 15- to 20-year lifetime of Northstar because only 5-year determinations are available under the Marine Mammal Protection Act.

The Service responded to the Commission's recommendation that it review the updated Oil Discharge Prevention and Contingency Plan and provide for regular site inspections by stating that the Service

has neither the expertise to conduct such a review or inspections, nor the authority to require that the plan be modified.

The Service responded to a Commission recommendation on visual monitoring during noisy activities, such as impact pipe driving, by adding a requirement to the authorization that visual monitoring be conducted whenever activities are planned that would potentially result in a sound pressure level greater than 180 dB beyond the island perimeter.

Addressing the Commission's request for an explanation of the term "when practicable" regarding the avoidance of located seal structures during on-ice activities by BPXA, the Service stated that little mitigation has been identified that would be practicable and effective during the construction of primary roads because of the need for those roads to be straight-line and constructed during the winter. However, primary roads will be constructed as early in the season as possible to mitigate interference with seals constructing birthing lairs, and secondary roads will be constructed later in the season, in areas not confined to a set track.

Furthermore, the Service concurred with the Commission's suggestion that rechecking seal structures in the vicinity of Northstar in May is appropriate if road construction, or other significant disturbance, has taken place after 1 March.

Incidental Take of Walruses and Polar Bears – Regulations governing the issuance of letters of authorization to take walruses and polar bears incidental to oil and gas activities in the southern Beaufort Sea and adjacent areas off Alaska were initially promulgated by the Fish and Wildlife Service in November 1993. In August 1995 those regulations were modified and extended through 15 December 1998. As noted in the Commission's previous report, on 28 January 1999 the Service published final regulations to govern the authorization of the unintentional take of small numbers of polar bears and Pacific walruses incidental to oil and gas exploration and development activities in the Beaufort Sea and adjacent coastal areas of Alaska through 30 January 2000. The *Federal Register* notice announcing those regulations indicated that the Service, rather than issuing the authorization for an additional five-year period, intended to consider new information associated with subsea pipeline construction and to propose an extension of the regulations for an additional four years early in 2000.

On December 1999 the Service published in the *Federal Register* a proposed negligible impact finding and proposed regulations to govern authorization of the unintentional take of small numbers of polar bears and Pacific walruses incidental to oil and gas activities in the Beaufort Sea and adjacent coastal areas of Alaska for a three-year period, beginning on 31 January 2000. Also, on 3 January 2000 the Service published proposed regulations to extend the existing regulations through 31 March 2000 to allow sufficient time for full consideration and evaluation of public comments on the December 1999 proposed rule. The final rule extending the regulations through 31 March 2000 was published in the *Federal Register* on 3 February 2000.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the 9 December 1999 proposed rule and provided comments to the Service by letter of 7 January 2000. The Commission noted that, based on information submitted to the National Marine Fisheries Service by BP Exploration (Alaska), Inc., related to the incidental taking of marine mammals under that agency's jurisdiction, it appeared that marine mammals could be taken incidental to a number of activities in addition to pipeline construction and operation (e.g., over-ice road construction), and that the effects of the proposed activities on ringed seals could, in turn, adversely affect polar bears, which rely upon those seals for food. The Commission speculated that such taking would likely be compounded over the long term by changes in ice conditions associated with apparently ongoing climate change and noted that the proposed rule did not consider possible cumulative impacts beyond the three-year period for which the regulations would be in effect, although production activities at the Northstar site are expected to continue for at least 15 years.

In light of these concerns, the Commission recommended that the Service (1) assess the potential direct and indirect effects of the proposed activity on polar bears and include the results of that assessment in any final regulations authorizing the incidental taking at the Northstar site; (2) conduct a power analysis to determine the kinds and levels of changes

in the Beaufort Sea polar bear population that could be detected by ongoing and planned tagging, monitoring, and biosampling programs and, if necessary, consult with the scientific community, industry, and Native groups to identify and take steps to ensure that adverse changes can be detected and mitigated before they have long-term or irreversible effects on population size or productivity; and (3) describe the nature and results of the power analysis and any subsequent changes or additions to the monitoring requirements in any final regulations proposed by the Service.

Concerning the Service's oil spill risk and impact assessment, the Commission noted that, from the information provided, it appeared that the probability of a spill occurring and killing 10 or more polar bears over a 15-year period would be 3 to 10 percent, a probability that the Commission believed could not be considered negligible without better justification. The Commission recommended that, if it had not already done so, the Service review the oil spill contingency plan developed and approved by the Alaska Department of Environmental Conservation, the U.S. Department of Transportation, the U.S. Coast Guard, and the U.S. Minerals Management Service to ensure that the risk of oil spills occurring had been estimated appropriately; that the planned measures for containing and cleaning up spills in both open-ocean and ice-covered areas would likely be effective; that everything feasible would be done to minimize the impacts of any spilled oil and any necessary containment and cleanup operations on polar bears; and that the risk of oil spills occurring and impacting polar bears directly and indirectly would, in fact, be negligible. Further, the Commission recommended that the Fish and Wildlife Service (1) require modification of the contingency plan if everything feasible had not been done to minimize the risk of spills occurring and impacting polar bears; (2) ensure that periodic site inspections be conducted by representatives of the Service or other appropriate government agencies as part of the long-term monitoring program to make certain that the contingency plan can be implemented as and when necessary; and (3) include the assessment of the contingency plan and related monitoring requirements in any final regulations authorizing the taking of marine mammals.

On 30 March 2000 the Service published a negligible impact finding and final regulations for authorizing the unintentional take of small numbers of polar bears and Pacific walruses during the course of oil and gas exploration, development, and production activities in the Beaufort Sea and the adjacent northern coast of Alaska through 31 March 2003. In response to the Commission's recommendations, the Service noted that, based on available information, it had determined that, even if the operation of the Northstar site influences the distributions of ringed seals and polar bears or increases interactions between humans and polar bears, the magnitude of these changes would not appreciably affect the species' rates of recruitment or survival. As for potential cumulative impacts, the Service stated that it is obligated to assess cumulative impacts only for the duration of the regulations and need not include information beyond that period, which could be speculative, incomplete, or beyond the scope of the regulations.

The Service concurred with the Commission that the concept of conducting a power analysis had merit and would be explored but noted that, due to limited agency resources and other factors, the results of such an effort would not be included in the final regulations. Concerning the potential for oil spills, the Service clarified that the estimated 3 to 10 percent likelihood of one or more spills greater than 1,000 barrels in size occurring in the marine environment was for the three-year period covered by the regulations. The Service stated that its finding of negligible impact was based on the results of a risk assessment analysis that showed that, despite the less-than-remote possibility of a spill occurring, there is a low probability that a large-volume spill, with high polar bear mortality, would occur. The Service expressed its belief that the oil spill contingency plan described feasible techniques for minimizing the impacts of oil spills and that the plan currently did not warrant further review. The Service noted, however, that should further advances in oil spill technology occur during the regulatory period, additional measures could be incorporated into letters of authorization.

Under the procedures adopted by the Service, letters of authorization are issued for specific activities under the incidental take regulations without opportunity for additional public review or comment. In 2000

the Fish and Wildlife Service issued 56 letters of authorization to take polar bears and walruses incidental to oil and gas exploration and development activities off Alaska. The authorizations were issued to Arco Alaska, Inc. (18); Phillips Alaska, Inc. (13); BP Exploration (Alaska), Inc. (10); Western Geophysical (10); Kuukpik/Fairweather (2); Fairweather Geophysical (1); and Exxon Mobil Company USA (2). Notices of these authorizations were published in the *Federal Register* on 16 March, 19 April, 18 May, 8 June, 18 August, 28 September, 24 November, and 20 December 2000.

In 2001 notices of authorization were published in the *Federal Register* on 7 March, 14 August, 20 September, 4 October, 7 December, and 27 December. Authorizations were issued to Phillips Alaska, Inc. (27); Andarko Petroleum Co. (2); Alaska Gas Producers Pipeline Team (1); Exxon Mobil (1); Western GeCo (1); and BP Exploration (1).

Taking Incidental to the Operation of the Seabrook Nuclear Power Plant – The North Atlantic Energy Service Corporation submitted an application to the National Marine Fisheries Service on 16 June 1997 for a five-year authorization to take small numbers of harbor, gray, harp, and hooded seals incidental to the operation of the nuclear power plant in Seabrook, New Hampshire. The application indicated that cooling water for the plant is drawn through tunnels from three intake structures located about 1.6 km (1 mi) offshore and that, between 1993 and 1997, the remains of 27 to 33 seals had been found in holding bays at the terminus of the intake tunnels. The letter transmitting the application noted that studies were being done to determine steps that might be taken to minimize the entrapment of seals.

As noted in the Commission's 1998 report, the National Marine Fisheries Service published proposed regulations to authorize the incidental taking on 25 August 1998. The Commission, in consultation with its Committee of Scientific Advisors, provided comments on the proposed regulations to the Service by letter of 9 October 1998. On 25 May 1999 the Service published final regulations to govern the unintentional take of small numbers of seals incidental to routine operation of the power plant. Among other things, the regulations required the North Atlantic Energy Service Corporation to report, within six months, on possible measures that could be taken to effect the least practicable adverse impact on the seals. The North Atlantic Energy Service Corporation sponsored a workshop on 28–29 January 1999 to identify and evaluate possible mitigation measures. The workshop report, provided to the Commission in April 1999, recommended the installation of vertical barriers on each of the three water intakes to prevent seals from entering the intakes. Such barriers subsequently were installed on all three offshore water intakes.

On 22 December 1999 the corporation advised the Service that no seals had been trapped in the water intake system since the completion of the barrier installation. The Commission commended the corporation for its prompt and effective action.

On 2 January 2001 the Service published notification in the *Federal Register* that a letter of authorization had been issued to the corporation to take small numbers of marine mammals in conjunction with the operation of the power plant. The authorization requires the corporation to conduct visual inspections of the forebays of the intakes twice daily and to follow other mitigation measures to prevent the take of seals. The authorization allows for the taking of up to 20 harbor seals and 4 of any combination of gray, harp, and hooded seals annually from 1 July 1999 through 30 June 2004.

Taking of Harbor Seals and California Sea Lions Incidental to Rocket Launches from Vandenberg Air Force Base – After section 101(a)(5)(D) was added to the Marine Mammal Protection Act in 1994, the U.S. Air Force requested and received a series of one-year authorizations to take harbor seals, and possibly northern elephant seals and northern fur seals, incidental to launches of Delta II, Titan II, Titan IV, Taurus, and Lockheed Martin rockets at Vandenberg Air Force Base on the central California coast. As noted in previous reports, the Commission commented that, if launches of these and other rockets from Vandenberg Air Force Base are expected to continue indefinitely, it would be more appropriate to obtain a five-year authorization under section 101(a)(5)(A) of the Act, rather than annual authorizations for each type of launch vehicle. The Commission also questioned whether the monitoring required by the National Marine Fisheries Service has been sufficient to detect

possible long-term cumulative adverse effects from the series of launches being conducted.

On 30 September 1997, as suggested by the Commission, the Air Force applied to the National Marine Fisheries Service for a five-year small-take authorization under section 101(a)(5)(A). Notice of receipt of the application and proposed regulations to authorize the unintentional taking of Pacific harbor seals and California sea lions incidental to rocket launches at Vandenberg Air Force Base were published in the *Federal Register* on 21 July 1998, and final regulations were published by the Service on 1 March 1999. The regulations, effective through 31 December 2003, specify measures that must be taken to minimize, to the greatest extent practicable, the adverse impacts of the rocket launches and related activities on marine mammals. They also specify research and monitoring requirements designed to confirm that any impacts on the size and productivity of the potentially affected marine mammal populations are negligible.

On 2 April 1999 the Service issued a letter of authorization to the 30th Space Wing, Department of the Air Force, that was valid until 1 April 2000 and specified the research, monitoring, and reporting to be conducted during the period of the authorization. A one-year authorization was issued because the Air Force had advised the Service of its intent to modify its request shortly.

On 3 August 1999 the Air Force asked that the letter of authorization be modified to include taking incidental to launches of the Minotaur, a modified Minuteman II rocket not included in the authorization issued on 2 April. Notice of the request was published in the *Federal Register* on 8 August 1999. The Commission, in consultation with its Committee of Scientific Advisors, provided comments to the Service on 8 September 1999 recommending that the request be granted, provided that the Service was satisfied that the proposed marine mammal monitoring program would be able to detect any possible cumulative adverse effects. The Service modified the letter of authorization issued to the Air Force on 4 October 1999.

On 31 May 2000 the Service published notice in the *Federal Register* that it had issued a new one-year letter of authorization to the 30th Space Wing, Department of the Air Force, to harass small numbers of Pacific harbor seals, California sea lions, northern elephant seals, and northern fur seals incidental to missile and rocket launches, aircraft flight test operations, and helicopter operations at Vandenberg Air Force Base. The Service's letter of authorization was based on a finding that the total takings would have no more than a negligible impact on the seal and sea lion populations in the area.

The Service published a notice on 19 March 2001 in the *Federal Register* that it had received a request from the Air Force seeking renewal and modification of its letter of authorization. The requested modification was designed to reflect the variable nature of the rocket launch vehicle type by eliminating the set number of launches per individual rocket program; clarify that currently authorized space launches occur from both North and South Vandenberg; and change the current monitoring requirements. The Commission, in consultation with its Committee of Scientific Advisors, concurred with the Service and recommended that the requested changes be made and the letter of authorization renewed. The Service published notice of the issuance and modifications in the *Federal Register* on 1 June 2001.

On 14 September 2001 the Service published notification in the *Federal Register* of a request by the Air Force for further modifications to the letter of authorization, asking that biological monitoring be required only during the Pacific harbor seal pupping season (1 March to 30 June). The Service proposed to modify the authorization based on its determination that the proposal would have a negligible impact on the affected marine mammals. Action on the request was still pending at year's end.

Authorizations under Section 101(a)(5)(D)

During 2001 the Commission considered several requests for small-take authorizations for taking by harassment only. They are described below.

Taking Incidental to Rocket Launches from the Naval Air Warfare Center Weapons Division, San Nicholas Island, California – In February 2001 the Department of the Navy applied to the National Marine Fisheries Service for authorization to take northern elephant seals, harbor seals, California sea lions, and northern fur seals incidental to launches of Vandal (or similar) and smaller subsonic target missiles from San Nicholas Island, California. Notice of receipt of the application and a proposed authorization for it were published by the Service in the *Federal Register* on 23 April 2001.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the application and provided comments to the Service on 23 May 2001. In its comments, the Commission concurred that only small numbers of the listed species of marine mammals are likely to be taken by harassment and that the proposed activities are likely to result in no more than short-term behavioral modifications. However, the Commission recommended that, with respect to the proposed monitoring program (1) the authorization specify that operations would be suspended until steps are taken to avoid future occurrences if a mortality or injury to a seal or sea lion occurs that appears to be related to launch activities; and (2) the Service be satisfied that the applicant's monitoring system is sufficient. The Commission noted that the Service was requiring that any disruption of behavioral patterns that might occur must be of a significant nature to constitute Level B harassment. The Commission expressed concern that this interpretation did not accurately reflect the statutory definition of Level B harassment and referred the Service to letters from the Commission dated 7 December 2000, 26 January 2001, and 7 February 2001 discussing the subject in detail. The Commission also advised that the Navy should consider seeking a five-year authorization under section 101(a)(5)(A) as being appropriate and that the Navy should obtain an authorization from the Fish and Wildlife Service for the small take of sea otters also present in the San Nicholas region.

Notice of the issuance of a one-year letter of authorization was published by the Service in the *Federal Register* on 9 August 2001. In the notification the Service addressed the Commission's comments. Specifically, the Service referred the Commission to the 7 February 2000 *Federal Register* notice wherein the Service states that, if the only reaction to the activity of the marine mammal is within the normal repertoire of actions that are required to carry out the "behavioral pattern," the Service considers the activity not to have caused an incidental disruption, provided the animal's reaction is not otherwise significant due to length or severity and therefore the reaction is not considered Level B harassment.

Taking Incidental to Shallow-Water Hazard Survey Activities by the North American Natural Gas Pipeline Group in the Beaufort Sea – On 30 May 2001 the National Marine Fisheries Service published a *Federal Register* notice announcing receipt of a request from the North American Natural Gas Pipeline Group seeking authorization to take small numbers of marine mammals incidental to conducting shallow hazard surveys using various acoustic sources, as part of pipeline route evaluation studies in the central and eastern Alaska Beaufort Sea. The Commission, in consultation with its Committee of Scientific Advisors, by letter of 29 June 2001 provided comments on the application and the Service's proposal to issue the authorization.

The Commission's letter concurred that the short-term impact of the proposed activities would result at most in temporary modifications of behavior of marine mammals. The Commission also agreed that the mitigation and monitoring measures proposed appeared to be adequate. However, as the Commission has recommended in several previous letters on the subject, it is concerned that the proposed activities may have cumulative impacts that may not be negligible when taken in combination with other ongoing and planned activities in the Beaufort Sea. The Commission therefore recommended that the Service consider ways, either through the monitoring programs established pursuant to incidental take authorizations or otherwise, to determine whether oil and gas exploration, development, production, and related activities are having broader-scale effects on marine mammals that may not be detected by site-specific monitoring programs.

The Service published notification in the *Federal Register* on 6 August 2001 that an incidental harassment authorization had been issued to the Alaska Gas Producers Pipeline Team, formerly known as the North American Natural Gas Pipeline Group. It responded to

the Commission's concerns over monitoring by announcing that the monitoring and mitigation program had been revised based on a peer review/stakeholders meeting held 5 June 2001. Regarding the potential for cumulative effects from anthropogenic noise, the Service stated that participants in a scientific peer review workshop had concluded that current industry research and monitoring programs in the Beaufort Sea, coupled with existing projects to monitor bowhead whale trends and abundance, is the best way to determine overall cumulative impacts from noise on bowhead whales.

Taking Incidental to Conducting Ocean Bottom Cable Seismic Surveys in the Beaufort Sea – On 24 April 2000 the National Marine Fisheries Service published a *Federal Register* notice announcing receipt of, and requesting comments on, a request by Western Geophysical seeking authorization to take several species of marine mammals by harassment incidental to seismic surveys in the Beaufort Sea off Alaska. The Commission, in consultation with its Committee of Scientific Advisors, provided comments on the application and the Service's proposal to issue the authorization by letter of 22 May 2000.

The Commission concurred with the Service's determination that the short-term impact of the proposed seismic surveys would result, at most, in the temporary modification of behavior by certain cetaceans and possibly by pinnipeds. It also agreed that monitoring and mitigation measures proposed by the applicant appeared adequate to ensure that the planned surveys would not result in the mortality or serious injury of any marine mammal or have unmitigable adverse effects on their availability to Alaska Natives for subsistence hunting. Further, the Commission concurred with the Service that, although the short-term impacts of the surveys are likely to result in no more than temporary behavioral modifications, there is uncertainty whether there may be long-term, cumulative adverse impacts from the surveys and other activities ongoing or planned in the Beaufort Sea. The Commission therefore recommended that the peer review group established to provide advice on the proposed monitoring and mitigation program be asked for its views as to whether the combination of site-specific and population monitoring is likely to be capable of detecting nonnegligible effects in time to take action to minimize or mitigate them and, if not, to identify what changes are needed to those programs. In addition, the Commission recommended that the Service consult with the applicant to determine what further activities are planned for the next five or more years inasmuch as the applicant apparently intends to continue conducting seismic surveys in the same general area for several years, and, if appropriate, (1) request that incidental taking authorization be sought under section 101(a)(5)(A) of the Act, and (2) identify steps to be taken by the applicant and the responsible regulatory agencies to detect, avoid, and mitigate cumulative adverse effects.

The Commission understands that Western Geophysical concluded its seismic work in 2000 before the commencement of the bowhead whale migration, and therefore the Service did not proceed with issuance of the incidental take harassment authorization at that time. On 1 February 2000 the Service published a notice in the *Federal Register* that it had issued an authorization for Western Geophysical to take ringed and bearded seals incidental to on-ice seismic operations in the Beaufort Sea, effective from 22 January to 31 May 2000.

On 18 June 2000 the Commission received a letter from the Service responding to the comments and recommendations that the Commission had submitted in its letter of 22 May 2000. In the Service's response it stated its belief that the combination of population-level monitoring and site-specific monitoring and mitigation measures are adequate to ensure that seismic and associated vessel noise are having only a negligible impact on marine mammals. The Service further stated that because Western GeCo does not conduct oil and gas exploration drilling, it cannot predict future oil and gas activities of other companies. The Service stated that it will take appropriate action to address cumulative impact issues if and when they increase to the extent that they become a significant concern.

On 11 June 2000 the Service published a notice in the *Federal Register* for a proposed authorization under section 101(a)(5)(D) for Western GeCo, LLC (formerly known as Western Geophysical), for the year 2001. The Commission, in consultation with its Committee of Scientific Advisors, provided comments to the Service on the proposed authorization by letter of 16 July 2001. In that letter the Commission reiterated its previous concerns regarding monitoring and cumulative effects, emphasizing the need for baseline information and consultations between the applicant, the Alaska Department of Fish and Game, and the Native communities to

determine the long-term monitoring that would be required to confirm that the proposed seismic surveys and possible future exploration and development do not cause changes in the seasonal distribution patterns, abundance, or productivity or marine mammal populations in the area.

On 13 August 2001 the Service published notice in the *Federal Register* of an incidental harassment authorization for Western GeCo, LLC, for the open-water period of 2001. In the authorization the Service responded to the Commission's 16 July 2001 comments, stating among other things, that the Service recognized the need to address potential adverse cumulative impacts from oil and gas exploratory and development activities and that a proposed scientific peer review workshop and existing monitoring projects should provide baseline information from which to monitor cumulative effects.

Taking Incidental to Demolition at Mugu Lagoon by the U.S. Navy – On 29 June 2001 the National Marine Fisheries Service published a *Federal Register* notice announcing receipt of a request from the Department of the Navy seeking authorization to take small numbers of marine mammals by harassment incidental to the demolition and removal of about 12 buildings and associated infrastructure at the entrance of Mugu Lagoon, Point Mugu, California.

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, reviewed the application and provided comments to the Service on 30 July 2001. The Commission concurred with the Service's preliminary determination that the short-term impact of conducting the proposed activities would not cause more than the incidental harassment of small numbers of harbor seals, northern elephant seals, and California sea lions and would have a negligible impact on the affected stocks.

Taking Incidental to a Pile-Installation Demonstration Project at the San Francisco–Oakland Bay Bridge – On 7 January 2000 the National Marine Fisheries Service published a *Federal Register* notice announcing receipt of a request from the California Department of Transportation seeking authorization to take small numbers of Pacific harbor seals and California sea lions by harassment incidental to a pile-installation demonstration project at the San Francisco –Oakland Bay Bridge.

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, reviewed the application and provided comments to the Service on 15 February 2000. The Commission con-curred with the Service's preliminary determination that the planned project would not cause more than the incidental harassment of small numbers of seals and sea lions and would have a negligible impact on the affected stocks. The Commission also concurred that the monitoring program proposed by the Service was adequate to verify that only small numbers of marine mammals are taken, that the taking is by harassment only, and that the impacts on the affected species and stocks are negligible.

On 23 May 2000 the Service published a *Federal Register* notice advising that a one-year letter of authorization had been issued to the California Department of Transportation, as requested.

On 26 November 2001 the Service published a *Federal Register* notice announcing the receipt of a request from the California Department of Transportation for authorization to take small numbers of Pacific harbor seals, California sea lions, and possibly gray whales by harassment incidental to further work on the San Francisco–Oakland Bay Bridge.

The Commission, in consultation with its Committee of Scientific Advisors, reviewed the application and provided comments to the Service on 31 December 2001. The Commission concurred that the short-term impact on marine mammals was likely to be negligible and agreed that the authorization should be granted, provided that all reasonable measures are taken to ensure the least-practicable impact on the subject species and that the visual monitoring of the safety zone to be conducted before and during pile-driving operations is adequate to detect all marine mammals within the safety zone.

Taking Incidental to Strengthening the Richmond–San Rafael Bridge – In 1997 the California Department of Transportation received authorization from the National Marine Fisheries Service to take small numbers of Pacific harbor seals and California sea lions by harassment incidental to strengthening the Richmond–San Rafael Bridge in San Francisco Bay to better withstand earthquakes. The work was not completed in 1998 as originally expected, and on 9 November 1998 the Service received a request to renew the authorization. A notice of the request was published in the *Federal Register* on 16 February 1999. The Commission, in consultation with its Committee of Scientific Advisors, reviewed the request and provided

comments to the Service on 10 March 1999. In its letter, the Commission agreed that harassment of marine mammals incidental to the bridge work likely would have negligible impacts on the affected stocks and recommended that the authorization be issued.

On 14 January 2000 the Service published a *Federal Register* notice advising that a one-year letter of authorization had been issued to the California Department of Transportation as requested.

The Service published a notice in the *Federal Register* on 23 July 2001 announcing a request for a second renewal of the authorization. The Commission, in consultation with its Committee of Scientific Advisors, concurred with the Service's proposed issuance of such an authorization in a letter dated 22 August 2001. On 26 September 2001 the Service published a notification of issuance of authorization in the *Federal Register.*

Taking Incidental to Repair of Facilities at Carpinteria, California – On 12 September 2001 the National Marine Fisheries Service published a notice in the *Federal Register* of a proposed authorization for the incidental harassment of small numbers of Pacific harbor seals incidental to the repair of gas pipeline supports and pier pilings at the Carpinteria Oil and Gas Processing Facility in Carpinteria, California. On 10 December 2001 the Service published notice of issuance of the authorization in the *Federal Register.*

Taking Incidental to Exploratory Drilling Activities in the Beaufort Sea – On 11 October 2000 the National Marine Fisheries Service published a *Federal Register* notice announcing receipt of a request from Phillips Alaska, Inc., seeking authorization to take small numbers of marine mammals incidental to oil and gas exploratory drilling activities and ice road construction during the winter at McCovey Prospect offshore Prudhoe Bay, Alaska, in the Beaufort Sea. The Commission, in consultation with its Committee of Scientific Advisors, by letter of 7 December 2000 provided comments on the application and the Service's proposal to issue the authorization.

The Commission concurred with the Service's preliminary determination that the short-term impact of exploratory drilling and related activities would likely result in no more than a temporary modification of the behavior of ringed seals, and possibly a small number of bearded seals, provided that efforts to locate and avoid seals during construction activities are effective. The Commission supported the Service's proposal to condition the requested authorization to require the use of dogs to detect seal lairs in the vicinity of the planned activities, but opposed the suggestion that the Service accept monitoring by humans as an alternative in the event that trained dogs are not available. The Commission also concurred with the Service's proposal that all ice roads be surveyed to a distance of 150 m (492 ft) on each side of the disturbed ice and recommended that this be made a requirement of the authorization. The Commission further recommended that any authorization issued by the Service should specify that, if a mortality or serious injury of a seal occurs, operations are to be suspended while the Service determines whether steps can be taken to avoid further injuries or mortalities or whether an incidental- take authorization under section 101(a)(5)(A) is needed.

Although it believed the proposed activities likely would have a negligible impact on marine mammals, the Commission expressed concern that the project, in combination with other ongoing and planned activities in the Beaufort Sea, may have cumulative impacts that may not be negligible. The Commission therefore recommended that the Service consider ways, either through the monitoring programs established pursuant to incidental-take authorizations or otherwise, to determine whether oil and gas exploration, development, production, and related activities are having broader-scale effects on marine mammals that may not be detected by site-specific monitoring programs. In addition, the Commission noted that the Service was proposing that disruption of behavioral patterns that might occur must be of a significant nature to constitute Level B harassment. The Commission expressed concern that this interpretation did not accurately reflect the statutory definition of the Level B harassment.

On 7 February 2001 the Service published notice of the issuance of the authorization and commented on the Commission's recommendations in the *Federal Register.* Among other comments, the Service stated that it did not believe that simply hearing a noise from ice road construction (and not having a reaction) or having a minor startle reaction, such as looking toward the sound source (but no other behavioral response), to rise to a level that considers a disruption of a behavioral pattern constituting harassment.

Interactions with Marine Mammals in the Wild

Interacting with wild dolphins and other marine mammal species is becoming increasingly popular with the public, and there has been a widely recognized, but largely unquantified, increase in such interactions over the past several years in Florida, Hawaii, and other coastal areas in the United States. One indication of the public's growing interest in interacting with marine mammals in the wild is the increasing number of commercial tour operations that feature opportunities to swim with dolphins and other cetacean species in their natural habitat. These activities typically involve close approaches to observe, photograph, pose with, touch, swim with, or otherwise interact with the animals although feeding marine mammals constitutes a violation of the Marine Mammal Protection Act. In Florida waters, swimming with wild dolphins appears to be facilitated by efforts to attract the animals using food although feeding wild marine mammals is a violation of the Marine Mammal Protection Act..

Although such activities generally are not motivated by a desire to harm the animals, they can pose substantial risks to both the humans and the wild marine mammals involved. Risks to people include injury or death from being bitten, rammed, or otherwise attacked. Animals may be driven from preferred habitat; injured by people trying to touch or prod them; debilitated by inappropriate, contaminated, or spoiled food; or have their behavior changed in ways that encourage them to interact with humans and become pests. Even when no immediate injury results, marine mammals may become habituated to people and boats, and as a result be exposed to risks they might not otherwise face. Because such human interactions can disturb or injure wild marine mammals, they, in many instances, constitute harassment under the Marine Mammal Protection Act. In 1991 the National Marine Fisheries Service amended its regulatory definition of the term "take" to include feeding marine mammals in the wild. As such, feeding marine mammals in the wild is clearly a prohibited act. The Service subsequently developed guidelines for responsibly viewing marine mammals in the wild and initiated a nationwide public education and outreach campaign encouraging passive viewing of wildlife from a distance.

As discussed in previous annual reports, the Commission wrote to the National Marine Fisheries Service in December 1996, recommending that the Service advise both the public and tour operators that direct interactions with marine mammals that have the potential to disrupt the animals' behavioral patterns constitute harassment under the Marine Mammal Protection Act. The Commission noted that the regulatory definition of "take" includes feeding marine mammals in the wild and, as such, feeding bottlenose dolphins to attract them, or as part of a tour, clearly violates the Marine Mammal Protection Act. In response to the Commission's recommendations, the Service, in coordination with the Florida Marine Patrol, increased their enforcement efforts during 1997 and 1998. During 2000 the Service successfully prosecuted a Panama City, Florida, boat rental company and its boat operator for illegally feeding wild dolphins during a June 1998 excursion off Panama City's Shell Island.

In 1998 the Commission, in cooperation with the Service, contracted for a pilot study of interactions between humans and bottlenose dolphins near Panama City Beach, Florida. The objectives were to assess interactions between humans and wild bottlenose dolphins aimed at designing a more thorough study to evaluate how habitual in-water interactions with humans might be affecting the dolphins' behavior. To evaluate the possible effects of such interactions further, the Commission in late 1998 contracted for a literature review to compile information on human interactions with both marine and terrestrial animals in the wild. The results of the marine mammal review were published in April 2000 (see Samuels 2000, Appendix B) .

Based on the results of the literature review and the earlier pilot study, the Commission concluded that there is compelling evidence that any efforts to interact intentionally with dolphins in the wild are likely to result in at least Level B harassment and, in some cases, could result in the death or injury of people or marine mammals. Therefore, on 23 May 2000 the Commission wrote to the Service recommending that it promulgate regulations specifying that any activity intended to enable in-water interactions between humans and dolphins in the wild constitutes a taking and is prohibited. The Service responded on 1 Sep-tember 2000, indicating that it was considering amending the applicable regulations to address these types of interactions.

The status of interactive programs with wild marine mammals was reviewed during the Marine Mammal Commission's 2000 annual meeting. Based

on information presented at that meeting, the Commission wrote to the Service on 12 December 2000 recommending, among other things, that it move quickly to develop and adopt appropriate and enforceable regulations concerning interactions between people and wild marine mammals and offering to assist the Service in developing such regulations.

During 2001 the Service continued to engage in education and outreach efforts, including its "Protect Dolphins" campaign, press releases, media interviews, and cooperative projects with the Watchable Wildlife Program (a national consortium of government agencies and conservation organizations dedicated to responsible wildlife viewing). In July 2000 at the National Marine Fisheries Service's request, the Commission reviewed a draft policy developed by the Service to address inappropriate and potentially harmful interactions between the public and marine mammals in the wild. Specifically, the policy seeks to clarify that closely approaching, swimming with, touching, or attempting to elicit a response from wild marine mammals constitutes harassment as defined in the Marine Mammal Protection Act. In a 16 July 2001 letter to the Service, the Commission sought to confirm its understanding that the Service still intends to promulgate regulations to clarify that interactions between the public and wild marine mammals constitute a taking under the Marine Mammal Protection Act. The Commission noted, however, that, in the interim, the policy would provide the public with appropriate guidance based on the Service's interpretation of the statutory definition of harassment as it pertains to these activities. The Commission understands that the Service is intending to publish its policy in early 2002, in conjunction with seeking public comments on a proposed rulemaking to address human–marine mammal interactions.

Despite the Service's efforts, swimming and feeding activities in the southeastern United States have not abated and appear to be increasing. Further, over the past few years, swim programs focusing on spinner dolphins have become established in Hawaii. In contrast to the activities in Florida, however, these swim programs do not appear to involve feeding. Rather the tour operators take advantage of the dolphins' use of shallow coves and bays during the day to rest and care for their young. The Commission and others are concerned that disturbance of the animals may interfere with these important activities or cause the dolphins to abandon these sensitive habitats.

In its previous correspondence to the National Marine Fisheries Service and the Fish and Wildlife Service, the Commission has suggested that the Services initiate discussions to develop consistent guidelines for viewing all marine mammals in the wild. The Commission further suggested that the two agencies consider whether their enforcement officers or those from the Florida Division of Enforcement might be available to participate in cooperative efforts to enforce the laws applicable to the conservation of dolphins and other marine mammals in the southeastern United States.

Harassment of Manatees in Crystal River, Florida

As discussed in last year's annual report, the Commission wrote to the Fish and Wildlife Service on 1 December 2000 expressing concern about the increasing interactions between people and manatees in the Crystal River area and citing evidence that at least some manatees have altered their behavior to avoid human interference. The Commission noted that each year tens of thousands of divers are drawn to Kings Bay, at the head of the Crystal River, and to the Blue Waters area, at the mouth of the spring run at Homosassa Springs, by the opportunity to view wild manatees underwater, and that the number of divers using these two sites may well exceed 100,000 per year in the near future. The Commission noted that, despite the Service's efforts to address manatee conservation needs, reports of manatees being harassed have continued to increase, in part because of the lack of enforcement personnel has hindered enforcement in areas where divers and manatees interact. The Commission recommended that the Service assign at least one additional full-time enforcement officer to help address manatee harassment issues at the Crystal River National Wildlife Refuge and at any new sanctuary designated at Homosassa Springs.

In addition, the Commission recommended that the Service take steps to reduce manatee harassment by reviewing and updating educational materials prepared by the Service for distribution by dive tour operators. It noted that, although the Service's current educational materials promote passive observation of manatees, this message is undermined by conflicting advice that condones or even encourages divers to touch and pet

manatees if approached. The Commission expressed concern that existing materials may be promoting the harassment of manatees by establishing an expectation among divers that they will have an opportunity to touch and play with manatees. Moreover, the Commission noted that, by allowing direct human contact with manatees, the Service may be undermining its efforts to reduce other types of interactions that the Service is attempting to discourage because of the potential to harm manatees. The Commission specifically recommended that the Service adopt a policy to inform divers that, to prevent manatees from being conditioned to approach humans and boats, divers should back away from approaching manatees and avoid touching, petting, or scratching them and tailor its education materials to promote this policy. The Commission noted that such a policy would be consistent with the Watchable Wildlife guidelines developed cooperatively by environmental groups, the Fish and Wildlife Service, and the National Marine Fisheries Service to minimize the impacts of viewing on wildlife.

In its 7 November 2001 response to the Commission's recommendations, the Fish and Wildlife Service stated that a new officer had been added to the staff at Crystal River. The Service also noted that the Crystal River National Wildlife Refuge, in partnership with the Professional Association of Dive Instructors, the Friends of Chassahowitzka National Wildlife Refuge, and the National Conservation Training Center, plans to replace the educational video "used as the primary educational tool for visitors to the refuge as a condition of special use permits issued to local dive/tour operators." The Service noted that the wording of the video will be consistent with the revised Crystal River National Wildlife Refuge brochure, which advocates the passive observation of manatees, and will caution visitors against taking manatees by harassment. The Commission will follow up with the Service on this issue in 2002.

Chapter X

MARINE MAMMALS IN CAPTIVITY

Under the Marine Mammal Protection Act, permits to take marine mammals may be issued by the National Marine Fisheries Service or the Fish and Wildlife Service, depending on the species of marine mammal involved, for various 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. Amendments to the Marine Mammal Protection Act enacted in 1994 limited the authority of the National Marine Fisheries Service and the Fish and Wildlife Service over marine mammals once they are removed from the wild and placed in captivity. As a result, greater emphasis was placed on the role of the Animal and Plant Health Inspection Service of the Department of Agriculture in matters concerning the care and maintenance of captive marine mammals. The Animal and Plant Health Inspection Service has responsibility under the Animal Welfare Act for ensuring that facilities for maintaining marine mammals in captivity meet certain standards. Since its inception, the Marine Mammal Commission has worked with the Services to ensure the safety and well-being of marine mammals in captivity.

Care and Maintenance Standards

The Animal and Plant Health Inspection Service regulates the humane handling, housing, care, treatment, and transportation of marine mammals and other warm-blooded animals under the Animal Welfare Act. The Service originally adopted standards applicable to marine mammals in 1979 and incorporated amendments in 1984. Until amended in 2001 the standards had not been updated. As discussed below, however, key portions of the standards have yet to be revised.

In 1995 the Animal and Plant Health Inspection Service initiated a negotiated rulemaking to review and revise its marine mammal standards and guidelines. The Commission, the National Marine Fisheries Service, and the Fish and Wildlife Service participated as nonvoting observers on the negotiated rulemaking committee, which was composed of representatives of the public display and animal welfare communities and affiliated professional organizations in addition to the government agencies. In 1996 the committee developed consensus language for proposed amendments to existing sections of the regulations concerning feeding, sanitation, employees and attendants, transportation, veterinary care, general facility systems (such as water and power supplies and waste disposal), paragraph (a) of space requirements, and separation of animals. Consensus was not reached on the regulatory sections that address the most contentious and potentially costly issues, including special considerations regarding compliance and variances, indoor facilities (which includes provisions on ambient temperatures, ventilation, and lighting), outdoor facilities (which includes temperature and shelter requirements), space, and water quality. After considering the costs of additional negotiating sessions and the likelihood of the committee reaching consensus on the remaining issues, the Animal and Plant Health Inspection Service decided to hold no further negotiating meetings and to develop the remaining sections of the proposed rule using traditional rulemaking procedures.

Proposed regulations based on the consensus language were published in the *Federal Register* on 23 February 1999 and are summarized in previous annual reports. A final rule, which did not differ significantly from the proposed rule, was published on 3 January 2001. The Service continues to work on developing a proposed rule for the remaining sections of its marine mammal care and maintenance regulations and is expected to seek public input on this process during 2002.

Swim-with-the-Dolphin Regulations

As discussed in previous Commission reports, on 4 September 1998 the Animal and Plant Health Inspection Service published a final rule establishing standards for programs that allow members of the public to enter the water and interact with captive dolphins. Prior to enactment of the 1994 Marine Mammal Protection Act amendments, such programs had been regulated by the National Marine Fisheries Service. The rule, which became effective in October 1998, includes standards for the humane handling, care, and treatment of cetaceans used in swim programs. Among other things, the rule establishes requirements on the size of enclosures in which swim programs may be conducted and sets forth standards pertaining to veterinary care programs, personnel qualifications, the handling of animals, and record keeping.

In response to industry complaints that the rule was overly broad, the Service published a *Federal Register* notice on 14 October 1998 announcing that, until further notice, it would not apply certain provisions of the swim regulations to facilities offering only wading programs, but would examine matters pertaining to these types of programs separately. Wading programs are defined as programs in which human participants interact with dolphins by remaining stationary and nonbuoyant. On 2 April 1999 the Service published a notice in the *Federal Register* seeking public comment on the need to regulate wading programs. At the end of 2001 it was the Commission's understanding that the Service intended to publish proposed amendments to the current swim regulations in conjunction with its proposed revisions to the remaining portions of the marine mammal care and maintenance standards, possibly sometime in 2002.

Exports of Marine Mammals to Foreign Facilities

The Marine Mammal Protection Act, as amended in 1994, prohibits the export of marine mammals taken in violation of the Act or for any purpose other than public display, scientific research, or species enhancement. A foreign facility wishing to obtain marine mammals for public display must demonstrate to the appropriate regulatory agencies that it meets standards comparable with those applicable to United States facilities concerning (a) education or conservation programs and public accessibility under the Marine Mammal Protection Act and (b) care and maintenance of the marine mammals under the Animal Welfare Act. Because foreign facilities are not subject to licensing or registration 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 disagreement among the responsible agencies and the public display industry as to how comparability findings for foreign facilities are to be made and for what period the facility must remain comparable. The National Marine Fisheries Service and the Fish and Wildlife Service believe that their responsibilities under the Marine Mammal Protection Act, and those of the receiving facility, do not end once an animal has been exported. The Services therefore require the foreign government with jurisdiction over the facility to certify the accuracy of information submitted by the facility and to afford comity (i.e., agree to recognize and facilitate enforcement of Service actions concerning the animals) to actions the Services may take to enforce the provisions of the Act after animals have been exported. The public display industry believes that there is no continuing U.S. jurisdiction once an animal is exported (i.e., that the comparability requirements apply only at the time of export and that a comity statement is therefore not necessary).

As discussed in previous annual reports, the Commission has expressed the view to the responsible agencies that the most reliable way to ascertain whether a foreign facility meets the comparability requirements is for the Animal and Plant Health Inspection Service to conduct an on-site inspection, as is done for United States' facilities, except that such inspections would be conducted at the foreign facility's expense. The Commission has also noted that, in light of their responsibilities under section 104 of the Marine Mammal Protection Act, the National Marine Fisheries Service and the Fish and Wildlife Service have 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. The Commission recognized, however, that given existing funding, it is unrealistic to believe that the Services will be able to monitor compliance by foreign facilities adequately or to take all needed remedial actions if problems are detected. The Commission therefore has suggested that it might make sense to amend the Marine Mammal Protection Act to eliminate continuing jurisdiction over marine mammals after they are exported, but to strengthen the mechanisms for ensuring comparability before authorizing an export. In its response, the National Marine Fisheries Service provided strong support for requiring on-site inspections of foreign facilities and agreed that the issue might best be addressed through amendment of the Animal Welfare Act or the Marine Mammal Protection Act. Until this occurs, however, the Service noted that requiring a comity statement and a certification of accuracy from the foreign government, combined with a comparability recommendation from the Animal and Plant Health Inspection Service, remained reasonable requirements consistent with the export provisions of the Marine Mammal Protection Act.

Issues pertaining to exports of marine mammals have arisen in a variety of contexts. The Commission has included discussion of the issue in testimony presented to Congress with respect to reauthorization of the Marine Mammal Protection Act. It is also a central issue under review as part of the National Marine Fisheries Service's proposed amendments to its public display permit regulations. Lastly, the issue of exports has arisen in the course of reviewing certain permit applications. Each of these contexts is discussed below.

Congressional Consideration

In testimony before the House Subcommittee on Fisheries Conservation, Wildlife, and Oceans in June 1999, the Commission recommended two alternatives to improve the Marine Mammal Protection Act's marine mammal export provisions. Under the first alternative, as a trade-off to yielding jurisdiction over a marine mammal once it has been exported, the United States could strengthen the reliability of its comparability determination by requiring a physical inspection of the facility before approving an export. Under the second alternative, the United States would not look at the adequacy of individual facilities. Rather it would restrict exports of marine mammals to those countries that have demonstrated that they have in place a program for overseeing the welfare of captive marine mammals comparable with that established by the United States under the Animal Welfare Act (i.e., that the country has adopted minimum requirements for facility construction and other aspects of care and maintenance, that those requirements are enforced through periodic inspections, and that it has in place an effective means of preventing exports of marine mammals to facilities in other countries that do not meet certain minimum standards).

On 16 August 2000 the Secretary of Commerce and the Secretary of the Interior, in coordination with the Commission, transmitted to Congress several recommended amendments to the export provisions of the Marine Mammal Protection Act, including a technical amendment to clarify that exports pursuant to a public display permit are authorized only if the requirements of section 104(c)(9) of the Act have been met (i.e., that the receiving facility meets standards that are comparable with those for domestic facilities). Provisions pertaining to comity statements, certification of foreign husbandry programs, or inspections of foreign facilities were not included in the proposed legislation. However, no action on the proposed amendments to the Marine Mammal Protection Act was taken during 2000 or 2001. As discussed in Chapter II, a new proposed bill is undergoing review within the administration, which may also address the issue of exports.

National Marine Fisheries Service Regulations

On 3 July 2001 the National Marine Fisheries Service published a proposed rule to implement the 1994 amendments to the Marine Mammal Protection Act concerning marine mammals maintained in captivity for purposes of public display. The Service proposed to amend its regulations to clarify the requirements relating to public display permits and indicated its intention to address the transfer and export of marine mammals for such purposes. As of the end of 2001 the Commission had yet to comment on the proposed rule. The Commission expects to provide comments soon that, among other things, will review the Act's provisions as they pertain to the exporting of marine mammals for purposes of public display.

Application for Export Authorization

The Commission identified another issue regarding exports in a 13 July 2001 letter to the Fish and Wildlife Service, concerning a request from two Japanese public display facilities seeking authorization to capture and export sea otters from Alaska. The Commission noted that, although it had not raised the issue during the review of six similar permit applications seeking authorization to collect and export sea otters since 1994, based on a recent review of the Marine Mammal Protection Act's export provisions conducted by the Commission, the Fish and Wildlife Service, and the National Marine Fisheries Service in anticipation of the Act's reauthorization, the Commission no longer believes that the Act authorizes the issuance of such permits. Specifically, the Commission noted that section 101(a) of the Act, which sets forth the exceptions to the Act's moratorium, specifies that permits may be issued to authorize the taking and importation of marine mammals, but does not mention export permits. Similarly, section 104, the Act's permitting provision, authorizes the Services to issue permits that allow the taking and importation of marine mammals, but does not include a similar authority for issuing export permits. Although the Commission's interpretation of the applicable statutory provisions would preclude issuance of a *permit* to take and export marine mammals directly to a foreign facility, exports of marine mammals for purposes of public display are allowed in other situations (e.g., the transfer of a captive animal being maintained at a domestic facility is allowed if the foreign facility meets requirements comparable to those applicable to U.S. facilities).

As a related matter, the Commission further noted that only a facility that is registered or holds a license under the applicable provisions of the Animal Welfare Act (7 U.S.C. § 2131 et seq.) can obtain a permit to take (e.g., collect from the wild) marine mammals for purposes of public display under section 104(c)(2)(A) of the Marine Mammal Protection Act. However, inasmuch as the Animal Welfare Act applies only to domestic facilities and the licensing and registration provisions of that Act pertain exclusively to such facilities, it follows that a foreign facility cannot meet the requirements for obtaining a permit to take marine mammals for purposes of public display. The Commission noted that, although it could be argued that the licensing or registration requirement applies only to domestic facilities and that a foreign facility qualifies for a taking permit if it demonstrates comparability with the Animal Welfare Act standards, the Commission believes that such an interpretation is at odds with the clear language of the Marine Mammal Protection Act and without any support in the legislative history of the 1994 amendments.

In light of these concerns, the Commission recommended that the Service work with the appropriate congressional committees to identify and correct any unintended consequences of the 1994 amendments that resulted from the addition of the prohibition on exporting marine mammals. In the meantime, however, the Commission believed that the Service was constrained by the existing statutory language and recommended that the permit be denied.

Release of Captive Marine Mammals to the Wild

As discussed in the Commission's previous annual reports, there has been considerable debate over the appropriateness of returning long-term captive marine mammals to the wild. Among other things, it is questionable whether such releases are in the best interests of the animals, the procedures for preparing animals for release are still experimental, and such releases could incidentally introduce diseases into wild populations. It is generally thought that release of long-term captive animals should be pursued only with adequate monitoring and in accordance with an appropriate research protocol, pursuant to a scientific research permit.

In the mid-1990s the Commission wrote to the National Marine Fisheries Service recommending that the Service refrain from considering any permit application seeking authority to release marine mammals to the wild until (1) objective, generally accepted criteria had been developed for judging when release is appropriate; (2) it has published an unequivocal policy statement or, if necessary, regulations specifying that the release of captive marine mammals to the wild without proper authorization has the potential to injure marine mammals and is considered an illegal taking; and (3) if current authority is lacking, the Marine

Mammal Protection Act is amended to provide clear authority to prevent unauthorized releases. Following the unauthorized release of two bottlenose dolphins from a Florida facility, the Commission wrote to the Animal and Plant Health Inspection Service in 1996 recommending that the Service work with the National Marine Fisheries Service and the Fish and Wildlife Service to review their respective authorities for preventing unauthorized releases of captive marine mammals and consider the need for more decisive enforcement of existing statutory provisions and regulations, issuance of policy statements, and regulatory amendments. The Commission recommended that, if the agencies determined that they do not have sufficient authority to prevent unauthorized releases, they seek such authority through statutory amendment.

In June 1999 the Commission recommended to the Subcommittee on Fisheries Conservation, Wildlife, and Oceans that the provisions of the Marine Mammal Protection Act be strengthened to explicitly prohibit the release of captive marine mammals, other than those being maintained under the stranding and rehabilitation program, without specific authorization. On 16 August 2000 the Secretary of Commerce and the Secretary of the Interior, in coordination with the Commission, recommended to Congress that the Marine Mammal Protection Act be amended to prohibit the release of captive marine mammals to the wild, unless authorized by a permit under section 104 or under section 109(h) of the Act, which pertains to the release of rehabilitated stranded marine mammals. The Commission reiterated this position in testimony before the Subcommittee on Fisheries Conservation, Wildlife, and Oceans at an 11 October 2001 hearing regarding implementation of the 1994 amendments to the Marine Mammal Protection Act.

Reintroduction of "Keiko" to the Wild

A long-term captive marine mammal currently being considered for release to the wild is Keiko, the killer whale featured in the movie *Free Willy*. Keiko, captured off Iceland in 1979 at the age of two, lived in an Icelandic aquarium for three years before being moved to a facility in Ontario, Canada. In 1985 the animal was sold to a facility in Mexico City. After nearly 20 years in captivity, the animal was moved to the Oregon Coast Aquarium in 1996, where the Free Willy/Keiko Foundation undertook a program to improve his health. In September 1998, Keiko was returned to Iceland for further rehabilitation and, if possible, eventual release to the wild. Since then, Keiko has been maintained in a bay near Vestmannaeyjar off Iceland's south coast.

As discussed in previous annual reports, the National Marine Fisheries Service advised the Free Willy/Keiko Foundation that, if Keiko was to be released to the wild, the approach taken would need to be comparable with what would be required to obtain a scientific research permit under the Marine Mammal Protection Act, including the development of a sound scientific research protocol. In 1998 the Ocean Futures Society, the successor to the Foundation, advised the Service that it would obtain full scientific peer review of a reintroduction protocol, similar to what would be required to obtain a scientific research permit in the United States. In the interim, the Society chose to maintain Keiko in captivity under the authority of a public display permit.

In late May 2000 the Society provided a reintroduction protocol to the Animal Welfare Board of Iceland, the National Marine Fisheries Service, the Marine Mammal Commission, and the Animal and Plant Health Inspection Service, as well as to several other experts. A permit authorizing Keiko's release was issued by Iceland on 9 June 2000 prior to receipt of reviewers' comments. A number of reviewers subsequently provided substantive comments on the protocol. The Commission's comments, provided to the Society by letter of 19 June 2000, are discussed in detail in the Commission's 2000 annual report. In July 2000 Ocean Futures provided the Commission with an addendum to the original reintroduction protocol. The addendum set forth revisions based on reviewers' comments and on Ocean Futures' experience with the reintroduction program to that date. On 22 December 2000 Ocean Futures advised the National Marine Fisheries Service that it had ceased reintroduction activities for 2000 due to the onset of fall and winter weather conditions and would reinitiate efforts in the spring of 2001.

Based on the 2000 reintroduction effort, Ocean Futures subsequently amended the protocol on two occasions in 2001. One amendment reflected the additional input of outside reviewers and Ocean Futures

staff; the other amendment reflected changes in the operational plans for the 2001 effort. In its 11 July 2001 comments on the amendments, the Commission stated its belief that all steps of the reintroduction effort should be documented so that others who may contemplate releasing long-term captive marine mammals in the future may receive the full value of Ocean Futures' experience. The Commission also urged that health screening of Keiko be continued to ensure that his health remains stable and recommended that the results of the screening tests be made available to reviewers. In its comments, the Commission recommended that estimated time frames and definitions of terms be included in the amended protocol; that monitoring of Keiko continue for at least several weeks after he appears to be integrated into a group of wild killer whales; and that Ocean Futures ensure that, at a minimum, visual monitoring efforts continue for at least three months post-reintroduction.

At the end of 2001, based on the results of the 2001 reintroduction effort, Ocean Futures concluded that the reintroduction program may take considerably longer than initially envisioned. As a result, it announced that it was looking for an alternative, less expensive, and more accessible site in Iceland at which to maintain Keiko.

Polar Bear Traveling Exhibit, Suarez Brothers Circus

By letter of 24 April 2001 the Marine Mammal Commission provided comments to the Fish and Wildlife Service concerning an application from Circo Hermanos Suarez (Suarez Brothers Circus) to import seven captive polar bears from Jamaica to Puerto Rico for purposes of public display as part of a traveling exhibit. In commenting on the application, the Commission raised several questions about the applicant's arrangements for transport and maintenance of the animals, and apparent discrepancies and inaccuracies in the inventory and CITES documentation provided with the application. The Commission also expressed concern about the appropriateness of maintaining polar bears in an outdoor facility in a tropical climate. The Commission recommended that, before issuing a permit to the circus, the Fish and Wildlife Service, in consultation with the Animal and Plant Health Inspection Service, obtain additional information concerning the adequacy of the facility and its animal care program, and, if necessary, reinspect the facility to ensure that the applicant's arrangements for the transport, care, and maintenance of the animals to be imported fully meet the applicable requirements and provide for the health and well-being of the bears. The Commission also recommended that the Animal and Plant Health Inspection Service, in consultation with independent veterinarians experienced in captive marine mammal care and maintenance, review the appropriateness of maintaining polar marine mammals in outdoor tropical environments and, if appropriate based on the results of that review, revise its standards accordingly.

The Service issued the permit on 3 May 2001, and the bears were subsequently imported into Puerto Rico in late May 2001. In an 8 May 2001 letter responding to the Commission's comments, the Service noted that it had been advised by the Animal and Plant Health Inspection Service that the applicant met all requirements for licensing under the Animal Welfare Act and had the "experience and capabilities to adequately care [for] and maintain these animals." With respect to CITES documentation, the Service indicated that it shared the Commission's concerns regarding the apparent inconsistencies and had communicated that concern to the applicant. The Service further explained that it had informed the applicant of its responsibility to ensure that the re-export documents corresponded to the correct original CITES documents.

Upon the arrival of the circus in Puerto Rico, inspections conducted by the Animal and Plant Health Inspection Service revealed several areas of noncompliance with applicable Animal Welfare Act regulations. Among other things, Animal and Plant Health Inspection Service reports indicated that the bears were provided only limited access to pools of water; water quality of the pools was apparently not being monitored; water temperature in the pools exceeded 80 degrees; mechanical ventilation or cooling was lacking or unused; the structural strength of the bears' primary enclosures was inadequate; and the animals, one of which had a fungal-like skin condition, had not been examined by the local attending veterinarian.

By letter of 29 June 2001 the Commission wrote to the Fish and Wildlife Service recommending that the

Fish and Wildlife Service obtain a written report from the Animal and Plant Health Inspection Service addressing the questions concerning facility adequacy and animal care raised in the Commission's 24 April 2001 letter. The Commission also requested an update on the steps taken by the Service and the circus to resolve the discrepancies identified in the inventory and CITES documentation. The Commission noted that, absent such information, it was unclear how the Fish and Wildlife Service determined that all requirements of the Marine Mammal Protection Act concerning the importation of the animals had been met. Further, the Commission requested that the Service advise it of whether it had consulted with the Animal and Plant Health Inspection Service regarding the Commission's recommendation that the Services review the appropriateness of maintaining polar marine mammals in outdoor tropical environments.

On 13 July 2001 the Commission wrote to the Animal and Plant Health Inspection Service requesting that the Service advise the Commission of the measures that it had taken to monitor the circus' polar bear facility and to ensure that it was in compliance with applicable standards. The Commission recommended, among other things, that the Service (1) conduct ongoing, unannounced inspections of the facilities throughout the circus' stay in Puerto Rico; (2) conduct a thorough review of the animals' medical records to evaluate the standard of care being provided to the animals; and (3) adopt procedures that enable the Service's inspectors to make a more concerted effort to determine that a facility is in full compliance with Animal Welfare Act regulations before authorizing importation.

The Animal and Plant Health Inspection Service responded to the Commission's 13 July 2001 letter on 20 July 2001. The Service stated, among other things, that it was making continuing efforts to ensure that the circus satisfactorily addressed the problem areas so as to bring the facility into compliance and that an inspection conducted in late June had found the facility to be in compliance. The Service agreed that a review of the appropriateness of maintaining polar marine mam-mals in outdoor tropical environments would be worthwhile, but maintained that it is beyond the scope of the Animal Welfare Act to prohibit such a practice. The Service noted that, although it was acutely aware of the additional challenges presented by traveling exhibits, it has no documented evidence that polar bears cannot be kept and handled humanely in warm environments, or that their health and well-being is adversely impacted at southern U.S. facilities.

In late August 2001 the Commission was informed of an inspection of the facility conducted by the Puerto Rico Department of Natural Resources on 14 August 2001. That inspection showed that, upon their arrival in Ponce from San Juan, the bears were maintained in the transport vehicle for 24 hours "in most poor conditions, at high temperatures." A videotape taken by the Puerto Rican authorities during the inspection showed the bears constantly swaying and panting, suggesting that they were distressed. It appeared that neither the air conditioning system nor the fans were operating at the time and that the temperatures far exceeded those generally believed to be appropriate for polar bears. The tape further suggested that the bears were being maintained in filthy conditions. Puerto Rican officials subsequently filed charges against the circus for two violations of Puerto Rico's animal protection laws. The matter had yet to be resolved as of the end of 2001.

The report from an inspection conducted in Mayaguez by the Animal and Plant Health Inspection Service on 27 and 28 August 2001 revealed that "the polar bears were in the transport vehicle for a total of approximately 55 hours at a temperature of between at least 79°F [26°C] and 87.5°F [30.8°C] during the daytime hours" without benefit of air conditioning or fans. The water temperature in the transport vehicle pools was recorded as being 84.5°F (20.2°C).

In mid-September, according to information provided to the Commission by the Puerto Rico Humane Society, an inspection by the Puerto Rico Department of Natural Resources of the circus at its Aguadilla location revealed that the bears had been maintained in the transport enclosures without the benefit of pools of water, air conditioning, or fans for a period of more than 22 hours.

By letters of 4 October 2001 the Commission wrote to the Animal and Plant Health Inspection Service and the Fish and Wildlife Service noting that, based on the Animal and Plant Health Inspection

Service's inspection reports, the circus had repeatedly been in and out of compliance with Animal Welfare Act standards since its arrival in Puerto Rico. The Commission further noted that information provided by the People for the Ethical Treatment of Animals (PETA) appeared to show additional compliance problems not identified in the Service's inspection reports. The Commission observed that, to the extent that the facility has been in compliance, this seems to have been possible only because of exemptions from otherwise applicable requirements pertaining to the design of the transport vehicle/enclosure and the separation of the bears. In particular, the Commission expressed concern about the Service's determination that the bears could be maintained in the transport vehicle without access to pools of water and air conditioning, provided that access is given during the period between 8 a.m. and 5 p.m. Monday through Saturday, and 7:30 a.m. to 1:00 p.m. on Sunday. The Commission noted that such a schedule would result in the bears being maintained without access to air conditioning and pools of water for more than 65 percent of the time, including the late afternoons on Monday through Saturday, when air temperatures can exceed the low to mid-80s, and during almost the entire afternoon on Sundays, when temperatures can exceed 100°F (37.8°C). In addition, the Commission expressed con-cern that the bears may not be receiving adequate medical attention and recommended that they be examined by an independent, experienced marine mammal veterinarian to determine whether they are receiving appropriate medical care. The Commission requested that it be provided with a report of the Service's findings, along with copies of the animals' medical records.

The Commission noted that a videotape taken by People for the Ethical Treatment of Animals of three performances by the bears in San Juan in July 2001 showed trainers striking and prodding the bears to compel them to perform various behaviors, and that independent experts from public display facilities who reviewed the tape were concerned that the methods used could cause permanent injury to the animals. The Commission questioned whether the use of such training methods was consistent with section 3.108 of the Service's regulations, which sets forth qualifications for trainers and other facility employees and which, prior to revision of the regulations in 2001, had specifically prohibited the use of training methods that included "physical punishment or abuse being used or inflicted upon the marine mammals." The Commission noted that other provisions of the applicable regulations (e.g., section 2.131, which addresses the handling of all animals covered under the Animal Welfare Act and which prohibits physical abuse in the training or handling of animals) might adequately address the methods being used by the circus and sought clarification from the Service. Further in this regard, the Commission recommended that, if the Service determines that the use of physical punishment or abuse as training techniques is not prohibited under existing regulations, a specific provision banning such practices be incorporated into the regulations as quickly as possible.

The Commission stated that, based on its review of the available information and the maintenance history it demonstrates, it was concerned as to whether the Suarez Brothers Circus was currently, and has consistently been, in compliance with the Animal and Plant Health Inspection Service's regulations for the humane handling, care, treatment, and transportation of marine mammals. The Commission recommended that the Animal and Plant Health Inspection Service, in consultation with the Fish and Wildlife Service, undertake an immediate review of the facility involving appropriately qualified individuals from the two agencies, the Marine Mammal Commission, and independent outside experts to ascertain whether the permittee is meeting all of its obligations under the Marine Mammal Protection Act, the Animal Welfare Act, applicable regulations, and the terms and conditions of the permit. The Commission also recommended that, should such an inspection reveal a pattern of substandard care and maintenance or deficiencies that cannot be, or that are not, readily remedied, the Fish and Wildlife Service consult with the Animal and Plant Health Inspection Service pursuant to section 104(c) (2)(D) of the Marine Mammal Protection Act and take action to revoke the permit and seize the polar bears. In addition, the Commission again recommended to both the Animal and Plant Health Inspection Service and the Fish and Wildlife Service that they, in consultation with independent veterinarians experienced in captive

marine mammal care and maintenance, review the appropriateness of maintaining polar marine mammals in outdoor tropical environments and the need for more explicit regulations detailing the conditions, if any, under which such exhibits should be allowed. As appropriate, based on the results of that review, the Commission further recommended that the Animal and Plant Health Inspection Service promptly take steps to revise its standards accordingly.

On 1 November 2001 the Fish and Wildlife Service replied to the Commission's 4 October 2001 letter, indicating that it had been informed by the Animal and Plant Health Inspection Service that, although the Suarez Brothers Circus had been "cited on occasion for noncompliance, the problems identified have been promptly corrected." The Service stated that it would continue to monitor the information received from the Animal and Plant Health Inspection Service regarding the circus' compliance with the requirements of the Animal Welfare Act. The Service also stated that it would continue to monitor the outcome of legal proceedings brought against the circus in Puerto Rico and would assess its bearing on the import permit issued to the circus. The Service further noted that it had opened an investigation concerning the origin and identity of one of the circus' bears and, if it appeared that violations of federal wildlife laws had occurred, would refer the case for review and possible prosecution. The Service indicated that it had advised the circus of its responsibility to provide an educational message in connection with the exhibition of the bears. The Service also stated that, based on the information available, it did not recommend revocation of the permit. If such action were warranted in the future, it would need to provide the permittee the opportunity for a hearing with respect to a proposed revocation. The Service's letter did not respond to the points raised in the Commission's 29 July 2001 letter, concerning the discrepancies with respect to the identities of the bears and the CITES documentation. As of the end of 2001 the Service's response to these issues was still pending.

The Animal and Plant Health Inspection Service responded to the Commission's 4 October 2001 letter on 6 November 2001. It stated that authority to confiscate animals is limited to licensees that refuse or fail to provide proper care for animals that are found to be suffering; the circus had been inspected 11 times since entering Puerto Rico; although several problems had been documented, signs of animal suffering that would prompt confiscation of the animals had not been observed; the circus had corrected problems noted by Animal and Plant Health Inspection Service inspectors; it was "investigating the noncompliant items that were identified on repeated inspections in the last three months"; and, due to its ongoing investigation of the facility, it would be inappropriate to convene a review panel to inspect the facility. The Service also stated that, based on discussions with experienced polar bear caretakers and veterinarians, it did not believe that housing polar bears in tropical and subtropical climates is inherently inhumane, provided the animals were acclimated to such climates and provided cool water and adequate ventilation to prevent overheating. In this regard, the Service noted that, although the bears were housed for much of the time in a vehicle without air conditioning, its side panels could be lifted to allow what the Service considers to be proper ventilation. The Service therefore concluded that "the bears would do well without access to the pools overnight as long as they had adequate ventilation and fresh drinking water." The Service also indicated that, inasmuch as the bears had been acclimated to subtropical climates for some time, it believed the circus was in compliance with section 3.103(a) of its regulations, which requires that "[m]arine mammals...not be housed in outdoor facilities unless the air and water temperature ranges which they may encounter...do not adversely affect their health and comfort."

The Service declined to provide the Commission with copies of the bears' medical records on grounds that, although such records are required to be available for inspection, they generally are not submitted to the Service. It also indicated that it could not compel the circus to provide the records to outside parties.

The Commission was preparing follow-up letters to the Fish and Wildlife Service and the Animal and Plant Health Inspection Service at the end of 2001.

APPENDIX A

MARINE MAMMAL COMMISSION RECOMMENDATIONS IN 2001

3 January — Commerce, scientific research permit, Daniel P. Costa.

3 January — Commerce, public display permit, Sea World, Inc.

5 January — Commerce, scientific research permit, Lizabeth Bowen.

8 January — Commerce, commenting to the National Oceanic and Atmospheric Administration on Reserve Preservation Areas and conservation measures for the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve; recommending that special protection measures to be given to preservation areas be adopted permanently, except for those pertaining to bottomfishing, which the Commission recommends be given further consideration; in particular recommending that all banks between French Frigate Shoals and Gardner Pinnacles be designated as preservation areas because these banks provide essential foraging grounds for the Hawaiian monk seal colony of French Frigate Shoals; strongly supporting the prohibition of oil and gas development and other activities that alter the seabed and habitat of the area; concurring with the National Oceanic and Atmospheric Administration that annual aggregate fishery caps not exceed those permitted in 1999; and encouraging the Department of Commerce to work with the State of Hawaii and the Department of the Interior to develop a comprehensive management plan for the Northwestern Hawaiian Islands.

16 January — Interior, amendment of scientific research permit, U.S. Geological Survey.

26 January — Commerce, commenting to the National Marine Fisheries Service on (1) a request from the U.S. Navy for authorization to take small numbers of marine mammals incidental to shock testing the USS *Winston Churchill*, and (2) the Service s proposed regulations to authorize and govern such taking; agreeing with the Navy and the Service that the mitigation program would minimize injury and mortality of marine mammals incidental to shock testing and that the anticipated disruption of behavior is unlikely to have biologically significant effects; pointing out that the reasoning on conclusions drawn by the Navy in their draft environmental impact statement concerning temporary threshold shift appears flawed and inconsistent with the statutory definition of the term "harassment"; pointing out that the rationale for using a 50 percent probability of eardrum rupture as a criterion for nonlethal injury to marine mammals is not clear; and suggesting that the Service advise the Navy that, notwithstanding the issuance of a Letter of Authorization, there is a possibility that conducting the shock tests as planned might constitute a violation of the Marine Mammal Protection Act because the permit does not cover all potential marine mammal species that might be taken in the area.

31 January — Defense and State, commenting to the Defense Undersecretary for Policy and the State Deputy Assistant Secretary for Oceans, Fisheries, and Space on the relocation of the U.S. Marine Corps Futenma Air Base; expressing concern that the proposed relocation might be detrimental to the small, genetically isolated population of dugongs of the Ryukyu Archipelago and their habitat; asking whether Japanese officials have committed to preparing an environmental impact statement; requesting information on the role the United States would play in drafting such a statement, and the criteria and policy to be used in the drafting process; pointing out that U.S. environmental laws will require the preparation of an environmental impact statement regardless of whether or not Japanese officials prepare one; and recommending that the State Department facilitate a cooperative approach with Japanese officials to look at long-term issues such as the effects of noise, increased traffic, and other issues.

2 February — Commerce, amendment of scientific research permit, Alaska Fisheries Science Center.

5 February Interior, commenting to the Fish and Wildlife Service on a draft recovery plan for the Florida manatee; recommending that the draft plan be revised to include the recovery criteria developed by the population status working group and that references to recovery goals be changed to emphasize recovery; recommending that reference to any specific target population size be removed from the draft plan and that delisting or downlisting not be discussed until habitat-related criteria are scientifically developed, justified, and assessed for each of the four manatee subpopulation regions; recommending that the importance of research be reflected in the priorities and that the priorities in the implementation schedule be given further consideration; suggesting that the Service utilize a professional editor, preferably with a strong background in biology, to improve the readability of the draft plan; recommending that sections be added establishing a regulatory system regarding swimming with or feeding manatees, modified to include sublethal injuries and stress caused by boating activities, added to give combined, cumulative, and synergistic effects on manatee immune systems, added to give maps, and modified to give a corrected explanation of the maximum net productivity; and recommending that the draft plan be peer-reviewed by independent scientists.

7 February Commerce, commenting to the National Marine Fisheries Service on its proposed regulations to authorize and govern incidental take of marine mammals during operations of the North Pacific Acoustic Laboratory's Acoustic Thermometry for Ocean Climate (ATOC) project for the next five years; agreeing with the Service that continued operation of the ATOC is unlikely to have immediate, biologically significant effects on marine mammals; expressing concern that the available data are insufficient to conclude that there will be no long-term effects on the distribution, size or productivity of marine mammals affected; recommending that the Service (1) consult with qualified scientists to develop baseline information and monitoring techniques that would be required to detect long-term population effects, and (2) include a detailed description of the required monitoring program if the authorization is issued; noting that the Service should more clearly explain the basis for the belief that sperm whale distribution may have been affected by ATOC in previous years; recommending that the Service consult with qualified researchers to obtain more realistic estimates of the numbers of various species that could be exposed to received sound levels between 120 and 180 dB during ATOC operations; recommending that the Service correct all misinterpretations of the current definition of Level B harassment throughout the document; and recommending that the Service should not authorize use of the acoustic source in the Midway Islands area until further information is available.

9 February Commerce, authorization to continue scientific research, Mark and Deborah Ferrari and Joseph R. Mobley Jr.

16 February Commerce, amendment of scientific research permit, Robin W. Baird.

16 February Commerce, commenting to the National Marine Fisheries Service on the draft environmental impact statement for whaling by the Makah Tribe; requesting the Service to provide a more detailed accounting of the legal analysis of the 1855 Treaty of Neah Bay as it relates to legislation such as the Marine Mammal Protection Act and to other treaties; suggesting that sections dealing with potential biological removal (PBR) levels be revised to more accurately reflect the PBR concept; recommending that methods for handling and storage of samples be reviewed before data collected from such research are used to show differences in measured lipid levels; suggesting that a more balanced discussion of the effects of a proposed saltworks in San Ignacio Lagoon is needed; recommending that the latest information on stranding episodes needs to be included in the final report; recommending that questions related to struck and loss issues be resolved; and suggesting that it is not clear that a harvest of 15 to 20 whales over a five-year period would not exceed PBR if other factors of mortality are taken into account.

2 March Commerce, scientific research permit, Texas A&M University.

15 March Commerce, scientific research permit, Geo-Marine, Inc.

15 March Commerce, scientific research permit, National Marine Mammal Laboratory.

15 March Interior, scientific research permit, Marine Mammals Management Division.

28 March Interior, scientific research permit, Iskande Larkin.

10 April Interior, commenting to the Fish and Wildlife Service on polar bear sport hunting in M'Clintock Channel; agreeing with the Service that Canada's management plan for this population does not meet import requirements under U.S. statutory criteria; and recommending that the interim rule to that effect be adopted permanently.

16 April Florida Fish and Wildlife Conservation Commission, commenting on a report on the status and trends of the Florida manatee; suggesting that the report undergo scientific peer review before its recommendations are used for management of the species.

18 April Commerce, scientific research permit, Thomas Norris.

23 April Interior, scientific research permit, World Wildlife Heritage Foundation Museum.

24 April Interior, commenting to the Fish and Wildlife Service on a request by Circo Hermanos Suarez for a permit to import seven captive polar bears for public display; recommending that the Animal and Plant Health Inspection Service (APHIS) reinspect the facility in which the animals are to be transported, maintained, and cared for to ensure compliance with regulations; expressing concern that numerous questions remain unanswered by the applicant about the standards of transportation, facilities and operations, animal health and husbandry, attending veterinarian and veterinary care, and licensing, and detailing those questions individually; recommending that the Service defer the issuance of a permit until such questions are satisfactorily answered; noting that the Commission views the outdoor maintenance of polar animals in a tropical environment to be potentially injurious to the animals; and asking APHIS to review the appropriateness of its standards for such outdoor maintenance.

4 May Commerce, scientific research permit, The Whale Center of New England.

8 May Commerce, permit to transfer animals, U.S. Navy.

14 May Commerce, modification and renewal of letter of authorization, U.S. Air Force.

16 May Interior, public display permit, Baltimore Zoo.

16 May Interior, commenting to the Fish and Wildlife Service on measures to conserve Florida manatees; agreeing that in many situations increased law enforcement may be the best way to protect manatees and their habitat in the development of new watercraft facilities; stating our belief that restrictions on the type and number of facilities may be warranted in some areas; recommending that the Service provide guidance on measures other than enforcement that developers could incorporate into their proposals; further recommending that an additional risk category be added to list areas where manatees are most at risk, and that the list of counties be expanded to include coastal counties in southeastern Georgia; and recommending that the Service review its methodology for estimating the amount of enforcement required to protect manatees.

21 May Commerce, scientific research permit, Whitlow Au.

23 May Commerce, permit to transport, Mystic Aquarium.

23 May Commerce, commenting to the National Marine Fisheries Service on a request by the U.S. Navy for authorization to take by harassment small numbers of northern elephant seals, harbor seals, northern fur seals, and California sea lions in conjunction with the launching of subsonic target missiles from San Nicholas Island; concurring with the Service that small numbers are likely to be taken by harassment and that such take is likely to be negligible; disagreeing with the Service's attempt to redefine Level B harassment to include only "biologically significant" disturbance; recommending that (1) the applicant be required to suspend operations if a serious injury or mortality of a seal or sea lion appears to be related to the launch activities and (2) the applicant's monitoring program be sufficient to detect the effects of the launch on the entire haul-out area before the authorization is issued; recommending that the Service consult with the Navy on the appropriateness of a five-year, rather than a one-year, authorization request;

and recommending that the Navy seek and obtain an authorization covering the population of sea otter, also present at the island.

4 June — Interior, scientific research permit, Fish and Wildlife Service, Alaska.

4 June — Commerce, authorization to continue scientific research, William G. Gilmartin.

4 June — Interior, scientific research permit, Mark Clementz.

5 June — Commerce, commenting to the National Marine Fisheries Service on a request for authorization by the U.S. Navy to take small numbers of marine mammals incidental to the operation of the Surveillance Towed Array Sensor System (SURTASS) Low Frequency Active Sonar; recommending that the species assemblages, their characteristics and the physical characteristics of each region affected be detailed; expressing concern about the impact of SURTASS in conjunction with other human-related factors that may be detrimental to marine mammals in the area; recommending that the definition of "small numbers" be revised; further recommending that the number of animals taken in the five-year period be estimated and that final regulations should explain the rationale for all assumptions and conclusions concerning the effect on the population; agreeing that certain identified areas should be subject to heightened protection; recommending that the regulations be revised to show relative burdens of proof concerning the impact of take; recommending that all data be examined concerning offshore areas possibly meriting designation for protection; recommending that a research plan on the biological effects of SURTASS be required before authorization is given and progress on the research be reviewed before the authorization is renewed; recommending (1) that minimum performance standards for detecting marine mammals within the 180 dB safety zone be developed, and (2) that the Navy test and demonstrate the system before authorization; recommending justification for the proposed reporting schedule or that data be made available more quickly; and further recommending that the long-term monitoring and research strategy be incorporated as part of the proposal.

11 June — Interior, scientific research permit, U.S. Geological Survey.

15 June — Commerce, commenting to the National Marine Fisheries Service on a draft plan for western north Atlantic bottlenose dolphins; suggesting that the highest priority be given to developing an implementation plan and hiring a program coordinator; noting that the stock is composed of two basic elements, one resident and one migratory; suggesting that task descriptions in the plan be reviewed; and suggesting that the plan be expanded, or a separate plan developed, for the bottlenose dolphins in the northern Gulf of Mexico.

18 June — Commerce, commenting to the National Marine Fisheries Service on final regulations governing vessel approaches to humpback whales in Alaska waters; recommending the regulations be revised to set specific speed limits within explicit distances from the animals; requesting, if the Service declines to set limits, that it provide the Commission with a detailed explanation regarding the problems with clutch-in speed and a list of the type of vessels likely to have clutch-in speeds of greater than 10 knots; requesting further information on why mariners would have difficulty in understanding and accepting a specific speed limit; noting the differences between "slow, safe speed" as used by the Coast Guard and the Service; and requesting a definition of the term "near a whale."

19 June — Commerce, commenting to the National Oceanic and Atmospheric Administration on assistance to state agencies; expressing concern that the Service is not doing everything possible to assist state agencies, which may be limiting the involvement of such agencies in important recovery programs; and recommending that the administration (1) examine the existing and potential role of state agencies in recovery programs, (2) develop cooperative agreements with states, (3) determine funding needs to help maintain cooperative programs, and (4) request appropriations for those programs under section 6 of the Endangered Species Act.

29 June — Commerce, amendment of scientific research permit, Sea World of Texas.

29 June — Commerce, scientific research permit, Leszek Karczmarski.

29 June Interior, commenting to the Fish and Wildlife Service on the issuance of a permit for importation of polar bears for public display for Circo Hermanos Suarez; recommending that the Service obtain a written record from the Animal and Plant Health Inspection Service addressing the questions raised in the Commission s letter of 24 April 2001; and requesting an update on the discrepancies in the inventory and CITES documentation, and other issues raised in the previous letter.

29 June Interior, amendment of scientific research permit, U.S. Geological Survey.

29 June Commerce, commenting to the National Marine Fisheries Service on a request for authorization by the North American Natural Gas Pipeline Group to take small numbers of marine mammals by harassment coincidental to a pipeline route survey in the Beaufort Sea; concurring with the Service that the effect on the behavior of certain pinnipeds and cetaceans will be temporary at most; agreeing that the monitoring and mitigation measures proposed are adequate; and recommending that the authorization be issued.

29 June Commerce, commenting to the National Marine Fisheries Service on a draft plan for the John H. Prescott Marine Mammal Rescue Assistance Grant Program; recommending that state and local governments be allowed to apply for support related to pinniped strandings; recommending that the Service allow applications from inexperienced applicants; and further recommending that the Service implement this program jointly with the Fish and Wildlife Service.

9 July Commerce, scientific research permit, Southwest Fisheries Science Center.

9 July Interior, amendment of scientific research permit, U.S. Geological Survey.

9 July Interior, scientific research permit, California Department of Fish and Game.

11 July Ocean Futures Society, commenting on amendments to the reintroduction protocol for the Keiko Project; urging the Society to document rejected as well as approved measures for future reference; urging that health screening of Keiko be continued and the results made available to reviewers; recommending that estimated time frames and definitions of terms be included in the protocol; asking for clarification on issues pertaining to Keiko s interaction with the walk boat; and recommending that visual monitoring be continued for at least three months post-reintroduction.

11 July Commerce, commenting to the National Marine Fisheries Service on a petition to designate critical habitat for North Pacific right whales; recommending that the designation be given and that the Service facilitate research on (1) satellite tagging in the southeastern Bering Sea, (2) genetic analyses of biopsy samples to determine stock structure, (3) surveys to locate, photo-identify, and biopsy individual whales, and (4) analyses of existing photos for ship and fishing gear scars; and further recommending that the Service evaluate potential risks to right whales in fisheries interactions.

13 July Commerce, amendment of scientific research permit, Peter L. Tyack.

13 July Agriculture, commenting to the Deputy Administrator on polar bears imported by Circo Hermanos Suarez; requesting supplemental information on questions raised before the permit issuance and that the Animal Plant and Health Inspection Service (APHIS) review the appropriateness of maintaining polar animals in outdoor tropical environments; recommending that APHIS conduct ongoing, unannounced inspections of the facilities; noting that a more complete inspection before permit issuance may have uncovered some of the deficiencies; and recommending that APHIS develop better procedures for inspections prior to the arrival of imported animals.

16 July Commerce, commenting to the National Marine Fisheries Service on a draft policy on interactions between the public and marine mammals; recommending that the policy be adopted after the Commission s editorial comments (listed separately) are incorporated.

16 July Commerce, commenting to the National Marine Fisheries Service on a request by WesternGeco, LLC, for authorization to take small numbers of marine mammals by harassment coincidental to seismic surveys in

the Beaufort Sea; concurring with the preliminary determination that the effect of the harassment will be temporary at most and therefore recommending that the authorization be issued; questioning whether the cumulative effect of past and future activities in the region are likely to have nonnegligible effects on any affected species; expressing concern that (1) no documentation has been provided estimating future seismic work required in the area, and (2) monitoring as proposed is unlikely to provide a determination on cumulative effects; and recommending that it be ascertained whether the long-term monitoring that would be required to determine cumulative effects does not in itself have negative effects.

23 July — Interior, commenting to the Fish and Wildlife Service on a draft assessment for the reconstruction of the shore protection for Tern Island; concurring that the steps listed in the assessment as needed to minimize wildlife impacts be incorporated, and that replacement of the seawall is necessary; recommending that construction proceed as soon as possible; recommending that the Service work with the Navy and Coast Guard to develop contingency plans in case contaminated sites are discovered during digging; and further recommending that the Service estimate the maximum amount of extra fill material that may be needed and the potential impact from supplying that material.

23 July — Commerce, photography permit, Dan Tapster.

26 July — Interior, amendment of scientific research permit, Florida Fish and Wildlife Commission.

27 July — Commerce, amendment of scientific research permits, National Marine Mammal Laboratory and Alaska Department of Fish and Game.

30 July — Commerce, commenting to the National Marine Fisheries Service on a request for authorization to take small numbers of marine mammals by incidental harassment in conjunction with demolition work at Mugu Lagoon; recommending that the authorization be issued.

31 July — Interior, commenting to the Fish and Wildlife Service on a request for authorization by Aquamarine Fukushima and Ibaraki Prefectural Oarai Aquarium to take sea otters for public display; recommending that the permit be denied until the Marine Mammal Protection Act is amended to accommodate the activities listed in the application; and requesting the Service to provide a detailed rationale addressing this question if the permit is authorized.

31 July — Commerce, commenting to the National Marine Fisheries Service on a draft impact statement for the Bering Sea/Aleutian Islands groundfish fishery; recommending that the statement be modified to include (1) a no-fishery altemative, and (2) a description and analysis of the potential effects of maximum sustainable yield based fishing strategy.

6 August — Interior, commenting to the Fish and Wildlife Service on a recovery plan for Florida manatees; recommending that all references to a maximum count of 3,276 manatees as being sufficient for delisting be removed; recommending that a population study be done to assess trends for different parameters; recommending that demographic benchmarks be set forth for statistical confidence of adult survival rates equal to or greater than 90% and that growth exceed 0% before delisting is considered; recommending that the plan clearly indicate that (1) periodic meetings of the recovery team will continue, (2) an enforcement team will be convened, (3) a manatee population biology workshop will be held and its results published in 2002, and (4) standards will be produced for developing and approving county manatee protection measures; and providing detailed recommendations on the plan by line item.

6 August — Commerce, scientific research permit, Ocean Alliance/Whale Conservation Institute.

6 August — Interior, permit to transfer animals, Harbor Branch Oceanographic Institution.

7 August — Commerce, commenting to the National Marine Fisheries Service on the status of the North Pacific gray whale; recommending that the Service (1) declare a second five-year period of monitoring, (2) review all data on the unusual observations of 1999 and 2000, make a formal statement as to whether these events are finished, and complete a response plan in case these events are not over, (3) analyze the cumulative effects

	of decreased reproduction and all mortality factors for 1999 and 2000 and report the findings to the International Whaling Commission, and (4) review current and future research to ensure that it provides data needed to understand the species status and facilitate its recovery.
13 August	Interior, scientific research permit, Monterey Bay Aquarium.
17 August	Interior, scientific research permit, Terrie M. Williams.
20 August	Interior, scientific research permit, Fish and Wildlife Service.
20 August	Interior, scientific research permit, U.S. Geological Survey.
20 August	Commerce, appear regarding scientific research permit, Whale Center of New England.
22 August	Commerce, commenting to the National Marine Fisheries Service on a request for renewal of authorization for the California Department of Transportation to take small numbers of marine mammals by incidental harassment in conjunction with the seismic retrofit of Richmond San Rafael Bridge; recommending that the authorization be issued.
24 August	Commerce, amendment of scientific research permit, Jim Hain.
27 August	Commerce, scientific research permit, National Marine Mammal Laboratory.
31 August	Commerce, scientific research permit, Robert B. Griffin.
31 August	Commerce, scientific research permit, Mystic Aquarium.
31 August	Commerce, scientific research permit, Southeast Fisheries Science Center.
31 August	Commerce, scientific research permit, John Wise.
5 September	Commerce, scientific research permit, Aleutians East Borough.
5 September	Commerce, scientific research permit, Southwest Fisheries Science Center.
24 September	Commerce, scientific research permit, Jennifer Burns.
4 October	Interior, commenting to the Fish and Wildlife Service on the public display of polar bears by Circo Hermanos Suarez; expressing concern over the maintenance, treatment, and medical attention the animals are receiving; recommending that the Service and the Animal and Plant Health Inspection Service (APHIS) immediately inspect the facilities and the conditions under which the animals are being kept to ascertain whether all applicable regulations are being complied with; recommending that the Service and APHIS take prompt action to revoke the permit and seize the animals if so warranted; and again recommending that both agencies review the appropriateness of maintaining polar animals outdoors in a tropical environment.
4 October	Agriculture, commenting to the Animal and Plant Health Inspection Service on the public display of polar bears by Circo Hermanos Suarez; recommending that the Service install tamperproof thermometers to record temperatures on an ongoing basis; recommending immediate review of all pertinent information on the health and veterinary care of the animals; recommending that the Service and the Fish and Wildlife Service take prompt action to revoke the permit and seize the animals if so warranted; recommending that the Service avoid similar situations by requiring its inspectors to make a more concerted effort to ensure compliance at the outset; and again recommending that both agencies review the appropriateness of maintaining polar animals outdoors in a tropical environment.
9 October	Commerce, amendment of scientific permit, Waikiki Aquarium.

19 October Commerce, commenting to the National Marine Fisheries Service on a draft statement on Steller sea lions in the groundfish fisheries off Alaska; recommending that the draft be revised to include an analysis of the long-term reduction in prey biomass resulting from the single-species, maximum sustainable yield based strategy; again recommending that a no-fishing alternative be included; recommending that the draft include a basis for the implied level of understanding or more accurately reflect the level of uncertainty of the expected effects of the measures under consideration; recommending that the draft be revised to include information on the nature of studies being conducted to investigate possible effects; and further recommending that the Service review its interpretation of the satellite telemetry data and corresponding protective measures.

22 October Commerce, commenting to the National Marine Fisheries Service on a request for authorization by BP Exploration to take small numbers of marine mammals by incidental harassment in conjunction with oil production operations; and recommending that the authorization be issued.

24 October Commerce, scientific research permit, James Harvey.

31 October Commerce, commenting to the National Marine Fisheries Service on proposed rules to reduce the entanglement of North Atlantic right whales; recommending that the Service modify the lobster take reduction technology list, change the proposed gear modification for offshore traps to reduce breaking strength, assess the effectiveness of weak links and knotless lines, require gear set owners to remove gear within a time set by the Service, define boundaries to include capture radius, and implement rules for seasonal area management north of Georges Bank; and listing individual line recommendations separately.

26 November Interior, review of sea otter mortality, scientific research permit, James Bodkin.

26 November Interior, scientific research permit, Peter L. Tyack.

26 November Commerce, scientific research permit, Scott D. Kraus.

13 December Commerce, scientific research permit, James Gilbert.

13 December Commerce, scientific research permit, LGL Limited, Environmental Research Associates.

13 December Commerce, scientific research permit, Patricia Mascarelli.

13 December Commerce, scientific research permit, Luciana Moller.

13 December Commerce, commenting to the National Marine Fisheries Service on proposed rules to amend the Atlantic Large Whale Take Reduction Plan; recommending that surveys of right whales in the area be continued with a view toward modifying the area s boundaries and seasonal restrictions; recommending that all gillnet and lobster fishing within the proposed area be prohibited until fishing gear proven to be unlikely to injure or kill right whales is developed and that the Service provide an estimate of the actual amount of gear that would be displaced under both the proposed rule and a complete closure; and further recommending that the Service propose a schedule for phasing in requirements for sinking or neutrally buoyant ground lines and single buoys.

18 December Commerce, scientific research permit, Doyle Hanan.

18 December Commerce, amendment to scientific research permit, National Marine Mammal Laboratory.

19 December Commerce, reauthorization of scientific research permit, Marsha Green.

31 December Interior, commenting to the Fish and Wildlife Service on the status of the northern sea otter; recommending that the Service redefine the northern sea otter stock structure to include division into three separate stocks; recommending that the Service budget for listing and list the southwestern stock under the Endangered Species Act; further recommending that the Service begin developing and implementing a

research and management plan for this stock; and finally, recommending that the Service review its current research plans and make the appropriate adjustments to ensure that issues of highest priority are given precedence.

31 December Commerce, commenting to the National Marine Fisheries Service on the status of ice seals; recommending that the Service develop, fund, and implement a strategy for obtaining baseline information on the status of ice seals and that the Service begin developing co-management teams for the various species.

31 December Commerce, commenting to the National Marine Fisheries Service on the status of harbor seals; recommending that the Service redefine harbor seal stock structure in Alaska to provide an appropriate basis for management and recovery activities; recommending that the different stocks undergo a status review to provide a basis for further research and management; and urging the Service to work closely with the Alaska Department of Fish and Game, the Alaska Native Harbor Seal Commission, and others to ensure continuity of research and continue sampling programs.

APPENDIX B

REPORTS OF COMMISSION-SPONSORED ACTIVITIES AVAILABLE FROM THE MARINE MAMMAL COMMISSION[1] OR THE NATIONAL TECHNICAL INFORMATION SERVICE (NTIS)[2]

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)

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APPENDIX C

SELECTED LITERATURE PUBLISHED ELSEWHERE RESULTING FROM COMMISSION-SPONSORED ACTIVITIES

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APPENDIX D

STATEMENT OF THE MARINE MAMMAL COMMISSION

Statement of John E. Reynolds, III, Ph.D.
Chairman, Marine Mammal Commission
Submitted to the House Committee on Resources,
Subcommittee on Fisheries Conservation, Wildlife, and Oceans
11 October 2001

Thank you for providing the Marine Mammal Commission with the opportunity to advise the Committee on actions that have been taken to implement the 1994 amendments to the Marine Mammal Protection Act, problems that have arisen concerning implementation, and possible amendments. The Commission submitted a comprehensive statement concerning these subjects to the Committee on 29 June 1999 and provided additional testimony at a 6 April 2000 hearing that reviewed progress being made to implement the regime governing the taking of marine mammals incidental to commercial fishing operations. Rather than revisiting these matters, the Commission asks that its previous statements, which are appended, be made a part of the record of this hearing. This will enable us to provide an update, focusing on more recent developments, those places where action is still needed, and proposed amendments.

Since the earlier hearings, the Commission has worked extensively with other agencies and with representatives of Alaska Native organizations to identify all of the areas where the Act needs to be strengthened or clarified and to fashion a comprehensive legislative proposal to address those concerns. During the previous session of Congress, the Secretaries of Commerce and the Interior transmitted a proposed bill to this Committee and its Senate counterpart for their consideration. Over the course of the past few months, the National Marine Fisheries Service and the Fish and Wildlife Service, along with the Commission, have been reworking the bill and, pending review within the Administration, expect to be able to provide a revised proposal to Congress shortly. Of course, the Department of Justice will be involved in the development of any such proposal to ensure that it meets Constitutional scrutiny under the Commerce and other clauses.

Taking Incidental to Commercial Fisheries, Sections 117 and 118

As of the 6 April 2000 hearing on implementation of the incidental take regime for commercial fisheries, the National Marine Fisheries Service had established five take reduction teams to help develop plans to reduce the mortality and serious injury of strategic marine mammal stocks to below the stock's potential biological removal level, and eventually to a level approaching a zero rate. As noted in our earlier testimony, the Atlantic Offshore Cetacean Take Reduction Team was disbanded after the Service closed the swordfish gillnet fishery and portions of other fisheries that were to be the focus of the plan. At that time, the Service indicated that it intended to reconstitute the team to address remaining issues. The team, however, has yet to be reconvened and the Service's plans in this regard remain uncertain.

Recently, the Service has initiated the process of establishing a bottlenose dolphin take reduction team to address the incidental taking of this species in a variety of fisheries along the Atlantic coast. Several general meetings were held to provide background information to potential team members, and a team, which includes the Commission's chairman and a Commission staff member, has now been selected. The first meeting of the team, originally scheduled for 12-13 September 2001, is expected to occur in the near future. Preparation of a take reduction plan for bottlenose dolphins sufficient to meet the mandates of the Act will be particularly challenging because of uncertainties concerning the stock structure of the species and incomplete information on the numbers of dolphins being killed or seriously injured incidental to fishing operations and on the locations and circumstances surrounding those takings. In this regard, the Commission encourages the Service to complete the analyses that will enable it to make better use of existing data and expand its observer programs for the suspected fisheries to obtain this essential information and to monitor the effectiveness of the take reduction measures that are eventually adopted.

Since the April 2000 hearing, it has become apparent that efforts to reduce the incidental mortality and serious injury of Gulf of Maine harbor porpoises have proven successful, and it is now believed that the level of such taking is below the stock's potential biological removal level. Although some of this reduction can be attributed to measures adopted under the take reduction plan, a large part

appears to be due to measures taken under the Magnuson-Stevens Fishery Conservation and Management Act to reduce fishing effort. While the statutory and regulatory basis for the actions leading to the reductions may not matter, it should be recognized that fishery management plans are subject to different procedural and substantive standards and that the measures taken to reduce fishing effort could change in the future, possibly affecting the incidental take of harbor porpoises. This being the case, the Commission has recommended that the take reduction plan and its implementing regulations be amended to consolidate the take reduction gains under the Marine Mammal Protection Act authority.

As the Committee is well aware, the process for convening take reduction teams, translating the team's recommendations into a final plan, and promulgating implementing regulations has not always gone smoothly. To help address these problems, the responsible agencies are reviewing the take reduction team process. Among the possible refinements currently under consideration are directing the Service to appoint an individual with commercial fishing expertise to serve as a technical liaison to each take reduction team and requiring the Service, once it has formulated proposed implementing regulations, to reconvene or otherwise consult with the involved take reduction team to explain and solicit advice concerning any deviations from the draft take reduction plan submitted by the team.

The Commission also believes that review of other aspects of section 118 may be warranted. As the Commission has advocated in the past, we think that this provision may need to specify that a take reduction plan need not be prepared for those strategic stocks for which mortality or serious injury related to fisheries is inconsequential. We also believe that consideration should be given to an amendment to clarify that it constitutes a violation of the Act to participate in any category I or category II fishery without having registered as required by section 118, regardless of whether incidental takes occur. Other possible changes that would strengthen this provision also need to be reviewed. Among the proposals meriting consideration are to specify that all participants in category I or category II fisheries, whether registered or not, are subject to the observer requirements of section 118 and that fishery-related mortalities and injuries of California sea otters should be factored into determinations with respect to listing fisheries and placing observers under section 118.

Another problem that has been identified is that coverage of the section 118 incidental take regime is limited to commercial fisheries. However, in some cases, recreational and other non-commercial fishermen are using identical or similar gear and fish for the same species in the same areas. Although these fisheries presumably present incidental take problems similar to their commercial counterparts, they are not included within the coverage of the Act's incidental taking authorization and have no responsibility to register, carry observers, report marine mammal injuries and mortalities, or comply with the terms of take reduction plans. The responsible agencies are currently reviewing this issue.

The Commission's June 1999 testimony noted that available funding has not always been sufficient to place observers within all fisheries that need to be monitored or to place them at levels needed to provide statistically reliable results. We again call this issue to the Committee's attention, requesting that it explore possible solutions. One possible solution would be to require a contribution from the involved fisheries to help support a more comprehensive monitoring program.

As a housekeeping measure, we recommend that section 114 of the Act, which established the pre-existing, interim exemption for commercial fisheries, be struck, along with references to that section in other statutory provisions. Similarly, section 120(j), pertaining to the Gulf of Maine harbor porpoise, is no longer operative and should be deleted.

The Commission would also like to take this opportunity to update the Committee on the outstanding issues preventing full implementation of section 118. Section 118(b) mandates that commercial fisheries reduce the incidental mortality and serious injury of marine mammals to insignificant levels approaching a zero mortality and serious injury rate within seven years of enactment of the 1994 amendments – that is, by 30 April 2001. Further, the National Marine Fisheries Service was to review the progress toward meeting that goal on a fishery-by-fishery basis and submit a report of its findings to Congress by the end of April 1998. Although considerable work was done on the report, it has yet to be completed and transmitted to Congress.

In hindsight, the zero mortality and serious injury rate goal appears to have been overly ambitious. While this goal likely has been achieved for some fisheries, it remains a considerable challenge to bring mortality and serious injuries down to such a level across the board. Although the existing statutory deadlines have passed, the Commission believes that a comprehensive progress report on where we stand with respect to meeting the goal, as originally envisioned by Congress in the 1994 amendments, continues to be a worthwhile undertaking and should be pursued under a revised schedule. Likewise, we encourage the Committee to adopt a revised schedule for meeting the zero mortality and serious injury rate goal and provide sufficient resources to enable the agencies and fishermen to adhere to that schedule.

One of the problems that has been encountered with respect to determining if the zero mortality and serious injury rate goal has been met is the lack of clear guidance as to how it should be quantified. We encourage the Committee, in consultation with the responsible agencies and other interested parties, to provide such guidance during the reauthorization process. In this regard, the Commission has endorsed a two-tiered approach that equates the goal with reducing mortalities and serious injuries to some biologically

insignificant level (e.g., 10 percent of a stock's potential biological removal level) for most stocks, but that also establishes a numerical cap to ensure that the taking of large numbers of marine mammals from abundant stocks would not be deemed as meeting the goal.

Another related issue that has yet to be fully resolved is the delineation of when an injury to a marine mammal is to be considered serious. Under section 118, fishermen are required to report all injuries, but only mortalities and serious injuries are to be considered when classifying fisheries and developing take reduction plans and in determining if the zero mortality rate goal has been achieved. Although the National Marine Fisheries Service, in its implementing regulations, has defined "serious injury" as any injury that will likely result in mortality, it is not always apparent at the time a marine mammal is released from fishing gear whether its injuries are life-threatening. To address this issue, the Service held a workshop in 1997 to establish more definitive criteria for differentiating between serious and non-serious injuries. It was expected that the workshop would enable the Service to publish clear guidelines for determining when injuries are to be considered serious. However, such guidelines, which the Commission still believes would be useful, have yet to be issued.

Taking of Endangered and Threatened Species Incidental to Commercial Fisheries, Section 101(a)(5)(E)

Section 101(a)(5)(E) directs the National Marine Fisheries Service to authorize the incidental taking of marine mammals listed as endangered or threatened if it determines that 1) the incidental mortality and serious injury from commercial fisheries will have a negligible impact on the species or stocks; 2) a recovery plan has been, or is being, developed for the species or stock under the Endangered Species Act; and 3) where required under section 118, a monitoring program has been established, the vessels are registered, and a take reduction plan has been, or is being, developed. The Service is to publish a list of the fisheries to which the authorization applies and, for vessels required to register under section 118, issue appropriate permits. Vessels participating in fisheries included on the list, but which are not required to register, are covered by the authorization, provided that they report any incidental mortality or serious injury.

The most recent authorizations under this provision were published by the Service in October 2000. They authorize the incidental taking of fin, humpback, and sperm whales and Steller sea lions in the California/Oregon drift gillnet fishery for thresher shark and swordfish.

Pinniped-Fisheries Interactions, Section 120

Section 120, added by the 1994 amendments, called on the Secretary of Commerce to study pinniped-fishery interactions and provided a mechanism for authorizing the lethal removal of individual pinnipeds that are adversely affecting certain salmonid stocks without obtaining a waiver of the Act's moratorium on taking. As discussed in the Commission's previous testimony before this Committee, the National Marine Fisheries Service provided a report to Congress in 1997 on the findings of a task force established to examine interaction problems between pinnipeds and aquaculture operations in the Gulf of Maine. In 1999, a report on the impacts of California sea lions and Pacific harbor seals on salmonid stocks and West Coast ecosystems was also provided to Congress. The Commission expects that this Congress will consider those reports as it fashions a reauthorization bill. We welcome the opportunity to work with the Committee on specific proposals if it determines that amendments to address these issues are needed.

Non-Lethal Deterrence of Marine Mammals, Section 101(a)(4)

Section 101(a)(4), as amended in 1994, authorizes fishermen to use non-lethal means to deter a marine mammal from damaging their gear or catch. This provision also authorizes owners of private property or their agents to use non-lethal means to deter marine mammals from damaging that property and government employees to deter marine mammals from damaging public property. Non-lethal deterrence of marine mammals to prevent endangerment of personal safety also is authorized under this provision. In each case, however, the deterrence measures used must not result in the death or serious injury of a marine mammal.

To implement this provision, the Secretaries of Commerce and the Interior, in consultation with appropriate experts, were required to publish guidelines setting forth the measures that may be taken to deter marine mammals safely and to prohibit, by regulation, any form of deterrence that is determined to have a significant adverse effect on marine mammals. For species listed as threatened or endangered under the Endangered Species Act, the Secretaries were to specify non-lethal deterrence measures that may be used.

The National Marine Fisheries Service issued proposed deterrence regulations in 1995, but has yet to publish final regulations. No measures for safely deterring endangered and threatened marine mammals have been proposed. In this regard, it should be noted that, even if the Service were to identify measures for safely deterring endangered and threatened species under the Marine Mammal Protection Act, employing such measures likely would constitute a violation of the Endangered Species Act, which contains no similar provision authorizing intentional taking. The Fish and Wildlife Service has yet to take any action to implement the deterrence provision.

Permits for Public Display, Scientific Research, and Other Purposes, Section 104

The 1994 amendments included changes to most of the Act's permit provisions and added authority for the issuance of permits for commercial and educational photography and the importation of polar bear trophies from Canada. Some, but not all, of the actions needed to implement these provisions have been taken by the regulatory agencies.

The National Marine Fisheries Service, some time ago, revised its regulations concerning general permitting issues and scientific research permits. Also, as required by the 1994 amendments, the Service published an interim final rule in 1994 implementing the general authorization for scientific research involving only Level B harassment. We understand that the Service intends to replace the interim regulations with a permanent rule, but it has yet to do so. Recently, the Service published proposed revisions to its public display regulations to reflect the 1994 amendments. Those regulations are currently open for public comment. We have been advised that the Service also intends to issue specific regulations concerning permits for educational and commercial photography to supplement its existing general regulations.

The Fish and Wildlife Service has concentrated its efforts on implementing the 1994 amendment concerning the importation of polar bear trophies legally taken in Canada's sport hunts. Regulations authorizing imports from 5 of Canada's 12 management units were published in 1997. Affirmative findings with respect to two additional management units were published in 1999. A recent survey of the M'Clintock Channel polar bear population, one of the originally approved management units, indicated that it was less abundant than originally believed and that the population was heavily skewed toward females, suggesting that the number of males had been reduced by hunting. This prompted the Service, on 10 January 2001, to publish an emergency interim rule rescinding the previous finding for this population.

The 1994 amendments directed the Fish and Wildlife Service to undertake a scientific review of the impact of issuing import permits on the polar bear populations in Canada. No further import permits could be issued if the review indicated that allowing polar bears to be imported into the United States is having a significant adverse effect on Canadian polar bear stocks. The review originally was to have been completed by 30 April 1996. Inasmuch as regulations authorizing any imports had yet to be finalized by that date, however, the Service indicated in its 1997 final rule that it would delay the review for two years. We understand that the Service has been working on this review but, as of yet, it has not been completed.

The Fish and Wildlife Service has yet to amend its permit regulations to reflect any of the 1994 amendments to section 104. As such, implementation of these provisions has largely been on an ad hoc basis. Among other things, the Service needs to promulgate regulations governing the general authorization for scientific research created under the 1994 amendments as specifically required by section 104(c)(3)(C) of the Act.

The Commission believes that several amendments related to the Act's permit provisions are warranted. First, we think that sections 101(a) and 104 should be amended to clarify that permits can be issued to authorize the export, as well as the taking and importation, of marine mammals.

The Commission notes that little purpose seems to be served by the publication and comment requirements of section 104 as they pertain to permits for the importation of polar bear trophies from Canada. The crucial question is whether to approve a population for import, a determination that would remain subject to public notice and comment. At the permitting stage, however, the only question is whether the bear to be imported was taken legally from an approved population. More than 400 polar bear trophy import permits that have been issued since 1997, and the Fish and Wildlife Service has received no substantive comments on any of them. Considerable costs could be avoided by eliminating the publication requirement for this class of permits. Nevertheless, it is important that the public continue to have access to information on the numbers of permits issued and on the ages, sexes, and taking locations of the bears authorized to be imported.

As detailed in prior Commission testimony, the return of captive marine mammals to the wild has the potential to pose significant risks to the animals unless it is well planned, the animals are thoroughly prepared, and there is adequate post-release monitoring. Moreover, the released animals may present a risk to humans they encounter and to wild marine mammal populations. The Commission continues to believe that this is an issue that merits review.

Also as previously discussed by the Commission, traveling marine mammal exhibits, by their very nature, present special problems for successful maintenance of the animals. We believe that, at least with respect to cetaceans, the risks to the animals in mobile or transient facilities are unacceptably high and that such displays should not be allowed. This view is shared by the National Marine Fisheries Service, which, until nullified by the shift in agency responsibilities under the 1994 amendments, had in place a policy not to authorize traveling cetacean exhibits. Such matters now are solely within the jurisdiction of the Animal and Plant Health Inspection Service, which has taken the position that it does not have authority under the Animal Welfare Act to prohibit such exhibits. While we disagree with this interpretation, and believe that this issue could be addressed by regulation, given the agency's view of its authority, we believe that a statutory clarification may be necessary.

More recently, serious questions have arisen concerning the level of care being provided to polar bears in a traveling exhibit currently touring Puerto Rico. The types of problems that have been encountered (e.g., maintaining temperatures within acceptable levels) seem to be related, at least in part, to the transitory nature of the display. This being the case, the Committee, as it considers this issue, might want to consider a ban on traveling exhibits that includes taxa other than cetaceans. We note, however, that polar bears, in general, are hardier than cetaceans and that the problems associated with the polar bear exhibit might be more a function of the individual facility and the fact that a polar species is being housed outdoors in a tropical climate. With respect to this last point, the Commission has recommended that the Animal and Plant Health Inspection Service, in consultation with independent experts, review the appropriateness of allowing polar species to be maintained in outdoor tropical environments and, as warranted based on the results of that review, revise its care and maintenance standards accordingly. The Service has replied that such an evaluation would be worthwhile, but concluded that it is beyond the scope of its authority under the Animal Welfare Act to prohibit such a practice. Again, the Commission disagrees with the Service's conclusions concerning the breadth of the actions that can be taken under the Animal Welfare Act. In this regard, we note that, under the 1994 amendments to the Marine Mammal Protection Act, the Animal Welfare Act is left as the sole federal authority available to ensure the well-being and humane maintenance of captive marine mammals. While we are not advocating a return to the shared jurisdiction over captive marine mammals that existed prior to 1994, we recommend that the Committee review the scope of the Animal Welfare Act as it pertains to marine mammals and provide additional guidance, as appropriate, either through amendment or in report language.

Prohibitions – Exports of Marine Mammals, Section 102(a)(4)

The package of permit-related amendments enacted in 1994 also amended section 102(a)(4) of the Act to add a prohibition against exporting any marine mammal or marine mammal product taken in violation of the Act or for any purpose other than public display, scientific research, or species enhancement. The language of this provision is problematic in two ways. As noted in our 1999 testimony, the amendment resurrected an enforcement problem that previously had been fixed in 1981 by reinstating the requirement that, to bring an action for the otherwise illegal transport, purchase, sale, or export of a marine mammal product, the government must show that the underlying taking was also in violation of the Act. As noted in the legislative report accompanying the 1981 amendment, this confounds enforcement actions by enabling marine mammals originally taken for legitimate purposes (e.g., Native subsistence) to be diverted to other ends. The Commission continues to believe that this is an issue warranting review.

The second problem noted in our earlier testimony is that the language of the 1994 amendment restricts exports to those made for purposes of public display, scientific research, or species enhancement. Exports for other purposes (e.g., for cultural exchanges, associated with personal foreign travel, or pursuant to a waiver of the Act's moratorium on taking and importing marine mammals) technically are not permissible. There also exists some question as to whether the export prohibition applies to handicrafts made and sold by Alaska Natives pursuant to section 101(b) of the Act. The Commission, along with the Fish and Wildlife Service and the National Marine Fisheries Service, has conducted a comprehensive review of the Act to help ensure that exports and other transactions involving marine mammals can continue to occur as Congress apparently intended prior to 1994. The Commission intends to pursue this issue as the Administration considers reauthorization proposals.

Imports Associated with Personal Travel and Cultural Exchanges, Section 101(a)(6)

In addition to highlighting the problems associated with exporting items allowed to be imported or exchanged under section 101(a)(6), the Commission's previous testimony recommended that the National Marine Fisheries Service and the Fish and Wildlife Service explore the appropriateness of developing a registration and tracking program to monitor compliance with this provision and consider whether the benefits of such a program would outweigh the costs. To date, neither agency has responded to this recommendation, and we are unaware of any analysis that has been done to assess the merit of such a program. Other than an amendment to overcome the export problem noted above, no changes are needed to this section.

Definitions, Section 3

The Commission's 1999 testimony noted that the definition of "harassment" added to section 3 in 1994 had created some practical difficulties related to interpretation and enforcement. We anticipate that any reauthorization bill forthcoming from the Administration will address this issue.

Small-Take Provisions, Section 101(a)(5)

The 1994 amendments added a new provision to section 101(a)(5) allowing the National Marine Fisheries Service and the Fish and Wildlife Service to use streamlined procedures (notice and comment) to authorize the taking of small numbers of marine mammals by harassment incidental

to otherwise lawful activities when such taking will have negligible impacts on marine mammal populations. Prior to enactment of those amendments, such taking could only be authorized by regulation. As noted in our 1999 testimony, the National Marine Fisheries Service has revised its small-take regulations to reflect the new provisions. However, the Fish and Wildlife Service has yet to update its regulations.

The Commission, in its 1999 testimony, noted one possible problem with the new authority. Incidental harassment authorizations are limited to one-year periods. As such, some applicants are segmenting long-term projects into one-year intervals and seeking a separate authorization for each such period. By doing so, it becomes difficult for the reviewing agencies to assess possible long-term and cumulative impacts that could have more than negligible impacts on marine mammal populations. The Commission reiterates its recommendation that Congress consider ways to address this problem, for example, by lengthening the period for which such authorizations may be issued.

Polar Bear Agreements, Section 113

Amendments to section 113 enacted in 1994 called on the Secretary of the Interior to undertake two reviews with respect to the Agreement on the Conservation of Polar Bears. Section 113(b) required the Secretary, in consultation with the other four parties to the agreement, to review the effectiveness of the agreement and to establish a process for conducting future reviews. Although all parties have been consulted, preparation of a final report is awaiting an official response from one of the parties.

The Secretary, in consultation with the Secretary of State and the Marine Mammal Commission, was also directed to undertake a review of domestic implementation of the polar bear agreement, with special attention to be given to the agreement's habitat protection mandates. A report on the results of that review was to be submitted to Congress by 1 April 1995. Although the Fish and Wildlife Service convened a workshop in 1995 to review U.S. implementation of the agreement and circulated a draft report in 1996,the report it has yet to be finalized and transmitted to Congress.

The 1994 amendments also called on the Secretary of the Interior, acting through the Secretary of State and in consultation with the Marine Mammal Commission and the State of Alaska, to consult with appropriate Russian officials in an effort to develop and implement enhanced cooperative research and management programs for conserving the shared population of polar bears. A report on the consultations and periodic progress reports on research and management actions taken under this provision are to be provided to Congress. Pursuant to this directive, the United States has negotiated a bilateral agreement with the Russian Federation, which was signed by the two parties last October. The advice and consent of the Senate is needed before the agreement enters into force. It is expected that the ratification documents, along with proposed implementing legislation, will be transmitted to Congress shortly.

Co-Management Agreements, Section 119

Both the Fish and Wildlife Service and the National Marine Fisheries Service have entered into cooperative agreements with various Alaska Native organizations to promote the conservation and co-management of marine mammal stocks taken for subsistence. Since 1997, the Fish and Wildlife Service has entered into annual agreements with the Eskimo Walrus Commission, the Alaska Sea Otter and Steller Sea Lion Commission (for sea otters), and the Nanuuq Commission (for polar bears). The National Marine Fisheries Service has concluded agreements with the Alaska Native Harbor Seal Commission and with the Alaska Beluga Whale Commission. In addition, the Service has entered into a co-management agreement with the Cook Inlet Marine Mammal Council to authorize the limited taking of beluga whales from this depleted stock, which otherwise is prohibited by section 627 of Public Law 106-553, enacted last December. This year, the strike of a single Cook Inlet beluga whale was allocated to the Native Village of Tyonek, which successfully harvested the whale in July. The National Marine Fisheries Service is also working to conclude a cooperative agreement with the Alaska Sea Otter and Steller Sea Lion Commission for Steller sea lions and with tribal governments in the Pribilof Islands for fur seals and Steller sea lions.

Despite the success of the Services and Alaska Native groups in concluding agreements and carrying out actions of mutual interest under them, both the government agencies and the Native groups recognize that much more could be accomplished in appropriate instances if the Act provided a mechanism to make co-management agreements enforceable among and between the parties. For example, the overharvesting of the Cook Inlet beluga whales by a few hunters during the late 1990s, which reduced the population by half in only four years and which led to the stock's designation as depleted, likely could have been avoided had there been such an authority in the Act at that time.

At the April 2000 hearing of this Committee, the former chairman urged the responsible government agencies to work with the affected Native groups to develop a proposal for such legislation. Pursuant to that charge, the Fish and Wildlife Service, the National Marine Fisheries Service, and the Marine Mammal Commission held a two-day session with representatives of the Indigenous People's Council for Marine Mammals (IPCoMM). Over the course of subsequent weeks, a preliminary consensus concerning the details of the joint proposal was reached among the negotiating parties. The agreement was carefully crafted to achieve the joint

goals of marine mammal conservation and protection of Native subsistence practices. We will consider this agreement in our review of the Administration bill.

Authorization of Appropriations

The Marine Mammal Protection Act contains several authorization provisions, including those for general appropriations under sections 116 and 207 pertaining to the activities of the Department of Commerce, the Department of the Interior, and the Marine Mammal Commission under the Act. The Commission recommends that appropriations be reauthorized for a five-year period. Also coverage could include section 405 to authorize the Secretary of Commerce to allocate appropriated funds toward responses to unusual mortality events. Currently, only donations and specifically earmarked monies can be placed in the response fund.

Other Issues Meriting Attention

As the Commission noted in 1999, several provisions of the Act setting monetary limits have not been updated to reflect economic changes since they were enacted in 1972. These include the Act's penalty provisions, which establish upper limits on fines that are quite low as compared with other natural resources statutes. We recommend that the provisions of sections 105 and 106 be reviewed and that increases to the available penalties be considered. We also recommend that Congress review section 206(4), which places a limit of $100 per day on the amount the Commission can expend in procuring the services of outside experts and consultants, and consider ways to place the Commission on an equal footing with other agencies when seeking such services.

The Commission supports the freestanding provision enacted in 1999 and codified as part of the Marine Mammal Protection Act (16 U.S.C. § 1375a) that allows fines collected by the Fish and Wildlife Service for violations of the Act to be used for activities directed at the protection and recovery of manatees, polar bears, sea otters, and walruses. We believe that similar authority for the National Marine Fisheries Service, enabling it to use penalties collected under the Marine Mammal Protection Act for the conservation of species under its jurisdiction, would likewise benefit the agency's ability to carry out its mandates under the Act .

The Commission also believes that the Committee should consider ways for improving compliance with, and enforcement of, the Act. Such proposals might usefully include adding a prohibition against interfering with enforcement investigations, increasing penalties for violations that harm or threaten enforcement officials, and allowing seizure and forfeiture of a vessel's cargo for fishing in violation of the requirements of section 118.

Another provision that merits overhauling by the Committee is section 110, which identifies specific research projects to be carried out by the regulatory agencies. The time frames for completing the existing activities set forth in this section have elapsed. As such, those provisions that are no longer operative should be deleted. In their place, the Committee should consider a more generic directive to the agencies, enabling the agencies to pursue pressing, broad-scale projects. Among the studies that might be worthwhile are an investigation of ecosystem-wide shifts in the Bering and Chukchi Seas and an examination of possible changes in the coastal California marine ecosystem that may be contributing to the recent declines in the California sea otter population.